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The Spread Area of Malaria Vector in Timor Island, East Nusa Tenggara Province

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ABSTRACT

The existence of the breeding habitat of *Anopheles spp.* is an indicator that malaria transmission can occur in these locations. Vector-borne disease transmission areas consist of several factors such as zoogeography, altitude, geography, geology and total area. East Nusa Tenggara Province is an archipelago consisting of three large islands; Flores, Sumba and Timor. Timor Island is surrounded by a row of hills and consists of steep slopes. Plains are generally found in the coastal areas and estuaries. Timor Island also has regional savannah and steppes. The purpose of this study was to map the anopheles adult fauna and the larva breeding habitats in various topography of the Timor Island. The method used in this study was observational, with the technique of a cross-sectional survey research. The most commonly documented breeding habit of *Anopheles spp.* on Timor Island was rice fields and rivers. The malaria vector found was *An. barbirostris*. It is necessary to become aware of the spread area of malaria in relation to the pattern of cropping and irrigation patterns, and to increase the early warning system.

Keywords: Vectors, malaria, *Anopheles spp.*, breeding places.

INTRODUCTION

Indonesia with its large and diverse geographic has more than 30 *Anopheles* species and in approximately 25% of the population residing in malaria endemic areas.¹ The existence of a breeding habitat of *Anopheles spp.* is an indicator that the transmission of the disease can occur in the location. However, regarding the flying ability of the mosquito which is a maximum of two kilometres, the location of the breeding habitat will significantly determine the occurrence of *Anopheles spp.* within the same location. The density of certain *Anopheles spp.* is an indicator that the species has the opportunity to become a vector. This is an important factor because it can determine the frequency of malaria cases as well as the intensity of malaria transmission.²

According to the Indonesian Ministry of Health, the location of vector-borne diseases is determined by the topography and the existence of vectors that can adapt to the environment and local people's lifestyle.³ A study also states that effective malaria control and elimination efforts need sufficient understanding on bionomic traits of each vector species with the geographical area.⁴ Indonesia and Papua New Guinea (PNG) Based on the location of the vector-borne disease transmission possibility, it is necessary to pay attention to several aspects, namely zoogeographic division, altitude, geographical location, geological composition and area.⁵

East Nusa Tenggara Province is an archipelago consisting of three major islands; Flores, Sumba and Timor. Timor Island and the surrounding small islands are generally hilly, many of which consist of steep slopes.⁶ Plains are generally only found in the areas near the coast and river mouths. On the island of Timor, there are also vast areas of savannah and steppe.

The purpose of this study was to map the fauna of *Anopheles spp.* adults and larvae from various breeding

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habitats according to the topography of Timor Island, where the selection of regions was based on the number of malaria cases found.

MATERIALS AND METHOD

The method was an observational design with a cross-sectional approach. The sample location was chosen by considering the condition of Timor Island, which had limited or no information available about the malaria vectors of *Anopheles spp.* The study was conducted in Kupang and Timor Tengah Utara (TTU). In Kupang, the study took place in the rice field areas, while in TTU the study was conducted in hilly areas. The data was collected over nine months from March to November 2013, where for each location, the samples were taken three times. The variables were the species and the behavior of the vectors, potential breeding habitats of *Anopheles spp.*, and the physical environment. The data analysis was carried out by studying the data phenomenon examined from the results of the measurements, examinations, observations and mapping. The researchers also carried out an identification of the present *Anopheles spp.* species, calculating density, ovarian dissection, vector status checking, mapping breeding habitat locations and *Anopheles spp.* Species present, as well as determining the results of an ELISA test.

RESULTS

- 1. *Anopheles spp.* on Timor Island:** There are eight *Anopheles* species that have been caught on Timor Island, namely *An. macullatus*, *An. barbirostris*, *An. vagus*, *An. anullaris*, *An. tessellatus*, *An. flavirostris*, *An. indefenitus* and *An. aconitus*. In Susulaku B Village and Popnam Village (hilly areas), the researcher found all eight *Anopheles spp.* species. Meanwhile, in Tebatan Village (rice field area), there was no evidence of *An. Aconitus* while in Tuapanaf Village, there was no *An. tesselatus*.
- 2. Bloodsucking activity of *Anopheles spp.*:** The total number of *Anopheles spp.* caught in the study came was 1,448. The most common species caught across the five study locations was *An. vagus* (n=706) while the least caught was *An. tesselatus* (n=7). The highest number of mosquitoes was found in Tesbatan 2 Village (n=342) while the least was in Popnam Village (n=172). In Tesbatan 2, *Anopheles spp.* started biting from the beginning of the night until the morning. The peak of the biting was 7 p.m. to 9 p.m. and in the early morning, from 2 a.m. to 5 a.m. In Tupanaf, the peak started from 11 p.m. through until 4 a.m. Species domination in Kupang (rice field area) was *An. Vagus* (Table 1).

Table 1: The number of *Anopheles spp.* caught in Kupang and TTU in 2013

Species	Kupang		TTU		Total	%
	Tesbatan 2	Tupanaf	Susulaku B	Popnam		
<i>An. maculatus</i>	19	8	32	18	77	5.32
<i>An. barbirostris</i>	1	41	19	40	101	6.98
<i>An. vagus</i>	342	281	29	54	706	48.79
<i>An. anullaris</i>	100	88	106	26	320	22.11
<i>An. tesselatus</i>	1	0	3	3	7	0.48
<i>An. flavirostris</i>	4	2	4	5	15	1.04
<i>An. indefinitus</i>	80	111	2	15	208	14.37
<i>An. aconitus</i>	0	2	1	11	14	0.97
Jumlah	547	533	196	172	1.448	

In Susulaku TTU (hilly area), the peak of the *Anopheles spp.* biting time was 8 p.m. to 9 p.m. as well as 2 a.m. to 4 a.m. 7 p.m. to 8 p.m and 11 p.m. to 12 p.m. were the lowest times for *Anopheles spp.* getting caught. In Popnam, there were three peak times, namely 7 p.m. to 8 p.m., 10 p.m. to 11 p.m. and 3 a.m. to 4 a.m. In TTU Regency, there was some variance in the species caught in one catching site compared to the others. In Susulaku

B, the dominant species was *An. anullaris*, while in Popnam, it was *An. vagus*.

Six out of all 8 *Anopheles spp.* found were dissected. The most dissected species was *An. vagus* (n=405), while the least was *An. tesselatus* (n=1). The parous rate of all *Anopheles spp.* dissected was 65.15%, in which the species with the most parous rate was *An. indefinitus*. The least was *An. maculatus*.

The types and environmental condition of the breeding habitats of *Anopheles spp.* on Timor Island:

The breeding habitat of the malaria vectors found in the rice fields area were fields, rivers, puddles, springs, wells and drains. Breeding habitats found in the hilly areas were rivers, fields, puddles, swamps, pools and springs.

In the rice field area, the *Anopheles spp.* larvae were mostly found in standing water exposed to direct sunlight. Although in the breeding habitat there was a biota of blue panchax fish (*Aplocheilichthys panchax*), mosquito larvae were still found. In the hilly areas, larvae were found most often in the rivers and fields which were exposed to direct sunlight.

The spread of the breeding habitats of *Anopheles spp.* in Kupang were generally on the edge of the residential areas with a radius of 0-200 metres. Meanwhile, in TTU, the spread was in the radius of 500-2,000 metres or more. These breeding habitats were far from the residential areas even though it was still within *Anopheles spp.* flying range, which reached two kilometres.

DISCUSSION

The spreading pattern of malaria and the height of a location has a close relationship. This observed pattern is more widespread in areas that are at an altitude below 1,000 metres above sea level (m.a.s.l.) and less observed at an altitude above 1,000 m.a.s.l. This is caused by the behaviour of the *Anopheles spp.* which likes to live in lowlands.³ The spread of the breeding habitat of *Anopheles spp.* in Kupang was located on the edge of the residential area with a radius of 0-200 metres. In TTU, the radius was 500-2,000 metres or more. These breeding habitats were far from the residential areas even though it was still within the *Anopheles spp.* flying range, which reaches up to two kilometres.

The observations of the breeding habitat of *Anopheles spp.* larvae were carried out at 34 sample points. There were six different types of habitat, namely swamps, puddles, clean water reservoirs, foot sinks, livestock drinking containers and sewers. This finding is in line with the research conducted by Nurhelmi in 2012. It states that the breeding habitats of the *Anopheles* mosquitoes are also varied, with the mosquitoes generally breeding in rice fields, irrigation channels, ponds, protected swamps, low flow rivers, waterways and protected grassy springs.⁷

In general, mosquitoes prefer to live in a place that is shady, moist and safe. However, with further

observation, each species turns out to have different behaviour. For instance, the mosquitoes living in the lowlands only settle in low altitude places such as the ground, and some also land on the rice fields, river banks, swamps, kale ponds, ditches and so on. The behaviour of the mosquitoes based on the location varies greatly as the female *Anopheles spp.* has the ability to choose a breeding place according to their individual preferences and needs⁸. There are some species that likes to live in places that are exposed to direct sunlight and some prefer shady places. Meanwhile, the mosquitoes living in the highlands are commonly found in grasses, forests and also plants that live on steep cliffs.⁹

The most species caught in the five study locations was *An. vagus* and the least was *An. tessellatus*. It corresponds with a study which states that the breeding habitat of *An. vagus* was in rice fields, ponds and plants.¹⁰ Stoops et al. also found that *An. Vagus* lives lowland rice fields and adjacent to human settlements.¹¹

Anopheles barbirostris was found in both the rice fields and hilly areas of Timor Island, in which the *Anopheles* species was a malaria vector in East Nusa Tenggara.¹² In nature, *An. barbirostris* can inhabit larval habitats such as small ponds, swamps and rice fields. In general, the mosquito likes to lay its eggs in fresh clean water with water plants that arise, float or slightly arise on the surface. In Indonesia, the largest population of the mosquito is associated with rice cultivation or rice fields.¹³ Wigati et al. also found *An. barbirostris* in abandoned fish ponds, small puddles near the coast, rice fields, irrigated waterways and water reservoirs from springs. *An. barbirostris* larvae prefer clear water whose water flow is calm or slightly flowing, such as ponds, springs and other places with water accumulation.¹⁰

An. macullatus has been confirmed as a vector on the Java and Sumatra Islands and has an ecological distribution in both plantation and forest areas in valleys or mountains. Another study also found that *An. macullatus* is also found in a singular hilly area in Jambi Province.¹⁴

In Susulaku B Village, TTU Regency (a hilly area), the peak of *Anopheles spp.* biting times was at 8 p.m. to 9 p.m. as well as 2 a.m. to 4 a.m. Meanwhile, 7 p.m. to 8 p.m. and 11 p.m. to 12 p.m. was the lowest time for being bitten by *Anopheles spp.* In Popnam Village, there were three peaks for biting encompassing 7 p.m. to 8 p.m., 10 p.m. to 11 p.m. and 3 a.m. to 4 a.m. According to a study by Santoso conducted in Purwodadi (2012), the biting times of *Anopheles spp.* also varied, ranging from 11:00 p.m. to 12 p.m.¹⁵ while another study conducted in

Ranoketang Tua Village stated that the peaks occurred at 12 p.m. to 1 a.m; 11 p.m. to 12 p.m. was also a lot, but not as significant as one hour afterwards.¹⁶

CONCLUSION

This study has concluded that the main breeding habitat of *Anopheles spp.* in East Nusa Tenggara was in the paddy fields and rivers. In the selected province, the *Anopheles spp.* found were *An. maculatus*, *An. barbirostris*, *An. vagus*, *An. annularis*, *An. tessellatus*, *An. flavirostris*, *An. indefinitus* dan *An. aconitus*. The vectors of malaria found were *An. barbirostris*, confirmed in East Nusa Tenggara and *An. aconitus*, confirmed on Java Island. The spread of the vector of *An. barbirostris* was found in four study places, including Tesbatan, Tuapanaf, Popnam and Susulaku B Villages. Meanwhile, *An. aconitus* was found in three study places; Tuapanaf, Popnam and Susulaku B Villages.

RECOMMENDATION

The control of larvae in the rice field habitat must be undertaken by regulating cropping and irrigation patterns. The malaria control methods must be based on local data and information specific to each region, because the control programs of some regions were less effective compared to other regions. *Anopheles spp.* which was confirmed as a vector in East Nusa Tenggara, has a habitat ranging from coastal lowland to higher altitude areas, therefore early vigilance must be implemented in all places.

Conflict of Interest: None.

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Developing Community Resilience as a Supporting System in the Care of People with Mental Health Problems in Indonesia

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ABSTRACT

People with mental disorders have complex disabilities which make them need other people's assistance in doing their daily living activities. Community resilience is one of the capacities which is needed to make a healthy environment for mental disorder patients. This study aims to describe how community resilience can be a supporting system in the care of people with mental disorders. A literature review was conducted in order to obtain 98 reference sources. Only 15 articles were eligible to be reviewed. The community resilience's supporting system consists of providing social, physical and economical infrastructures through employment opportunities or financial support and a decent life. Interactions between community members and people with mental disorders become a positive relationship, helping people with mental disorders to carry out their activities and to become independent. It also has an impact on decreasing the symptoms of relapse as well as reducing the level of dependency that cause them to continue to be a burden on their families, communities and global society.

Keywords: *community resilience, mental health, supporting system*

INTRODUCTION

The number of people with mental disorders, which is increasing with the years, is becoming a burden for families, communities and the global health care system. In 2016, the prevalence of psychiatric patients in the United States reached around 44.7 million people who were more than 18 years old. This number indicates that 18.3% of Americans suffer from a type of mental disorder.¹ In Indonesia, the prevalence of severe mental disorders, such as schizophrenia, reached around 400,000 people, or as many as 1.7 per 1,000 population. In addition, the prevalence of emotional and mental disorders as indicated by symptoms of depression and anxiety for those aged 15 years old and over reached about 14 million people or 6% population.²

The community is one of the support systems that can facilitate the recovery of mental disorders with the opportunity to live independently, to participate in community activities, to interact with others and to attach themselves to their daily environment. The community has an important role in creating positive support and wide opportunities for people with mental disorders for them to be fully involved in every event in the community.³⁻⁵

Previous studies explain that people with mental disorders also have awareness and the responsibility to deal with reality and to fulfil their actualisation. They understand expectations, goals, and responses to social needs and are able to work independently. They want to be recognised like any other individual who is able to adapt to society, despite experiencing inconsistencies in their way of thinking. If they only live in the hospital, what they see is only a group of people with mental disorders, and they can feel like life has stopped. Thus, support for people with mental disorders is needed, especially from the community around their homes. When they live with healthy individuals, they can plan for a better future.^{6,7}

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The treatment of mental disorders requires integration between adequate mental health services and

opportunities for the sufferers to develop themselves. The key points are the provision of information about their conditions, the opportunity to develop themselves, the chance to foster hope of them recovering from their mental disorders and the importance of mental health services' role in the community in providing positive emotional control for people with mental disorders.^{8,9}

The existence of positive support from the community can prompt motivation in the patients for them to get up and recover from mental disorders. The forms of support obtained can be varied, such as the existence of positive assessments, being given the opportunity to tell stories, to be listened to by others and to be able to engage in activities that exist in the community.^{7,10} recovery oriented experiences are required which recognise the holistic and diverse needs of individuals. Aim: The aim of the study was to examine the experiences of people living with a mental illness who participated in a recovery oriented program called Recovery Camp. The study aimed to examine how the program may have related and contributed to their mental health recovery. Methods: A descriptive phenomenological approach guided the study. Consenting participants (n = 5

The discovery of various factors affecting individuals and community mental health shows that people with mental disorders who live in the community can recover with community support. This study has intended to describe how community resilience can be used as a support system in the care of people with mental disorders.

METHOD

This study was a systematic review which used some of the literature from 98 articles obtained from Science Direct, Google Scholar, Proquest Health, Medical Complete, Proquest Nursing, Allied Health Source, Proquest Psychology Journals and Proquest Science Journals dating from 2008 to 2018. The inclusion criteria used were health or related research articles published in the last 10 years, research articles on topics about the community as a support system in the treatment of mental disorders, and research articles discussing the concept of community resilience.

Based on a literature review of 98 articles obtained from the listed databases, there were 50 articles that fulfilled the inclusion criteria. However, there were only

15 articles that discussed in detail about community resilience and the ability of the community to support the care of people with mental disorders.

RESULTS

Gillard et al. states that the care of mental illness sufferers has two main keys; a positive personal relationship (oneself) and wider social interactions (others).¹¹ Self-awareness and positive self-acceptance give the individual the ability to reconcile themselves between the outside world and the internal mind. Self-recovery in mental disorders is the concept of balance between internal and external worlds. Table 1 shows the results of a literature review that discusses community resilience and community capacity in supporting the care of people with mental disorders.

DISCUSSION

Conflicts, stress and exposure to hazards can cause crises in the community system. Resilience is the ability of individuals or groups to react and move away from stress or exposure to stressors. Resilience describes the dynamic process of adapting to the crisis situation faced by the people.¹² Resilience can be analogous to the philosophy of a bamboo plant, in which if it is exposed to the wind then it will bend and move, but in the end, it can return to its original position.¹³

Community resilience is the method or ability of a community to show its resilience when facing existing stresses to restore their productivity through daily activities.¹³ Resilient communities have become the nearest supporting system for people with mental disorders. Nowadays, resilience is defined as a process rather than a result. Resilience is the capacity of the system to face or recover from disturbances as well as changes that threaten adaptation or development functions. There are two stages in which resilience is considered to be a process, namely: 1) the disturbance or stressor that significantly affects the system and 2) the resilience capacity system that shows an ability to adjust and recover from the occurrence of trauma.¹⁴

The mechanism of resilience activation occurs throughout three stages, namely liminal suspension, compassionate witnessing and relational redundancy. Liminal suspension means the time of crisis in which individuals mutually reinforce each other in relation to their interpersonal relationships. Compassionate witnessing means how individuals within the

community are bound together and help to fulfil the needs of one another. Relational redundancy means coordination between the sources of the organisation concerned with strengthening resilience. When a critical situation arises, the group of people will gather, interact and perform in a variety of ways that can enable their existing capacity to survive and achieve resilience.¹⁵

Teo et al. found that the mechanism of resilience activation occurs during an exposure to stressor or crisis events. However, the existence of a stressor can generate resources in the community to strengthen interpersonal relationships, especially helping in the recovery of people with mental disorders in the community.¹⁶

Cohen et al. explained that community resilience involves local organisations and existing policies applied locally and regionally when strengthening resilience. Effective leadership is a leader who is able to interact with other community members and who can meet the needs desired by all members of the community. Community leaders have an important role in improving community resilience, primarily by focusing on the needs and demands of the local community.¹⁷

The involvement of a local government is needed in enhancing community resilience, including the development of access to technology that can support sources of social and economic capital. Increasing the productivity of community members through economics supported by local governments can increase resilience.¹⁸

There are several strategies for the reconstruction and revitalisation of sources of social capital after a crisis, including strengthening social networks and communities, building social organisations, and macro-social policies that can improve people's access to resources and power. In the aspect of social capital, social networks are important aspects that can affect mental well-being.^{3,19-21}

Several previous studies have explained that economic resources are the most significant aspect in relation to building resilience. When individuals have suitable jobs and are in line with local needs, this will also increase the adaptive capacity of the community. A resilient community is a community that has the capacity to innovate and provide mutual support to other members of the community, including making a person with a mental disorder able to engage in productive activities in the community.¹⁰

Community resilience is an important focus of attention which can lead to positive attachments between people with mental and community disorders. Resilient communities are able to provide opportunities for sufferers to live like other individuals, who are able to be independent and work for themselves and others.

CONCLUSIONS

Community resilience is the capacity that is owned by the community that becomes an appropriate supporting system in the care of people with mental disorders living in the community. The increase in the provision of social, physical and economic infrastructure along with the interaction between community members and mental disorder patients is positive; helping people with mental disorders to carry out their daily activities and to become independent. This will also have an impact on decreasing the symptoms of relapse as well as reducing the level of dependency that will continue to be a burden on families, communities, and global society.

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Effects of Knowledge of Vitamin D on Attitudes toward Sun Exposure among Middle-Aged and Elderly Indonesian Adults

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ABSTRACT

Introduction: Vitamin D deficiency may contribute to certain health problems among senior people. Excessive body weight lowers the vitamin D level. Hypovitaminosis D affects older adults, with a greater risk of infection, disease, type 2 diabetes, cardiovascular disease, stroke, and dementia. However, little is known as to what extent the knowledge of vitamin D's benefits contributes to the attitude toward sunlight exposure among people at risk of hypovitaminosis D.

Aim: The objective was to investigate the effect of knowledge of vitamin D on attitudes toward sunlight among 166 middle-aged and elderly people in East Java, Indonesia.

Method: We conducted an observational study using a case control design. The sample was purposively recruited among visitors consulting the geriatric clinic at a community health centre in Sidoarjo, East Java, Indonesia. Each case and control group consisted of 83 men and women aged 46 years old or older. The assignment of subjects to each group was determined based on their body mass index (BMI). A standardised questionnaire was delivered to the study subjects to obtain data on their knowledge and attitudes related to vitamin D. A Chi square test was performed to assess the difference between the obese group and the non-obese group.

Results: Our study found no significant difference in relation to the knowledge of vitamin D between the two groups ($p=0.436$). However, the two groups showed a significant difference in attitude toward sun exposure ($p=0.030$).

Conclusion: No significant effect was found between knowledge of vitamin D and attitude toward sun exposure among the adults.

Keywords: *knowledge, attitude, geriatric, vitamin D, obesity*

INTRODUCTION

Vitamin D deficiency has affected more than one-third of the population worldwide across all ethnic and age groups.¹ It is indicated by a lower 25(OH)D level, of less than 50 nmol/L in the body.^{2,3} Lifestyle and environmental changes are considered to have a significant contribution toward lower vitamin D levels. Lack of vitamin D is an independent factor of the increased mortality caused by non-communicable diseases such as heart disease, osteoporosis, diabetes, autoimmune and cancer.⁴ The high prevalence of vitamin D deficiency has become a public health concern as it relates to the increased risk of various chronic diseases

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and the high prevalence of osteoporotic hip fractures among older adults.¹ In addition, excessive body weight increases the risk of vitamin D deficiency which could also negatively affect bone.⁵

Having a vitamin D deficiency increases the risk of frailty among older adults.⁶ Geriatric syndrome and impaired physical activity are usually considered to be multidimensional clinical conditions in the elderly. Geriatric syndrome is characterised by functional decline, low cognitive status, and increased exogenous and endogenous stress.⁷ Functional decline, especially in relation to physical functions, may result in frailty, limited mobility, and death. Although vitamin D can be obtained from food and supplements, having sufficient sun exposure is beneficial in order to stimulate the skin to produce vitamin D.⁴ On the other hand, as the human body ages, the skin's capacity to produce vitamin D3 decreases.⁸ Therefore, the elderly have a higher risk of vitamin D deficiency than younger people.

Lack of knowledge on the importance of sun exposure for vitamin D synthesis in the body may induce an avoidance of sun exposure.^{9,10} Most people prefer to stay, work, and exercise indoors or behind glass that is anti-ultraviolet (UVB) than be directly exposed to sunlight. Wearing closed-off clothing and using regular sunscreen may block the UVB transmission which is intended to prevent sun-related skin aging, reduce the risk of skin cancer, and avoid undue skin discoloration.¹¹ Our study aims to assess the difference between two groups on the knowledge of vitamin D and their attitude toward sunlight exposure.

METHOD

Research design: This study employed an observational research design using a case control method. A structured questionnaire was administered to the study subjects to understand their level of knowledge and attitude relevant to vitamin D.

Population and sample: The population of this study was the visitors of a geriatric consultation clinic at Taman community health centre in Sidoarjo district, in the East Java province of Indonesia. The age of the population was 45 years old or older. The inclusion criteria were no disability, that they were able to read and write, and had no co-morbidity such as cardiovascular disease, stroke,

respiratory disease, or liver disease. The exclusion criteria were that they were unwilling to participate in the study. The participants were recruited using purposive sampling selection. The obese participants were assigned to the case group, while the non-obese participants were assigned to the control group. A threshold body mass index (BMI) level of 27 or higher was set up to classify participants in the obese group. Other male and female participants with lower BMI levels than the threshold were included in the normal weight group. To obtain the BMI level, body weight and height were measured for each participant. The BMI level was calculated through dividing the body weight (kilograms) by the square of the height (meters).

Sample size: To calculate the sample size, we adopted the following formula:

$$n = \frac{N}{1 + N(d^2)}$$

N in a capital letter is the size of the population, while n in a small letter represents the sample size. The confidence level was set at 0.1. The total population in this study was 500 people, based on the average number of monthly visits to the geriatric clinic of the study location in 2017. Therefore, the sample size calculation and the result has been presented in the following equation:

$$n = \frac{500}{1 + 500(0,1^2)} = 83 \text{ orang}$$

The minimum number of study participants for each case and control group was 83 people.

VARIABLES

The study variables were knowledge and attitude. Each variable had an assessment category of poor and good based on the scores obtained from the questionnaire answers. A participant was considered to have good knowledge if his/her total score of knowledge was 6 or higher. A total score below 6 was considered as having poor knowledge. The variable of attitude had 9 questions related to the participant's attitude toward sun exposure. Each item of questions was given a score of 2 for an answer related to a higher risk of vitamin D deficiency. A total score of 10 or higher was marked as having a good attitude, while a lower score than 10 represented a poor attitude.

DATA COLLECTION AND ANALYSIS

Prior to the data collection, the validity and reliability of the standardised questionnaire was tested, involving a convenience sample of 30 homogeneous respondents. To assess the validity of the questionnaire, the Pearson Product Moment Correlation was performed using SPSS software. The test was conducted by correlating the scores of each item of the questionnaire with the total score. Each question with a statistically significant value < 0.05, and count value $r > r$ in the product moment table was concluded as a valid item. The questionnaire reliability was assessed using Cronbach’s coefficient alpha to estimate the internal consistency of the questionnaire items. A minimum Cronbach’s alpha value was determined to be 0.61 to be considered for inclusion in the questionnaire.

The measurement scale used in the present study was ordinal data presented in two categorical variables (poor and good). The data was analysed using the chi-square test to examine the difference between the obese group and the non-obese group on their knowledge of vitamin D deficiency and their attitude toward sun exposure. The difference between the obese and non-obese participants was concluded to be statistically significant when the p-value was 0.05 or less.

RESULTS

Table 1 displays the characteristics of the study participants. Females were the majority in both the obese group (84.3%) and the non-obese group (60.2%). Most of the participants were aged between 56 and 65 years old in both the obese group (45.8%) and the non-obese group (53.0%).

Table 1: The frequency distribution of the participant’s characteristics

Characteristics		Groups	
		Obese n (%)	Non-Obese n (%)
Gender	Female	70 (84.3)	50 (60.2)
	Male	13 (15.7)	33 (39.8)
Age (years)	46-55	29 (34.9)	25 (30.1)
	56-65	38 (45.8)	44 (53.0)
	>65	16 (19.3)	14 (16.9)

Table 2 presents the results of the chi-squared test when analysing the difference in the knowledge score between the obese group and the non-obese group. More

than half of the obese group (57.8%) and the non-obese group (51.8%) have a good knowledge of vitamin D deficiency. The percentage of subjects with a good level of knowledge was slightly higher in the obese group than the non-obese group. The chi-square test generated a p-value of 0.436, indicating that no significant difference between the two groups was observed related to the knowledge of vitamin D deficiency.

Table 2: The chi-squared test results of the knowledge of vitamin D deficiency

Knowledge	Groups		P Value
	Obese n (%)	Non-Obese n (%)	
Good	48 (57.8)	43 (51.8)	0.436
Poor	35 (42.2)	40 (48.2)	
Total	83 (100.0)	88 (100.0)	

The chi-square test on the attitude toward sun exposure has been presented in Table 3. Most of the participants in the obese group showed a poor attitude toward sunlight (57.8%). In the non-obese group, most of the participants had a good attitude toward sun exposure (59.0%). The results of the chi-square test showed a p-value of 0.030, indicating that there is a significant difference between the two groups in relation to their attitude toward sun exposure.

Table 3: The chi-squared test results of the attitude toward sun exposure

Attitude	Groups		P Value
	Obese n (%)	Non-Obese n (%)	
Good	35 (42.2)	49 (59.0)	0.030
Poor	48 (57.8)	34 (41.0)	
Total	83 (100.0)	83 (100.0)	

DISCUSSION

The participants in our study were dominated by those of the female sex whose age was between 56 to 65 years old. The World Health Organisation (WHO) determined 60 years old to be the cut-off standard for the older population.¹² The proportion of middle-aged people in the present study was less than 30% in both groups.

Our study showed no significant difference between the obese group and the non-obese group on the

knowledge of vitamin D deficiency. More than half of the study respondents had a good knowledge score. This result indicates that the importance of having sufficient vitamin D is well understood by both groups. A previous study reported that having a good level of knowledge on vitamin D significantly contributes to the positive behavior in maintaining the vitamin D sufficiency.¹³

Vitamin D has a pivotal role in regulating the absorption of calcium and phosphorus in order to maintain optimum bone mineral density.³ Vitamin D has two forms, namely vitamin D2 and vitamin D3. Vitamin D2 is a 28-carbon molecule derived from ergosterol, which is a component of fungal cell membranes. Vitamin D3 is a 27-carbon derived from cholesterol.¹⁴ Vitamin D3 (cholecalciferol or D3) is synthesised in the skin in response to the effect of sunlight (eUVB) with a wavelength of 295-297 nm.² The UV-B skin irradiation triggers the photolysis of 7-dehydrocholesterol (pro-vitamin D3) to pre-vitamin D3, which is rapidly converted to vitamin D3 at skin temperature.

Vitamin D2 and vitamin D3 are produced from the skin undergo sequential hydroxylation. Hydroxylation firstly occurs in the liver (25 [OH] D) and secondly, takes place in the kidney which leads to the biological form of active 1,25-dihydroxyvitamin D (1.25 [OH] 2D).¹⁵ Furthermore, the 1.25 [OH] 2D will bind to the vitamin D receptor (VDR), which can increase the absorption of calcium and intestinal phosphorus. Vitamin D is also actively involved in bone formation, resorption, mineralisation, and the maintenance of neuromuscular function. In addition, 1.25 [OH] 2D can also inhibit serum parathyroid hormone (PTH) levels through a negative feedback mechanism, by increasing serum calcium levels. This process leads to a regulation of bone metabolism through VDR activation in osteoblast and adult osteoclast formation.¹⁶

In a body with vitamin D deficiency, the small intestine can only absorb approximately 10% -15% of the calcium ingested. In a normal vitamin D level context, the body can absorb 30% - 40% of the calcium from food. Therefore, low levels of vitamin D (25 [OH] D) may hamper calcium absorption, which has some clinical implications, not only in relation to the bone but also some of the major metabolic functions.¹⁵ Vitamin D also has an important function in minimising tissue damage by lowering oxidative stress. Muscles are one of the susceptible tissues easily exposed to free radicals. Muscle tissue is composed of approximately 40% of the total body mass. Various toxicities such as infection,

ischemia, and inflammation may cause further damage to the muscle cells. The damaged muscle cell would release the myoglobin or protein in the muscle into the bloodstream, which is dangerous for the kidneys and may cause kidney failure.¹⁷ A higher amount of free radicals from the muscle damage, more than the antioxidants of the body, would eventually aggravate the organ damage.

Although there was no significant difference regarding the knowledge of vitamin D deficiency, the two groups of this study presented a significant difference in the attitude toward sun exposure. The obese group had a higher proportion of poor attitude, which reflects having less sun exposure than the non-obese group. One possible explanation is that obesity contributes to a low level of participation in physical activity.¹⁸ The elderly with obesity may have a fear of falls and may also have a certain degree of physical immobility that prevents them from taking part in recreational physical activity outdoors¹⁸, thus they have less exposure to sunlight. A previous study reported that the prevalence of vitamin D deficiency is 35% higher among obese people.¹⁹ Poor attitude toward sun exposure to increase the vitamin D sufficiency increases the risk of the elderly with obesity from contracting various non-communicable diseases.

CONCLUSION

Our study presented a non-significant difference in the knowledge of vitamin D deficiency. However, the two groups have a significant difference in their attitude toward sun exposure. Having good knowledge is important to prevent the risk of vitamin D deficiency. However, it may not be sufficient to drive the expected attitude. Therefore, understanding people's constraints in relation to sun exposure is important, and in need of further investigation.

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The Effects of Age And Body Mass Index on Blood Glucose, Blood Cholesterol, and Blood Pressure in Adult Women

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ABSTRACT

Introduction: The risk factors of cardiovascular disease include having a high body mass index, hyperglycemia, hypercholesterolemia and increased blood pressure. The purpose of this study was to analyse the effects of age and body mass index (BMI) on blood glucose, blood cholesterol and blood pressure in adult women.

Method: An analytical observation using a cross-sectional method was employed as the study design. The study recruited 60 women aged between 30 to 60 years old to participate, using a purposive sampling technique. The data was analysed using univariate analysis and path analysis.

Result: Age and BMI showed as having the strongest direct effect on the blood pressure. Age also had a direct effect on blood glucose level and blood cholesterol level. The effect of age on blood glucose and blood cholesterol was also mediated by BMI.

Conclusion: Being of an older age had a direct effect on increased blood glucose, blood cholesterol, and blood pressure, while a higher BMI had a direct effect on increased blood pressure. As women get older, maintaining a normal BMI is beneficial to preventing the increase of their blood glucose, blood cholesterol and blood pressure.

Keywords: age, body mass index, blood glucose, blood cholesterol, blood pressure

INTRODUCTION

Cardiovascular disease is a public health problems and the leading cause of death in both developed and developing countries.^{1,2} Globally, the number of deaths due to cardiovascular disease is estimated to have increased from 16.7 million in 2002 to 23.3 million in 2030.³ In Indonesia, coronary heart disease is the second leading cause of death after stroke, contributing to 12.9% of the overall mortality rate.⁴

Several risk factors have been identified as a contributing factor to cardiovascular disease including

age, increased body mass index, hyperglycemia, hypercholesterolemia and increased blood pressure.^{2, 5-8} The risk of cardiovascular disease in females is greater than in males, with the influence of conventional factors such as high blood pressure, high cholesterol, diabetes, excessive body weight, and factors related to psychosocial condition and socioeconomic status.⁹ In addition, hormonal changes throughout a woman's stages of life that affect the cardiac conduction system and the structure and function of the blood vessels, and systemic inflammation could cause cardiovascular disease.^{10, 11} The purpose of this study was to analyse the effect of age and body mass index (BMI) on blood glucose, blood cholesterol and blood pressure in adult women.

METHOD

Study design, setting, and sample size: This study employed an analytical observational design method with a cross-sectional method. The study was conducted

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in Malang district, East Java, Indonesia. Using a purposive sampling method, 60 women aged between 30 to 60 years old were recruited to participate in the study.

Variables and the instrument of the data collection:

There were five variables in the study, including age, BMI, blood glucose, blood cholesterol, and blood pressure as described below.

- a. **Age:** The data of age was obtained from the sociodemographic characteristics of the respondents stated during the data collection. Other sociodemographic data included marital status, employment status and co-morbidity.
- b. **Body mass index (BMI):** The body mass index was obtained from the measurement of body weight (kg) and height (m). The formula to calculate the BMI is as follow: (weight (kg) / weight (m))². BMI was classified as underweight (BMI <20 kg/m², normal (BMI= 20-24.9 kg/m²), overweight (BMI= 25-29.9 kg/m²), and obesity (BMI≥30 kg/m²).⁷
- c. **Blood glucose:** The blood glucose was measured based on the capillary blood glucose level (mg/dl) using a glucose meter. For the purpose of this study, blood glucose was measured from a random glucose test. A blood glucose level of less than 200 mg/dl was categorised as normal and a level of 200 mg/dl or higher was classified as hyperglycemia.
- d. **Blood cholesterol:** Blood cholesterol was measured from the total blood cholesterol level obtained from peripheral blood (mg/dl) using a finger-stick cholesterol test. The blood cholesterol level was considered to be normal at less than 200 mg/dl, and hypocholesteremic at 200 mg/dl or higher.
- e. **Blood pressure:** The blood pressure level was measured using a sphygmomanometer. The results of the Systolic Blood Pressure (SBP) and Diastolic Blood Pressure (DBP) measurements of each study participant were recorded on an observation sheet. Using the Joint National Committee’s 8 guidelines, the blood pressure level was categorised as normal for the SBP < 120 mmHg and DBP < 80 mmHg, pre-hypertension for the SBP 120 – 139 mmHg and DBP 80 – 89 mmHg, hypertension stage 1 for the SBP 140 – 159 mmHg and DBP 90 – 99 mmHg, and hypertension stage 2 for the SBP ≥ 160 mmHg and DBP ≥ 100 mmHg.¹²

Ethical consideration and the data collection: Before the data collection, all of the study participants were provided with information about the study and the right to withdraw at any time. A written informed consent was submitted by participants to indicate agreement to participate in the study. After filling in the questionnaire with their age, marital status, and current employment status, participants were measured for their blood pressure level, blood glucose level and blood cholesterol level.

DATA ANALYSIS

The data was analysed using descriptive analysis to describe the sociodemographic characteristics and the clinical characteristics of the participants. The data was then analysed using path analysis.

RESULTS

Sociodemographic and clinical characteristics of the study participants: As shown in Table 1, more than half of the subjects (63.3%) were aged between 30 to 45 years old. The majority of the women were married (88.3%) and unemployed (68.3%). Based on their clinical status, the majority of them did not have diabetes mellitus as a co-morbidity as indicated by the high percentage of women (91.7%) with normal random blood glucose level. The majority of the subjects had a normal BMI (45%). Most of the study subjects had a normal blood cholesterol level (51.7%), and normal blood pressure (35%).

Table 1: Sociodemographic characteristics and clinical characteristics of the study participants

Characteristics		Total	
		N	%
Socio-demographic characteristics			
Age (years)	30–45	38	63.3
	≥ 46	22	36.7
Marital status	Married	53	88.3
	Single/Divorce/ Widowed	7	11.7
Employment status	Employed	19	31.7
	Unemployed	41	68.3
Clinical characteristic			
Diabetes mellitus as co-morbidity	Yes	5	8.3
	No	55	91.7

Conted...

Body mass index	Underweight	7	11.6
	Normal	27	45.0
	Overweight	15	25.0
	Obesity	11	18.4
Blood glucose	Normal	55	91.7
	Hyperglycemia	5	8.3
Blood cholesterol	Normal	31	51.7
	Hypercholesterolemia	29	48.3
Blood pressure	Normal	21	35.0
	Pre-hypertension	19	31.7
	Hypertension stage 1	14	23.3
	Hypertension stage 2	6	10.0

Path analysis: As shown in Figure 3, the diagram path presented the results of the path analysis on the effects of age and BMI on blood glucose, blood cholesterol and blood pressure among the women participating in the study. There were four paths with significant relationships. The first significant direct effect was in age (X1. Usia) → blood glucose (Y1.GD). The second significant direct effect was age (X1. Usia) → blood

cholesterol (Y2.KD). The third significant direct effect was age (X1. Usia) → blood pressure (Y3.TD). The fourth significant direct effect was shown in BMI (X2. IMT) → blood pressure (Y3.TD).

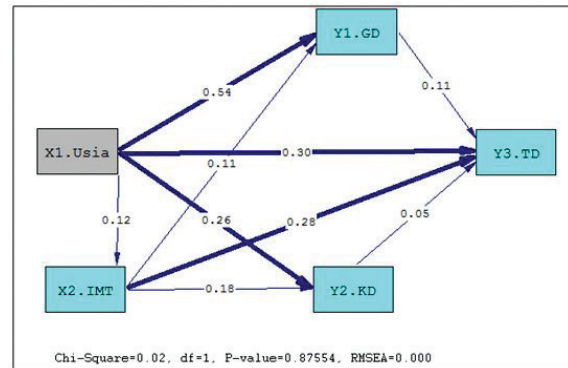


Figure 1: Results of the path analyses with their beta coefficient value

Table 2 presents the results of the path analysis displaying the effect values of age related to blood glucose, blood cholesterol and blood pressure. Each path described the direct or indirect effect of age on blood glucose, blood cholesterol and blood pressure. BMI was entered as the mediating variable.

Table 2: The path effect value of age on blood glucose, blood cholesterol, and blood pressure

No.	Path of variable	Effect value	Total effect
1.	Age → Blood Glucose	0.54	0.553
2.	Age → BMI → Blood Glucose	0.12 x 0.11 = 0.0132	
3.	Age → Blood cholesterol	0.26	0.282
4.	Age → BMI → Blood cholesterol	0.12 x 0.18 = 0.0216	
5.	Age → Blood Pressure	0.30	0.409
6.	Age → Blood Glucose → Blood pressure	0.54 x 0.11 = 0.0594	
7.	Age → Blood cholesterol → Blood Pressure	0.26 x 0.05 = 0.013	
8.	Age → BMI → Blood Cholesterol → Blood Pressure	0.12 x 0.18 x 0.05 = 0.0011	
9.	Age → BMI → Blood Glucose → Blood Pressure	0.12 x 0.11 x 0.11 = 0.0015	
10.	Age → BMI → Blood Pressure	0.28 = 0.034	

The first path showed a direct effect between age (X1) and blood glucose (Y1), while the second path had BMI as the mediator variable (X2). The effect value in the first path was 0.54. The value of this effect was unidirectional. As the women got older, their blood glucose levels tended to increase by 0.54 times. In the second path, the effect value was 0.013. The direction showed an order of effect that indicated that older age with

the BMI increase as the mediation would increase the blood glucose level by 0.013 times. The total effect of the relationship between age and blood glucose was 0.553 times.

The third and fourth paths showed the effect between age (X1) and blood cholesterol (Y2). The third path presented a direct path, while the fourth path had a direction with BMI as the mediating variable (X2). The effect value of the third path was 0.26, while the

fourth path was 0.0216 after being mediated by BMI. The total effect of the relationship between women's age and blood cholesterol level was 0.282. This effect value indicated the unidirectional path which explained that growing older would lead women to have an increased blood cholesterol level by 0.282 times.

The paths from the fifth to the tenth were the pathway between age (X1) and the blood pressure variable (Y3). While the fifth path had a direct line between age and blood pressure level, the sixth path up to the tenth path were each mediated by BMI, blood glucose, and blood cholesterol respectively. The total of the effect value from the fifth to the tenth paths was 0.409. The unidirectional effect value means that the increased age of women would lead to the increasing blood pressure level by 0.409 times.

This finding indicates that the women's age had a strong significant effect on blood glucose, blood pressure, and blood cholesterol respectively. The women's BMI had a significant effect on blood pressure.

DISCUSSION

Age was shown to have a strong effect on blood glucose level, blood pressure level, and blood cholesterol level. The blood glucose level tends to rise along with an increase in age. The results of this study confirmed the findings of previous studies.^{13, 14} Aging has a correlation to the changes in glucose metabolism in the blood system, including insulin resistance and cell dysfunction.^{15, 16} The effectiveness of insulin could be decreasing due to an increase in abdominal fat mass, low physical activity, mitochondrial dysfunction, and hormonal changes.^{17, 18}

The strong effect of age on the women's blood pressure level has been shown in the present study. This finding was consistent with previous studies that reported that increased blood pressure level was significantly associated with increasing age.¹⁹⁻²¹ Aging causes changes in the structure of the arteries, so then the arteries become more rigid.²² The increase in blood pressure may occur due to an unhealthy lifestyle, such as a high salt intake and high sugar consumption.²³ A high level of salt in diet can cause changes in vascular smooth muscle cells, which results in the accumulation of collagen in the walls of the arteries, thus increasing arterial stiffness.²⁴ For women, approaching the menopausal period cause a greater risk of increased

blood pressure level than men. The mechanism of the blood pressure rise involves multiple factors such as decreased oestrogen levels, oxidative stress, endothelial dysfunction, and the influence of the renin angiotensin system and sympathetic activation.²⁵

Another strong effect was also found between the women's age and blood cholesterol level in this study. The aging process results in changes in the cholesterol metabolism of the blood. These changes cause an increase in Low Density Lipoprotein (LDL) cholesterol. The balance between intake, synthesis, absorption, and excretion affects the cholesterol metabolism of the human body.²⁶

Body Mass Index (BMI) affects blood pressure level. This finding supports the results of previous studies that illustrated the significant relationship between BMI and blood pressure.^{19, 23} A high level of BMI affects blood pressure. Practicing a healthy lifestyle and controlling bodily weight should be encouraged in order to prevent an increase in blood pressure.^{25, 27, 28}

CONCLUSION

Age has a significant effect on blood glucose, blood pressure, and blood cholesterol, while BMI has a significant effect on blood pressure. Aging puts women at a greater risk of having an increased level of blood glucose, blood pressure, and blood cholesterol. The risk escalates for older women with a high BMI. To maintain a normal level of blood sugar, blood cholesterol, and blood pressure, the risk factors should be controlled. While aging is inevitable, BMI level can be managed by practicing a healthy lifestyle such as reducing fat, salt, and sugar intake in their diet, promoting physical activity, and maintaining a normal body weight.

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The Antioxidant Activity and Organoleptic Properties of Soursop Leaf Tea (*Annona Muricata L.*) and Moringa Leaf (*Moringa Oliefera L.*) in Combination with Guava Leaf (*Psidium Guajava*)

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ABSTRACT

Soursop leaf tea (*Annona muricata L.*) and drumstick tree leaf tea (*Moringa oliefera L.*) in combination with guava leaves (*Psidium guajava*) are innovative herbal drinks from Indonesia. Soursop, drumstick and guava leaves contain antioxidant compounds such as tannin, saponin, flavonoids, alkaloids, triterpene and quercetin. This study aims to compare the antioxidant activity and organoleptic properties between soursop leaf tea and drumstick tree leaf tea in combination with guava leaves. The study was conducted through analysing the production of tea with an overall drying temperature at 50 °C, 55 °C, 60 °C and 65 °C respectively. The antioxidant activity was measured using the UV-Vis spectrophotometric method (λ 517 nm), while the organoleptic properties were measured using the parameters of taste, colour aroma, and viscosity. The highest antioxidant activity was performed at a temperature of 50 °C, which measured the lowest EC50 value while having the lowest level of organoleptic properties.

Keywords: *soursop leaf tea, drumstick leaf tea, guava leaf, drying temperature, antioxidant activity and organoleptic properties*

INTRODUCTION

Tea is a popular type of beverage in Asia. The tea drinking culture is a socio-cultural function that bring families closer together.¹ Tea is generally made from the young shoots of tea leaves. The tea leaves have undergone the processing of withering, rolling, grinding, enzymatic oxidation and drying. Tea has been widely recognised as having various benefits not limited to being a regular daily drink, but also health benefits including its use as alternative medicine² or as a cancer drug.³

Tea is believed containing flavonoids which have are antioxidants.⁴ Almost every group of flavonoids has the capacity to act as antioxidants. Flavones and

catechins contain flavonoids that can help to protect the body against reactive oxygen species. They are associated with improved pulmonary functions and the reduction of a chronic cough.⁵ Body cells and tissues are continuously threatened by the damage caused by free radicals and reactive oxygen species, which are produced during normal oxygen metabolism or induced by exogenous damage.⁶

The development of health sciences in relation to the tea production has expanded the use of materials to not only from the tea leaves buds but also from other plants such as soursop leaves, drumstick leaves, avocado leaves and guava leaves. Soursop leaves have been widely used as a herbal medicine to treat various diseases including asthma, diabetes and seizures.⁷ The content of the compounds in the soursop leaves includes steroids/terpenoids, flavonoids, coumarins, alkaloids, and tannins. Moringa leaves can be utilised as a nutritious medicinal ingredient because of its flavonoid content, which serve as antioxidants and anti-inflammatories. Flavonoid

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compounds are known to work as antioxidants against cancer, anti-microbials, antivirals, photosynthetic regulators, and growth regulators.⁸ Moringa leaves also contain anthraquinones, alkaloids, saponins, terpenoids, anthocyanins, tannins and carotenoids.⁹

The soursop, drumstick and guava leaves can be used as a herbal tea because the dried leaves are better preserved than fresh leaves. In addition, consuming the dried leaves as a herbal tea is also more practical. In the tea factory, the drying process aims to reduce the water level of the fresh tea leaves. The drying process should maintain the drying temperature, so then the active components of the leaves can be preserved. Therefore, it is important to investigate what is the optimum drying temperature in order to produce good quality tea with organoleptic properties. The aim of this study was to compare the antioxidant activity and organoleptic characteristics between soursop leaf (*Annona muricata* L.) and moringa leaf (*Moringa oleifera* L.) in combination with guava leaf (*Psidium guajava*).

MATERIAL AND METHOD

Materials: Soursop leaves, drumstick leaves and guava leaves were collected. Some of the tools and instruments prepared included a water level test (AOAC, 1995), a qualitative test of the phenolic and flavonoids compounds¹⁰, a quantitative test of antioxidant activity using the EC₅₀ method¹¹, and an organoleptic properties test.¹²

Procedure of the sample preparation:

1. Tea Preparation: First, the soursop, drumstick and guava leaves were left to wither for approximately 24 hours. After the withering process, the leaves were divided into four parts with an equal composition of soursop leaves and combined drumstick and guava leaves. Each part was then dried at 50°C, 55°C, 60°C, and 65°C respectively using an oven for 2 hours. Subsequently, the dried leaves of the different drying temperatures were ground to produce the tea powder. The tea powder of the soursop leaves and the drumstick leaves in combination with guava leaves were then weighed. Every 100 mg of tea powder was packed into a labelled dyed bag, and then each tea bag was brewed in 70°C water for 4 minutes.

2. Determination of Phenolic Compound: Each 100 mg tea bag of a different drying temperature

was put into 100ml of hot water and boiled. After boiling, 5 ml of the tea from each tea bag was collected and put into a test tube. Each test tube with a tea solution had 5 drops of 5% FeCl₃ added. The test tube was shaken hard until the colour of the tea solution changed into blackish-blue, indicating the presence of a phenolic compound.

3. Qualitative Determination of Flavonoid Compounds:

Each 5ml tea (soursop leaf tea and the combination of drumstick leaves and guava leaves) solution was put into a test tube, and then 1 ml HCl concentrated powder was added, and 5 ml amyl alcohol. After the solution was shaken hard, the tea colour could turn orange, indicating the presence of flavonoid compounds.

4. Quantitative Determination of Antioxidants:

To determine the antioxidant activity in each tea bag, two methods were used; the α -diphenyl- β -picrylhydrazyl (DPPH) method and Effective Concentration [EC₅₀].¹³ In the DPPH method, the procedure involves a 4 ml DPPH solution of 0.07 mM put into a test tube. This was added to the 50 μ l tea solution. Each tea solution was homogenised with a vortex. Another DPPH solution was left without any treatment applied as the control sample. The UV-VIS Spectrophotometer with a 517nm wavelength at 40 minutes operating time was used to measure the solution. EC₍₅₀₎ (concentration required obtaining a 50% antioxidant effect) is a parameter utilised to measure the antioxidant capacity and to compare the activity of the different compounds. Substances that have high antioxidant activity will have a low level of EC₍₅₀₎.¹⁴

5. Organoleptic Properties Using Organoleptic Panel Testing:

The Organoleptic Panel Testing tool¹² was used to determine the organoleptic properties. The parameters for the organoleptic properties consist of taste, colour, aroma and appearance. The panel of 20 tea experts filled out a descriptive qualitative form in order to describe the organoleptic properties of each tea bag, each with a different drying temperature.

RESULTS AND DISCUSSION

The tea made from soursop leaves in combination with drumstick and guava leaves was based on the method developed in a previous study.¹⁵ The operating

condition of the withered leaves referred to the optimum condition of the soursop leaves, drumstick leaves, and guava leaves in this study. This present study used four variations of drying temperature (50°C, 55°C, 60°C, and 65 °C) to find out the antioxidant activity. Tests performed on the tea bags for the soursop leaves tea and the tea bags of the combined drumstick leaves and guava leaves yielded results of the organoleptic properties and the antioxidant activity, which has been described and discussed below.

Organoleptic Properties: After the drying process, the colour of the leaves turned brownish because of the carbonate group Maillard reaction of the glucose reacted with the nucleophilic amine group of proteins, which produced a distinctive brown colour. The drying process caused the leaves to be oxidised.¹⁶

Both the soursop leaf tea and the combined drumstick leaf and guava leaf tea had a bitter taste, which is an indication of antioxidants. The bitterness of the tea is generally attributable to the combination of catechins, saponins, polyphenols and amino acids, which are recognised as the components of antioxidants.¹⁷ Some flavonoids are very bitter, whereas others are not, depending on the type of glycoside chain. Naringin and neohesperidin are very bitter, whereas hesperidin is tasteless.¹⁸ The bitter taste is also caused by the catechins and tannins, that do not have tanning and clotted proteins.¹⁹

The aroma of the tea was bitter which caused by saponin.²⁰ The components in soursop leaves and combination of drumstick and guava leaves which caused the aroma is the glycosidase enzyme. Based on the results of organoleptic test, all 20 panellists stated that the taste, aroma, colour and viscosity of the soursop leaves tea and the drumstick leaves tea in combination with guava leaves was good. All panellists were generally favourable to consume the soursop leaves tea as well as the drumstick leaves and guava leaves tea.

Antioxidants Activities

1. The phenolic compound of the soursop leaf tea and the combination of drumstick leaf and guava leaf tea.

FeCl₃ reacted with the phenolic groups to form complexes of green, purple and black.²¹ Table 1 displays the presence of phenolic compound in

four different drying temperature teas. The (+) indicates the presence of phenolic compounds in the soursop leaf tea and the combination of drumstick leaf and guava leaf tea.

Table 1: Phenolic compound of the soursop leaf tea and the combination of drumstick leaf and guava leaf tea

No.	Drying Temperature (°C)	Phenolic compound
1.	50	+
2.	55	+
3.	60	+
4.	65	+

2. The flavonoid compound of the soursop leaf tea and the combination of drumstick leaf and guava leaf tea

The flavonoid compounds reacted to the magnesium powder and with the help of concentrated HCl, they formed a complex with green to orange flavonoid groups. The test results were positive when the orange colour emerged from the mahogany flavonoid complex (Robinson, 1995). Table 2 shows the presence of flavonoid compounds in the tested tea. The (+) indicates the presence of phenolic compounds in the soursop leaf tea and the combination drumstick leaf and guava leaf tea.

Table 2: Flavonoid compound of the soursop leaf tea and the combination drumstick leaf and guava leaf tea

No.	Drying Temperature (°C)	Flavonoid compound
1.	50	+
2.	55	+
3.	60	+
4.	65	+

Antioxidants Activity using EC₅₀: The EC₅₀ value is usually used to describe the antioxidant activity of the test material by the DPPH free radical scavenging method.¹³ The EC₅₀ values are inversely proportional to the ability of the antioxidant compounds. The smaller the EC₅₀ value, the stronger the antioxidant ability.¹⁴ The analysis result of the antioxidant activity in the present study showed that the effective concentration

value (EC_{50}) was at the higher drying temperature, so the EC_{50} value was lower. The highest levels of antioxidant activity were 76.06% for the soursop leaf tea and 70.49% for the combination of drumstick leaf and guava leaf tea. The highest level of antioxidant activity for both the soursop leaf tea and the combination of drumstick leaf and guava leaf tea were found from tea bags with a drying temperature of 50°C. Compared to the other drying temperatures of 55, 60, and 65°C, the 50°C drying temperature generated the highest level of antioxidant activity as indicated from the lowest EC_{50} level. However, the soursop leaf tea showed a higher antioxidant activity than the combination drumstick leaf and guava leaf tea. A possible explanation is that the soursop leaf tea has a higher number of phenolic and flavonoid compounds than the combination of drumstick leaves and guava leaves.

CONCLUSION

Drying temperature has a significant influence on determining the antioxidant activity levels of the soursop leaf tea and the combination drumstick leaf and guava leaf tea. The optimal operational drying temperature was 50°C, which produced the highest antioxidant activity and lowest EC_{50} value. The soursop leaf tea has a higher antioxidant level than the combination drumstick leaves and guava leaves at the drying temperature of 50°C. Based on the organoleptic test, the panellists stated that the soursop leaf tea and the combination drumstick leaf and guava leaf tea were both generally good in terms of aroma, colour, taste, and viscosity.

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Parent Communication Regarding Sexual and Reproductive Health of Adolescent: A Qualitative Systematic Review

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ABSTRACT

Parents have significant influence on the sexual and reproductive health of adolescent. This study aimed to describe parents communication related to the sexual and reproductive health of adolescent. This study present a systematic review of articles related to the topic in the last ten years (2008-2018). The review found 155 articles with 10 articles meeting inclusions criteria. There were five main themes including the reason for sexuality communication, discomfort talking about sexuality, communication barriers, intergenerational comparison and parent as a decision maker. It is recommended to reduce barriers, determine the proper reasons to start communication about sexuality and arrange a comfortable environment for adolescents to express their sexual and reproductive health needs to parents.

Keywords: *parenting, communication, adolescence, sexual health*

INTRODUCTION

The sexual and reproductive health of adolescent attracts global attention as the number of sexually active adolescents has been increasing in these recent years.¹ The population of adolescent was estimated to increase from 1.2 billion to 1.3 billion during 2010 and 2030, and become 18% and 15% of total world population respectively.² The teenagers tend to try new sexual experience as the manifestation of their puberty period. The age of sexual intercourse for the first time can also influence the decision of adolescents to use contraception that triggers sexual debut during his lifetime where sexual debut early in adolescence increases the risk of mouth STIs and unwanted pregnancies.^{2,3} but little is known about its effects beyond adolescence. This study examines the relationship between the age at first intercourse and subsequent contraceptive gaps.

METHODS We identified 3538 sexually active, fertile women participants from the 2006-2008 National Survey of Family Growth. Women were classified as consistent contraceptive users or inconsistent/nonusers. Age at first intercourse with a man was determined by self-report and categorized as <15, 15-17, and ≥18 years. **RESULTS** Twenty-three percent reported gaps in contraceptive use in the year prior to interview. Compared with women who were 18 or older at first intercourse, women who were <15 years of age at the time of first intercourse were nearly two times as likely to report a gap in contraceptive use (adjusted odds ratio: 1.93; 95% confidence interval: 1.23-3.00). A study stated that 33.5% of the adolescents had ever had sexual intercourse while as many as 32.5% had more than one sexual partners and only 26.2% stated that used condom in their last intercourse.⁴

Parental engagement still become an important factor to protect their children to have a negative sexual behaviors, especially in this internet era.⁵ The role of the family is very important to prevent risky sexual behavior in adolescents such as premarital sexual behavior.⁵ Some previous studies stated that adolescents who engage in premarital sex usually come from divorced families or teenagers who lived with his parents where a family function does not run properly⁶⁻⁹. One factor that causes poor family function is due to the lack of communication between parents and teenagers¹⁰.

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The few studies that reviewed qualitative studies especially those related to family experiences in communicating with adolescents related to sexual and reproductive health were the hallmarks of this study. The purpose of this current study was to describe results of a qualitative systematic review of parent communication regarding the sexual and reproductive health of adolescent.

METHOD

The study used several approaches qualitative systematic review. The most important of qualitative systematic reviews is the aim to answer research questions about participants' feelings and perceptions so that a detailed process was needed to achieve them.¹¹ The first stage that must be passed from this study is to determine the topic and purpose of the article review. The next step is to determine keywords to search for articles where in this study we use the "word parenting", "family communication", "parent-adolescent relationship", "sexual health", "sexuality", and "qualitative". Further, we determined the inclusion criteria which included 1) research participants were parents, both mother and father and teenager, male or female; 2) age for adolescent participants between 11-20 years; 3) research topics around family experiences and perspectives on adolescence sexual health; and 4) qualitative studies. The topic of LGBT was excluded from this study. Literature collected using data sources: Google Scholar, Science Direct, Proquest Health and Medical Complete, Psychology Journals Proquest, Proquest Science Journals and PubMed, during ten years from 2008 to 2018. Of the 155 papers identified, 58 articles were excluded due to duplication. As many as 20 articles met the inclusion criteria and were re-identified for eligibility until finally ten papers were found for review. The next important step is data extraction and synthesis data from the 10 papers reviewed.

RESULTS

Of the ten research articles reviewed, seven articles discussed parent communication, an article about father involvement in the reproductive health intervention, an article about puberty and an article about the role of parents in child development. In terms of research participants, three studies used mothers as participants in one study using fathers as informants. Five studies used parents

and teenage children as participants and only one study explored the experiences of young women. Regarding the data collection, four studies used focus group discussions, two studies conducted in-depth interviews, while the other studies applied narrative interviews, telephones interviews, audio recorded conversations and combination of written and group discussions.

Bello et al. has assessed the reactions of adolescents and their parents to puberty in urban poor settings in two African countries and compared to the experiences of current adolescents to their parents' generation. The participants was 66 boys and girls (aged 11-13 years) and their parents. The study was conducted by narrative interviews. The themes identified were adolescents' reaction to reviews their pubertal body changes, parental reactions to adolescent pubertal changes, pubertal intergenerational comparison of adolescent behavior.¹²

Cox et al. determined the content that should be included in a Web-based intervention that specifically targets improved mother-child communication with 24 mothers of sixth to eighth-grade students as participants. The focus group interview was used and the theme found were discomfort discussing sex with male children, the influence of mothers' belief, the need for developmentally appropriate information.¹³

Crichton et al. explored the quality of mother-daughter communication about sexual maturation, abstinence and unintended pregnancy in Nairobi, Kenya. A total of 87 girls (aged 12-17 years) and 37 mothers of teenage girls were included. The theme found were Mothers 'and daughters' views and preferences about communication , Mothers 'and Daughters' experiences: facilitators and barriers to communication , message content, how messages are conveyed, the impacts of context on communication.¹⁴

Francis et al. examined women 's attitude, knowledge, beliefs about HPV and cervical cancer prevention, vaccine awareness, and acceptance, and maternal - child communication about STDs and sexual health within an urban community in Johannesburg. This study included 24 women who have at least one child. The themes were maternal-child communication and sexuality, healthcare decision-making and gender roles, understanding of HPV and cervical cancer, vaccine acceptance.¹⁵

Grossman, Jenkins, and Richer gave a unique long examination of parents' perceptions of continuity and

change in middle-school communication from middle school to high school. As many as 23 parents (20 mothers, 3 fathers) were included for interview. The theme found were reason for sexuality communication, comfort talking about sex, talk about dating and relationships, talk about readiness for sex, and talk about sexual risk and protection.¹⁶

Guilamo-Ramos et al. identified and characterized fathers' role in shaping Latino adolescent sexual behavior and the feasibility and acceptability of a father-son intervention. As many as 30 fathers-son dyads were included for in-dept interview. The theme found wer fathers matter latino and can shape adolescent male sexual decision making, Latino fathers influence their sons through specific paternal parenting processes, and a Latino father-son approach is acceptable and feasible.¹⁷

Hutchinson and Cederbaum tried to understand adolescent females' perceptions about how their fathers contributed to their sexual socialization. The total of 234 females' adolescent (aged 19-21 years) were included. Telephone interview (35-55 minutes) was conducted as part of the larger quantitative study. The themes were how fathers were contributed to their daughters 'sexual socialization, how fathers could have had their daughters' sexual socialization, and barriers.¹⁸

Nurachmah et al. investigated parents and their female adolescent communication patterns of sexual and reproductive health in West Kalimantan, Indonesia. As many as 15 adolescent girls (aged 13-15 years) and 14 mothers were included in a focus group discussion. The findings were infrequent mother-daughter communication about sexuality, mothers tend to avoid discussing srh or feel ashamed and that it is not culturally acceptable to talk about sexual matters, topic about body change during puberty as the content of the mother-daughter communication, and both mother and daughters need adequate information about SRH.¹⁹it appears to be inadequately practiced in Indonesia. Given that female adolescents in Indonesia are faced with increased sex-related risks, it is important to understand, from parents and adolescents' perspectives, how parents communicate about SRH to their adolescents. This study was designed to investigate parents and their female adolescent children's patterns of SRH communication in West Kalimantan, Indonesia. A total of 15 adolescent girls (ages 13-15

Ramchandani et al. characterized the messages mothers communicate to young adolescents regarding

abstinence. As many as 15 mother-daughter dyads and 6 mother-son dyads were involved. The findings were that the children need to know what abstinence is, the needs for setting boundaries for abstinence, abstinence is best considering the risks, and suggestion to come to talk to the partents.²⁰

Worthman, Tomlinson, and Rotheram-Borus tried to understand parent ethnotheories about child developmental needs, appropriate parenting and effects of quality of early childcare. As many as 38 mothers were involve to complete written task and group discussion. It was found that early childhood as a crucial, sensitive period. The focus of parental concern and effort were danger, monitor/control, puberty, reproductive risk, peer influence, morality, teachable, inform/advice, and risk-taking.

From the results of the data synthesis of 10 papers, reviewers have identified **five main** theme related parent communication regarding adolescent sexual and reproductive health that is the reason for sexuality communication, discomfort talking about sexuality, barriers of communication, intergenerational comparison and parent as a decision maker. The main theme is presented in Table 1.

Table 1: Data synthesis of papers reviewed

Themes	Papers
Reason for sexuality communication	Francis et al. (2011) ¹⁵ Grossman, Jenkins and Richer (2018) ¹⁶ Ramchandani et al. (2017) ²⁰ Worthman, Tomlinson and Rotheram Borus (2016) ²¹
Discomfort talking about sexuality	Cox et al. (2010) ¹³ Nurachmah et al. (2018) ¹⁹
Barriers of communication	Crichton et al. (2012) ¹⁴ Hutchinson and Cederbaum (2011) ¹⁸
Intergenerational comparison	Bello et al. (2017) ¹²
Parent as decision maker	Guilamo-Ramos et al. (2018) ¹⁷ Ramchandani et al. (2017) ²⁰

DISCUSSION

After the data extraction process and synthetic data, the researchers had identified five main themes contained in the parents' experience of communicating with

teenagers on the topic of sexual and reproductive health. All of these themes reflect the answers to the objectives of this study, namely parents communication regarding the sexual and reproductive health of the adolescent. Communication has an important role in keeping the family functioning properly, as well as the physical and mental health of family members. Communication also plays an important role in the process of making decisions in families. Most problems that arise in the family are because there is a problem in communication between couple²². When communication with a partner does not go well, the child will be affected.

In children with adolescence, communication between parents and adolescents will lead adolescents to improve social and health behavior, in this case sexual and reproductive health. Young women are usually more comfortable talking about privacy about sexuality with mothers than with fathers¹⁰, this is because mothers know more about a woman's body parts and have experienced the same things as young women feel¹⁶.

Regarding the barrier in communication, parents feel insecure about discussing sexuality with adolescents due to the lack of information they have and lack of skill of doing sex al content communication.²³ In terms of generational differences between parents and adolescents, the rapid advancement of technology and the ease of internet access make teenagers prefer to seek information related to sexual and reproductive health through internet media rather than asking parents, even though this phenomenon was not found when the parents were still small first.^{23,24} However, parents are still looking for a decision maker when teenagers experience problems related to sexual and reproductive health.^{17,20}

CONCLUSIONS

The study of qualitative systematic review concludes that parent-adolescent communication about sexual and reproductive health is very important for the adolescents wellness; by reducing the communication barriers, setting the right reasons for initiating communication about sexual topic and arranging a comfortable environment for teenagers to express their sexual and reproductive health needs to parents.

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Five Types of Personality and the Locus of Internal Control in relation to Preeclampsia Pregnancy

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ABSTRACT

Preeclampsia is one of the highest mortality factors for pregnant women. Hypertension, one of the main characteristics of preeclampsia, is the second main causes of maternal mortality at 27.1%. During pregnancy, they will face physical and psychological stressors. One of the factors related to stress management is the woman's characteristics and the locus of control. This study aims to identify the relationship between the five types of personality and the locus of internal control in relation to preeclampsia in pregnancy. This study used a cross-sectional design. The population of this study consisted of pregnant women with preeclampsia who came to the independent midwifery practices in Jombang; 135 women total. The sample was selected using the total sampling method. The data was analysed by regression analysis. The independent variables related to preeclampsia included neuroticism ($p=0.003$; $\text{Exp}(B)=11.234$) and the negative internal locus of control ($p=0.000$; $\text{Exp}(B)=11.387$). It is expected that midwifery professionals can provide counselling services effectively and efficiently in relation to performing antenatal care services.

Keywords: *personality, locus of control internal, pregnancy, preeclampsia.*

INTRODUCTION

Preeclampsia is one of the highest mortality factors for pregnant women¹. Hypertension, one of the main characteristics of preeclampsia, is the second main cause of maternal mortality at 27.1%, after haemorrhage (30.3%) and before infection (7.3%)². According to the data of *Survey Demografi Kesehatan Indonesia (SDKI)* in 2007 and 2012, the Maternal Mortality Rate (MMR) in Indonesia was still high, by as many as 228 and 359 per-100,000 live births respectively. This number is still far from the target of the Millennium Development Goals (MDGs) 2015, which aims for 102 per-100,000 live births³.

According to the health profile of Indonesia's East Java Province in 2012 and 2013, the mortality rate was

97.43 per-100,000 live births and 97.13 per-100,000 live births respectively⁴. In Jombang City in 2017, there were 28 maternal deaths following live births. The number increased from 2016, with 17 deaths. The 28 deaths in 2017 were caused by preeclampsia (5 cases), haemorrhage post-partum (4 cases), eclampsia (3 cases), amniotic embolism (2 cases) and an ante-partum bleeding case, while the other 13 was caused by other co-morbidities. These cases must be considered to devise more effective initial assessments and interventions in order to decrease the maternal mortality rate caused by preeclampsia and eclampsia.

Pregnant women are one of the most vulnerable members of a community. During pregnancy, they will face physical and psychological stressors. Good stress management determines the success of the pregnancy. One of the factors related to stress management is the woman's characteristics and how far the woman can control her emotions in relation to overcoming the stress related to the physical alterations caused by pregnancy and for other reasons.

There are five basic personalities according to Goldberg, encompassing openness to experience,

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conscientiousness, extraversion, agreeableness and neuroticism, which affects people in the context of solving their problems⁵ The locus of internal control also influences the pregnant women's condition⁶their commitments are influenced by their personality traits, as they are also known as emotional labour. The purpose of this study is to investigate the dominant personality traits in the company based on the Big Five Personality theory, to assess the level of employees' commitment to service quality (quality pledge. This study aimed to identify the relationship between the five types of personality and the locus of internal control with preeclampsia pregnancy.

METHOD

This study used a cross-sectional design. The study was conducted in Jombang Regency, from July to September 2016. The population of this study were all of the pregnant women with preeclampsia who came to the selected independent midwifery practices in Jombang, totalling 135 women. The sample was selected using the total sampling method. The instrument used was a questionnaire with a Cronbach's Alpha value of 0.862. The data was analysed using regression analysis.

RESULTS

Table 1: Demographic characteristics of the respondents (n = 135)

Characteristics	Parameters	n	%
Age (years old)	18-35	73	54.0
	> 35	62	46.0
Pregnancy	Primigravida	44	33.0
	Multigravida	91	67.0
Occupation	Housemaid	27	20
	Factory workers	53	39
	Teacher	55	41
Education	Senior High School	116	86
	College	19	14
Locus Internal Control	Positive	53	39
	Negative	82	61
Personality	Openness to experience	12	8
	Conscientiousness	18	13
	Extraversion	7	5
	Agreeableness	30	22
	Neuroticism	68	52

Table 2: Results of logistic regression analysis

Variable	B	S.E.	Sig.	Exp (B)	95%CI
Neuroticism	2.897	0.432	0.003	11.234	2.899< OR < 43.587
Negative ILC	1.143	0.458	0.000	11.387	1.897< OR < 23.426

Table 1 shows that most of the respondents were 18-35 years old (54%). Most of the women had multigravida (67%). Regarding occupation, most were factory workers (395) and had a senior high school level of education (86%). The most common locus of control had was negative, and the most common personality was neuroticism (52%).

Table 2 shows that the independent variables related to preeclampsia included the personality of neuroticism ($p=0.003$; $\text{Exp}(B)=11.234$) and the negative internal locus of control ($p=0.000$; $\text{Exp}(B)=11.387$).

DISCUSSION

- Age:** Based on age, the respondent's characteristics showed that the majority of the respondents were 18-35 years old. Age is a determinant factor influencing the health status of pregnant women. However, in preeclampsia cases, the mother's age does not influence occurrence. Instead, it is affected by other factors encompassing the environment, health record, parity, metabolism disorders, psychological conditions, and social-economic status⁷. The many occurrences of preeclampsia at a healthy age are due to most pregnancy and childbirth cases occurring between the ages of 18 and 35 years old. According to the Indonesian Ministry of Health, the age of pregnant women who are at the highest level of risk is mothers who are too young (<20 years) or too old (> 35 years).
- Pregnancy:** The characteristics of the respondents based on their pregnancy showed that most of the respondents had multigravida pregnancy. Cunningham (2014) stated that the risk factors for preeclampsia are nullipara, the environment, socioeconomic conditions, seasonal influences, obesity, gemelli pregnancy, maternal age, impaired metabolism and a family history of

preeclampsia or previous history of preeclampsia. A study conducted by Hindun (2015) showed that primigravida has a greater chance of developing by 2.875 times into preeclampsia compared with non-primigravida.

3. Occupation: The characteristics of the respondents based on their work indicated that most of the pregnant women work as factory workers. The risk factors for preeclampsia include their socioeconomic condition, in which one of the supporting factors is employment⁷. Work as a factory worker is an activity that involves physical activity. In a factory, the conditions are always pressured, which is a factor that causes psychological disorders that affect maternal pregnancy. A study mentioned that mothers who work in the formal sector have better access to information about their health, more actively have a positive attitude and more independently take care actions⁸.

4. Education: The characteristics of the respondents based on education level was that the majority of respondents had a high school level of education. A person's level of education influences how a person makes decisions on the health problems that they experience. The lower the mother's education level, the less the mother has the desire to use health services. A study mentioned that mothers with a higher education level have better access to information about health. It makes them have a better decision-making process related to determining care planning for the duration of their pregnancy⁸.

5. Personality and Locus of Control: The regression analysis results showed that the independent variable allegedly related to the preeclampsia cases was the personality of neuroticism with $\text{Exp}(B)=11.234$. It means that pregnant women with a neurotic personality are 11.387 times more likely to get preeclampsia. The negative ILC has a relationship with preeclampsia with $\text{Exp}(B)$ 11.387. This means that pregnant women with a negative ILC have 11.387 times the probability of having preeclampsia.

Neuroticism is a personality in which a person can evaluate their ability to handle pressure or stress⁹. The positive characteristic of neuroticism is emotional stability. Individuals with emotional stability tend to be calm in facing problems, have self-confidence and firm principles. However, the negative characteristics

of neuroticism are being easily nervous, depressed, not confident and easily changing their mind⁵. A study proved that there is an influence between stress and the occurrence of hypertension in pregnant women¹⁰. This is because they are unable to overcome the problems faced by their mental, physical and emotional health.

The negative attributes of neuroticism as mentioned above show that the pregnant women were not ready to adapt to the physical and psychological alterations of pregnancy. It influences their mental and emotional health, and can affect their cardiovascular condition, increasing their blood pressure and thus, leading to preeclampsia¹¹ who were matched for age and date of delivery. The incidences of diabetes, dyslipidemia, hypertension and cardiovascular events after pregnancy were identified from medical records after the date of delivery to the date of an event or the end of the study.

RESULTS

The median follow-up duration was 9.8 years (interquartile 5.1–12.7 years).

The study showed that there was a relationship between negative locus of control and the incidence rate of preeclampsia. Locus of control is a condition where a person can control him/herself against the problem at hand. When a pregnant woman is unable to adapt to a problem, it means that the pregnant woman has a negative locus of control. The risk factors for preeclampsia are nullipara, the environment, socioeconomic conditions, seasonal influences, obesity, gemelli pregnancy, maternal age, impaired metabolism and a family history of preeclampsia or a history of previous preeclampsia, as well as psychological factors^{7,12}.

CONCLUSION

Based on the results of the study, it showed that out of the five major properties of personality, neuroticism and having a negative internal locus of control were the variables most associated with the incidence rate of preeclampsia. It is expected that a midwifery professional can provide counselling services effectively and efficiently in relation to performing antenatal care services.

Conflict of Interest: None.

Ethical Clearance: The study passed ethical clearance from Ethical Committee of the Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia.

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The Effect of Diabetes Self-Management Education, Based on The Health Belief Model, on the Psychosocial Outcome of Type 2 Diabetic Patients in Indonesia

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ABSTRACT

Lack of knowledge on disease management may distress type 2 diabetic patients, which could negatively affect their quality of life. The health belief model has been widely used to improve the patient's knowledge, skill, and abilities in relation to self-care. The study aimed to examine the effect of diabetes self-management education, based on the Health Belief Model (HBM), on the psychosocial outcome (self-efficacy, self-care behaviour, distress, and quality of life), and glycemic control (measured by their blood glucose level). A randomised control trial was employed, using a pre-test-post-test design. Our study recruited 120 type 2 diabetic patients who were equally assigned to the intervention group (n= 60) and the control group (n=60). The data was analysed using an independent t test with a significance level of 0.05. After the intervention, the intervention group and control group showed significantly different scores in self-efficacy, self-care behaviour, diabetes distress, quality of life, and blood glucose level. Diabetes self-management education based on the HBM had a significant effect on the psychosocial outcome of patients with type 2 diabetes.

Keywords: health education, health belief model, type 2 diabetes, psychosocial outcome, glycemic control.

INTRODUCTION

Diabetes Mellitus (DM) is a major chronic disease in the world which can cause heart disease, blindness, renal failure and lower extremity amputations.^{1, 2} Globally, the number of people living with type 2 DM was approximately 424.9 million people in 2017.² Type 2 diabetes affected almost 6.7% of the Indonesia population, approximately 10.3 million people, in 2017.² Worldwide, Indonesia is ranked 6th among countries with a high percentage of the population with type 2 DM, after China, India, the United States, Brazil and Mexico.² Diabetes type 2 is the third leading cause of death in Indonesia after stroke (21.1%) and coronary heart disease (12.9%).³

Living with diabetes can be difficult for patients and their families. Diabetic patients can show negative psychological responses, including feeling guilty and hopeless, losing confidence, having a low self-image, and becoming anxious and angry.^{4, 5} Diabetes distress is an additional burden for patients and their families, as a result of the cost incurred due to long-term care and treatments. Appropriate treatment is required to prevent disability, poor productivity, low quality of life and increased mortality.⁶ Patients and their families should acquire the knowledge, skills and self-efficacy related to the proper self-management of DM for successful treatment.^{7, 8} The Health Belief Model (HBM) is a constructed model that has been widely used to predict adherence to self-care behaviour.⁹ It consists of five core components, including perceived severity, perceived susceptibility, cues to action, perceived benefits and perceived barriers. Perceived severity relates to beliefs on the severity level of the disease and the consequences relevant to the illness. Perceived susceptibility represents to what extent the person perceives their risk of having the illness. Cues to action reflects the internal or external

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indications such as physical symptoms (internal) and medication reminders (external). Perceived benefits involves the individual's perception toward the advantages and accessibility of the actions that they are to take. Perceived barriers includes the negative consequences from the actions taken.⁹ The study aimed to examine the effect of diabetes self-management education, based on HBM, on psychosocial outcome (self-efficacy, self-care behaviour, distress and quality of life), and glycemic control.

METHOD

The study employed a randomised control trial with a pre-test- post-test design. The study population was made up of 382 patients with type 2 DM attending the Patrang community health center (CHC) in Jember district, East Java in Indonesia. The inclusion criteria was that the patients had been diagnosed with type 2 DM within the last six months, who showed compos mentis mindfulness and were generally in good condition. Their age should have been between 40 and 65 years old, they lived within the Patrang CHC service area, and expressed a willingness to participate in the study. Patients with a cognitive impairment (dementia and active psychosis) were excluded. 260 patients met the inclusion and exclusion criteria.

Using the 95% confidence interval ($\alpha = 0.05$) and a statistical power of 80% ($\beta = 0.20$), the sample size for the intervention group and control group was 55 subjects each. To anticipate the participants dropping out, an additional 10% was determined, resulting in 60 subjects recruited for each group. Simple random sampling was applied in order to select the study participants.

The intervention group received a six-week educational program using the HBM approach over six sessions. The control group received their usual daily care. Every educational session lasted for approximately 120 minutes. The intervention group received knowledge about diabetes and self-management activities based on the four main sources of self-efficacy including performance accomplishment, vicarious experience, verbal persuasion, and physiological and emotional arousal. The six intervention sessions were divided into two home visit sessions (sessions 1 and 6) and four group sessions (sessions 2-5). The educational program was prepared based on the national standard for diabetes self-management education and support, and the management and prevention of type 2 DM from

the Indonesian Endocrinology Association (PERKENI). Additional information was obtained from the American Diabetes Association (ADA). The pre-test was conducted before the intervention started, while the post-test was conducted three months after the intervention.

The pre-test and post-test questionnaires used four scales to measure the psychosocial outcome, including the diabetes management self-efficacy scale (DMSES), the diabetes distress scale (DDS), the summary of diabetes self-care activities (SDSCA), and the diabetes quality of life scale (DQOL), in addition to the glycemic control test tool. The DMSES questionnaire used was a modified version by Shi, Ostwald, & Wang (2010) from the van der Bijl instrument.¹⁰ The DMSES questionnaire consisted of 20 items with a Likert scale of 1-5. The results of the validity test showed an r-value of 0.658, and reliability test of $\alpha = 0.975$. The DDS questionnaire of 17 items was adopted from the instrument developed by Polonsky, et al. (2005).¹¹ The results of the DDS validity test showed an r-value that was larger than 0.537, with a reliability test of $\alpha = 0.874$. The SDSCA questionnaire consisted of 12 items with a scoring system of 0 – 7, using the Wu modified version (2009) from the Toobert SDSCA instrument.¹² The SDCA validity test result was $r = 0.632$, with the reliability test being $\alpha = 0.923$. The DQOL questionnaire had 30 items with multiple selection available, scored using the Likert scale. The DQOL result of the validity was $r > 0.36$, and the reliability test $\alpha = 0.956$. The data analysis used an independent t-test to examine the group differences with a significance p-value of $\alpha \leq 0.05$.

RESULTS

Table 1 shows the mean of patient age was 57.60 years. Most of the patients were female (65%), employed (65%), and had an education level of junior high school (41.67%). The average duration of illness among the patients was 45.07 months. The patient characteristics showed no significant difference between the intervention group and the control group. Table 1 displays the baseline score of self-efficacy, self-care behaviour, diabetes distress, quality of life and blood glucose level. The mean scores for self-efficacy, self-care behaviour, diabetes distress, and quality of life were 41.63, 15.13, 39.00, and 65.77 respectively, with no significant difference between the intervention group and the control group. Likewise, the average blood glucose level was 207.62 mg/dl, and no significant difference was observed between the intervention group and the control group.

Table 1: Baseline characteristics of all patients (n = 120) in the intervention group and the control group (n = 60/group)

Variable	All patients (n, %) or mean ± SD	Intervention group (n, %) or mean ± SD	Control group (n, %) or mean ± SD	P-value
Age (years)	57.60 ± 6.25	57.50 ± 6.83	57.70 ± 5.65	0.862
Gender				
Female	76 (63.33%)	42 (70%)	34 (56.67%)	0.132
Male	44 (36.67 %)	18 (30%)	26 (43.33%)	
Employment				
Employed	78 (65%)	38 (63.33%)	40 (66.67%)	0.718
Unemployed/retired/house- wife	42 (35%)	22(36.67%)	20 (33.33%)	
Duration of illness	45.07 ± 33.05	45.33 ± 37.45	44.80 ± 28.28	0.930
Level of education				
Elementary school	39 (32.5%)	18 (30%)	21 (35%)	0.769
Junior high school	50 (41.67%)	24 (40%)	26(43.33%)	
Senior high school	23 (19.17%)	12 (20%)	11 (18.33%)	
Higher education	8 (6.67%)	6 (10%)	2 (3.33%)	
Self-efficacy score	41.63 ± 8.75	41.83 ± 9.67	41.43 ± 7.80	0.803
Self-care behaviour score	15.13 ± 4.86	14.93 ± 4.64	15.33 ± 5.10	0.654
Diabetes distress score	39.00 ± 6.11	39.33 ± 6.87	38.67 ± 5.28	0.552
Quality of life score	65.77 ± 15.37	66.03 ± 17.09	65.50 ± 13.57	0.850
Blood glucose level (mg/dl)	207.62 ± 63.69	207.62 ± 63.69	197.37 ± 65.91	0.078

Table 2 shows that both groups had increased scores for self-efficacy, self-care, and quality of life from the baseline. The diabetes distress score and blood glucose level were reduced in both groups after the intervention. The post-test results show a statistically significant difference in each score of the psychosocial outcome between the intervention group and the control group. A more significant improvement in psychosocial outcome was experienced by the intervention group than the control group, indicating the positive effect of diabetes self-management education using the HBM approach.

Table 2: Comparison of the pre- and post-intervention variables of each group and the results of the independent t-test after the intervention

Variable*	Intervention group (n = 60)		Control group (n = 60)		F	p-value	t	p-value
	Pre	Post	Pre	Post				
Self-efficacy score	41.83 ± 9.67	61.87 ± 6.84	41.43 ± 7.80	56.10 ± 11.06	11.618	0.001	3.434	0.001
Self-care behaviour score	14.93 ± 4.64	23.90 ± 6.49	15.33 ± 5.10	21.83 ± 4.43	13.893	0.001	2.039	0.044
Diabetes distress score	39.33 ± 6.87	28.23 ± 3.79	38.67 ± 5.28	35.27 ± 5.76	22.865	0.001	-7.889	0.001
Quality of life score	66.03 ± 17.09	92.33 ± 11.17	65.50 ± 13.57	77.73 ± 15.67	6.775	0.010	5.878	0.001
Blood glucose level (mg/dl)	207.62±63.69	118.25±23.50	197.37±65.91	187.37±52.49	19.625	0.001	-9.310	0.001

*data expressed as mean ± standard deviation

DISCUSSION

Characteristics of the study participants: The average age of the diabetic patients was 57.6 years old, confirming the previous study stating that insulin retention tends to increase by the age of 45 years old or older.⁴ Individuals older than 45 years old have an increased risk of developing type 2 diabetes by almost 15 times compared to younger individuals.³ Most of the patients with type 2 diabetes in this study were female, again confirming the results of previous studies.^{7, 13} Elderly women may have a higher LDL cholesterol and triglyceride level than men, which affects the decreasing level of their insulin sensitivity.¹⁴ The average duration of illness among the diabetic patients in the present study was 45.07 months, or almost four years. The risk of macrovascular complication from diabetes increased in the fifth year since the diabetes was first diagnosed.¹⁵

In our study, most of the participants in both groups had completed junior high school and were employed. Level of education may influence the individual's acceptance of information and their capacity to manage stressors.^{16,17} Being employed could increase the individual's self-confidence in relation to problem solving, as having a source of income which enable them to access information, appropriate care and better treatment.^{18,19}

Self-efficacy before and after the intervention: The results of the data analysis showed that there was a significant difference in the self-efficacy between the groups after the intervention. Perceived self-efficacy affects the way that someone understands, feels, senses, drives their self-motivation, and takes action, which can generate effects through cognitive, motivational, affective and selection processes.²⁰ Improving the patient's perception of their vulnerability and the disease severity during the health education intervention could help patients to manage the disease, which increases their self-efficacy.^{21, 22}

Self-care behaviour before and after the intervention: The results showed that there were significant differences related to self-care behaviour between the intervention group and the control group. The acquisition of knowledge about the disease and care management of the disease is crucial in helping diabetic patients perform the proper self-care behaviour.⁸ Self-care depends on the patient's ability to make decisions and

daily assessments in order to implement comprehensive diabetes management.¹² Diabetes patients with a good self-care ability can control their blood sugar levels by changing to a healthier lifestyle.²³

Diabetes Distress before and after intervention: The intervention group experienced a more significant decrease in their diabetes distress score than the control group after the educational intervention. Having proper health education can help them to gain self-control so then the patient can maintain an ideal health condition and reduce stress.¹⁹ Acquiring coping strategies to reduce stress could encourage diabetic patients to seek social support from their family, friends, neighbours and co-workers.²⁴ Having cognitive skills would increase the patient's understanding and acceptance of their condition, so as to reduce the level of stress.¹⁹

Quality of life before and after the intervention: An essential key to the quality of life assessment was the satisfaction of self-care. Health workers have an important role in providing proper health education to patients and their families in promoting the self-care of diabetes with complications, in order to achieve an optimal quality of life.^{7,25} The ability to perform self-care and knowing how to reduce the risk of complications could improve quality of life.¹

Glycemic control: The intervention group had a more significantly reduced level of blood sugar than the control group after the HBM educational intervention. Knowledge about diabetes helped the patient to control the disease and to reduce the risk of disability.^{15, 22} The diabetes self-management education (DSME) significantly reduced the patient's fasting blood glucose level, improved their diabetes knowledge, self-management skill and self-efficacy.²⁶

CONCLUSION

This study has highlighted the importance of health education in improving the patient's psychosocial outcome. This educational intervention, along with the HBM approach, has significantly improved self-efficacy, self-care behaviour and quality of life, as well as reducing the level of diabetes distress and their blood glucose level. The diabetes self-management education based on the Health Belief Model is recommended to be used as a health education intervention for patients with type 2 diabetes.

Ethical Clearance: Ethical approval was granted by the School of Public Health in Airlangga University, Surabaya.

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How does the Dayak Ngaju Community Treat Malaria? A Qualitative Study on the Use of Traditional Medicine in Central Kalimantan Province, Indonesia

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ABSTRACT

Background: Malaria is an endemic disease present in most tropical countries, including Indonesia. The elimination of Malaria has been among the strategies used to improve the health status of the community. However, most traditional tribes in Indonesia who live in remote areas may opt to use traditional medicine instead of the biomedical services available in health facilities. This study aimed to shed a light on the use of traditional medicine for treating malaria within the Dayak Ngaju community.

Method: This research was designed using a qualitative approach. Five respondents, consisting of a community leader and traditional healers, agreed to participate in the study. The interviews were conducted in the interviewee's house in Gunung Mas district, Central Kalimantan province. Descriptive analysis was employed to explain the phenomena of the use of traditional medicine within the study community.

Results: Three themes emerged as the result of the study, including 1) the community perception of malaria, 2) familial influence on the use of traditional medicine, and 3) access to public health facilities for malaria treatment. People consider malaria to be a mild disease that the traditional healer has adequate knowledge of and capacity to cure. The family has the role of encouraging and deciding on the use of traditional medicine. Despite the use of traditional medicine, Dayak Ngaju community use the biomedical health services when they are accessible.

Conclusion: Traditional medicine is considered to be the first option for seeking care among the Dayak Ngaju community. Providing access to health facilities will promote the use of said facilities and biomedical services for malaria treatment.

Keywords: *Dayak Ngaju, traditional medicine, malaria, qualitative study*

INTRODUCTION

Malaria is an endemic disease in tropical countries, including Indonesia. The physical environment such as air temperature, humidity, sunlight, rain, and water currents are the contributing factors of the breeding habitat for mosquitoes, including *Anopheles* sp, the

host of malaria parasites.¹ According to the World Health Organisation (WHO), approximately 212 million malaria cases occurred in 2015, claiming the lives of 429,000 people worldwide.² Approximately half of all Indonesians live in malaria endemic areas.² The national Annual Parasite Incidence (API) in Indonesia was approximately 0.85 per 1000 population in 2015.³

Central Kalimantan is an endemic area of malaria in Indonesia. Although the Malaria API of Central Kalimantan was approximately 0.42 per 1000 population in 2017, certain areas had a higher API than the national rate.^{3, 4} Malaria cases were particularly found in some districts in Central Kalimantan province, including Gunung Mas, Kapuas, Katingan and Seruyan which

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especially affect the indigenous population. Their economic activities are mostly related to agriculture, plantations and mining, which leads to various environmental changes and the migration of the population from other provinces or islands of Indonesia. Gunung Mas's topography consist of rivers, tropical forest, and swamp which are an ideal habitat for the *Anopheles sp* mosquito.⁵ The population of Gunung Mas district is dominated by the Dayak ethnic. Dayak Ngaju are one of the Dayak ethnicities that still practice their traditional beliefs in relation to the treatment of infectious disease, including malaria.

With the rapid development of medical science and technology, traditional medicine has also received attention when developing new drugs.⁶ Traditional medicine is still believed to have a strong efficacy in association with recovering from ill health among the Dayak Ngaju community. Some community members would use modern medical treatment, however the isolation and remote location of the Dayak Ngaju community causes most people to rely on traditional medicine for treating communicable diseases.⁵ Remote areas in Indonesia are often underprivileged, in relation to medical and other health staffs.⁷ Therefore, it is common for indigenous people to utilise traditional medicine.⁸ Maintaining cultural beliefs through the use of traditional medicine has received attention for its potential success, acceptability and accessibility.⁶ In the Dayak Ngaju community, the treatment ritual of a certain disease is usually performed by the traditional healer, locally known as the *tabib* or *lasang* or *bahtra*, at the residence of the sick man.

Traditional medicine has been seen by the Dayak Ngaju community as the primary treatment before utilising modern medicine in district hospitals or other modern health facilities. For this community, illness is not only viewed as a symptom of individual biology, but is holistically related to the nature, humanity and God. Therefore, to gain good health when seeking treatment, people should not only use drugs as the treatment but also practice certain traditional rituals involving ancient mantras (*Sangiang* language).⁹ Therefore, the healing process for a disease does not only deal with the biological aspects of the patient, but also the socio-cultural and spiritual aspects.⁹ This research aims to elucidate the beliefs and practices of the Dayak Ngaju community in relation to using traditional medicine as an alternative to malaria treatment.

MATERIAL AND METHOD

A qualitative study design was employed using in-depth unstructured interviews. The researcher (TL) was the research instrument who conducted the interview. The Dayak Ngaju community leader in Kualakurun sub-district was approached by the researcher and was asked to recommend four other key informants to participate in the study. The five respondents consisted of the community leader and four traditional healers (*Bahtra*). The interview was conducted in the Dayak language. The researcher was a native to speaking the language, therefore no language barrier was experienced during the interview. The key informants were asked several questions including: 'What is the concept of health and disease within the Dayak Ngaju Community?' 'How do people perceive the malaria disease?' 'How the traditional medicine is delivered?' and 'What treatment options are used by the Dayak Ngaju community?' Each interview was recorded using an audio-tape and lasted approximately an hour. Each interview was conducted separately at the interviewee's house to ensure that all of the interviewees felt relaxed in telling their experience. The researcher also took brief notes during the interview. The audio records were textually transcribed in the Dayak language and then translated into Bahasa Indonesia (the national language). The data analysis process included listening carefully to the records and reading the interview transcripts repeatedly in order to understand the content. The researchers read the translated interview transcripts separately. Key statements were extracted and highlighted to grasp the meanings. The meanings were consolidated by the researchers in order to produce the themes.

RESULTS

From the data analysis, three themes emerged on the belief and practice of traditional medicine for treating malaria: 1) Dayak Ngaju community perception of malaria, 2) family influence on the use of traditional medicine, and 3) access to public health facilities for malaria treatment.

Dayak Ngaju community perception of Malaria: The Dayak Ngaju community believe that being healthy or ill (*barigas* dan *haban*) is determined by the combined factors of nature/the environment, humanity and spirits. The occurrence of a disease is not only biologically caused by the natural or human factor. It may also affect someone because of supernatural power. Therefore, in

order to cure the disease, it would not only involve herbs and other materials as medicine, but also traditional rituals to satisfy the spirits.

Knowledge of disease is a crucial competency of the traditional healer (*bahtra*) in order to determine the illness and the medication required for the ill person. The competency is obtained usually from knowledge passed down from generation to generation within the *bahtra* family. In the Dayak Ngaju language, malaria is termed “*Sahangen*”, a disease that is considered mild and not dangerous with some common symptoms including fever, bone pain and a prolonged headache. An interviewee, a *bahtra*, said that there is “nothing to worry about malaria. It is *Sahangen*, not dangerous. Everyone can get it including my own children. Especially for elderly, sometimes having fever is just normal. Death is destiny” (P2). Malaria is also considered to be a disease that is necessary for a person to grow in maturity, as an interviewee pointed out: “So somebody gets this malaria. It means (that) he is experiencing *Sahangen*. This is a process toward a person’s maturity. A process of becoming a better human being.” (P5).

The Dayak Ngaju community trust the *bahtra* and their knowledge of malaria. Often, they consider visiting a traditional healer first in order to have an opinion on the severity of the disease and to utilise traditional medicine, as well as the ritual required for healing. They may use this to see whether or not the patient requires going to a modern health facility. Therefore, the traditional healer has a central role in treating malaria. As informed by the community leader, “people go to the *bahtra* when they felt fever and headache. If the *bahtra* says that the person has malaria and assures the patient to use only traditional medicine and a ritual because of the mild condition, then people follow this.” (P1)

Family influences on the use of traditional medicine: Family is very influential in relation to utilising traditional medicine. This is also part of the local wisdom that continues to use a certain plant to treat malaria. Although some people in the family may not fully believe in the use of traditional medicine for various reasons, they would be obliged to obey the decision made by the oldest or the most respected member of the family. The ritual done while providing the traditional medicine also involves the family member with guidance from the *bahtra*. One of the *bahtra* respondents recalled that “some younger people think that using traditional medicine and practices is useless. But what they can do, if the elders say otherwise. We should maintain our tradition, because this is our roots” (P4).

In practice, the traditional medicine of the Dayak Ngaju community involves a ritual of *Sahangen*, or malaria treatment. The patient would be laid down in the living room near to the house entrance. The first cousin of the patient would be requested to burn leaves from any green plants found in the yard, and blow the smoke toward the patient’s body. This practice should be conducted three times a day, in the morning, afternoon and evening. The patient would also be given a drink of medicated water. The medicated water was boiling water, with a special river stone soaked inside. Finally, the traditional healer also applied oil rubbed over the patient’s body.

Access to public health facilities for malaria treatment:

Although the Dayak Ngaju community would go first to the traditional healer for treating malaria, more people now also use the modern medicine available in the community health centre and village health posts. The traditional healers also recognise this phenomenon, and one said that “of course some people would still need to go to community health centre if their fever gets worse. But for people living a distance from the facility, we, the *bahtra*, were always the first to provide help” (P3).

The traditional healer expects that community would preserve the traditional practices as they are inherited from their ancestors. In addition, some of the community still live separately in remote locations which are far from the modern health facility. Encouraging them to solely use modern medicine without considering the traditional practices would put people’s health at risk.

DISCUSSION

To this date, traditional medicine is still a popular option to cure both communicable and non-communicable disease in many countries.^{6, 10, 11} For the Dayak Ngaju community, the use of traditional medicine for curing malaria is rooted in the concept of health and disease, which is a combination of the factors of nature/the environment, humanity, and spirits/God. The concept has continuously evolved over generations, which motivates them to preserve the use of traditional medicine. A similar concept of health and disease was also described in a previous qualitative study about the use of traditional medicine and practices among postpartum women in China.¹² The role of the traditional healer is prominent in diagnosing the patient’s illness. Traditional healers also help the patient’s family in implementing coping strategies during the loss of a patient’s life.

Family also plays a crucial role in preserving traditions and beliefs. Support from the family is a beneficial factor related to seeking care.¹³ The family influence the decision related to selecting between traditional and modern medication and treatment for malaria. The family can understand and work with the traditional healer to encourage the patient to receive the treatment and to do the ritual. The traditional ritual carried out by the family has also been believed to satisfy supernatural powers and help in the recovery from illness, as seen in a previous study.¹¹

Traditional medicine has been the first choice for the Dayak Ngaju community when seeking treatment. The Dayak Ngaju community believe that selecting the treatment of malaria or other illness should relate to the disease's aetiology, which is a combination of natural and personal causes. However, the choice of treatment is influenced by not only the traditional beliefs, but also the availability and accessibility of modern health facilities. According to Notoatmojo (2003), the attitude to take action in relation to health care depends on other supporting factors and conditions, such as the availability of nearby health facilities and support from their family and other parties.¹⁴ Therefore, people eventually go to health facilities to seek malaria treatment, because of the influential support from their family as well as their access to the health facility.

CONCLUSIONS

The concept of health and disease among the Dayak Ngaju community is determined by the traditional belief that illness is caused by the factors of nature, man and spirits. Therefore, a traditional healer is seen as a prominent figure providing first aid, including to treat malaria. Family is a crucial factor in determining the care that is sought. Preserving the culture of using traditional medicine and related practices among people with malaria is also influenced by the decision of the eldest member of the family. Most people of the Dayak Ngaju community also believe that the biomedical health services can be used jointly with traditional medicine. Therefore, access to a modern health facility for this remote population is urgently required.

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The Effect of Young Coconut Water against Morning Sickness among Women in the First Trimester of Pregnancy

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ABSTRACT

Introduction: Morning sickness is experienced by approximately 70% to 90% of women in their first trimester of pregnancy. The slowing motility of the gastric muscles due to the influence of pregnancy hormones causes an increase in the amount of stomach acid that irritates the gastric mucosa. Pregnant women experience nausea, vomiting, bloating, frequent burping, sour taste, bitterness, loss of appetite, and discomfort which causes the loss of fluids and some essential minerals, such as sodium, potassium, calcium, and magnesium.

Method: Using a randomized control trial with pretest posttest method, we employed a total of 74 women in the first trimester pregnancy complaining of nausea and vomiting. The intervention group received a daily dose of young coconut water of 300 ml for a week. The control group received 300 ml of mineral water with added sugar for a week. The morning sickness scores before and after the treatment were analyzed statistically using the independent t-test.

Results: The provision of young coconut water reduces the morning sickness scores at an average of 11.19 in the intervention group, while the control group only have a slide reduction of the average morning sickness score at 20.00. The treatment of the intervention group who consumed young coconut water had a significant effect at p -value = 0.042.

Conclusion: Consuming young coconut water provides a significant effect on decreasing symptoms of morning sickness in the first trimester of pregnancy.

Keywords: young coconut water, morning sickness, the first trimester pregnancy

INTRODUCTION

Morning sickness refers to a condition of nausea, with or without vomiting, which usually affects women during the first trimester of pregnancy.¹ This condition affects about 70% to 90% of pregnant women during the early weeks of pregnancy. Approximately 80% of pregnant women experience nausea, and about 50% had nausea and vomiting.² About 0.3% to 3.6% of pregnant women may develop a severe and excessive nausea and vomiting termed as hyperemesis gravidarum.³

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Morning sickness occurs due to the increased production of pregnancy hormones including estrogen, progesterone, and chorionic gonadotropin (HCG) hormone.⁴ Pregnancy hormones affect physiological changes, such as the slowdown of gastrointestinal motility.⁴ The slowdown of gastrointestinal motility results in an increased amount of gastric acid and irritates the gastric mucosa resulting in nausea, vomiting, bloating, and frequent burping, due to the perceived sourness, bitterness, loss of appetite, and discomfort.³ The effect is worse in the presence of heartburn and chest pain with an infection from *helicobacter pylori* in the injured stomach that leads to inflammation of the oesophagus.³ This condition is referred to as gastroesophageal reflux disease (GERD) which influences the poor absorption of water and nutrients from food.⁵ To reduce the symptoms of GERD, various

treatments have been applied to pregnant women such as antimietic medication, accrupressure, accupuncture, vitamin B6, and ginger consumption.^{1,6}

Another alternative treatment is the consumption of young coconut water as a medical prevention for conditions similar to morning sickness.⁷ Young coconut water contains potassium that is capable of neutralizing gastric acid reactions and improves muscular motility of the stomach.^{8,9} However, the evidence is scarce on the benefits of using young coconut water to reduce morning sickness in early weeks of pregnancy. Therefore, this study aims to examine the influence of young coconut water in reducing morning sickness among pregnant women during the first trimester of pregnancy.

MATERIALS AND METHOD

This study employed an experimental research design using a pretest-posttest of the randomized control trial method. The research was conducted in Palangka Raya city, Central Kalimantan Indonesia. The study population was first-trimester pregnant women who visited the community health centre between May and November 2016 with complaints of nausea and vomiting. The inclusion criteria was women who were pregnant for 1 – 10 weeks with morning sickness complaints, had a clear residential address, had no history of multiple gestation, and were willing to participate in the study. The exclusion criteria was pregnant women with a history of abortive outcome, absence from the intervention of more than one day, moving out to another city, being hospitalized, and having hyperemesis gravidarum.

The sample size formula is calculated as follows:

$$n = \frac{2(Z_{\alpha} + Z_{1-\beta})^{2\alpha 2}}{\Delta^2}$$

We calculated our sample size based on the results of a previous study on the effect of acupressure treatment on morning sickness among pregnant women, with the mean difference of symptoms between before and after intervention, $\Delta = 0.25$, error type 1 $Z_{\alpha}(5\%) = 1.96$, error type 2 $Z_{1-\beta} = 0.842$.¹⁰ The sample size obtained was 34 subjects for each group. To anticipate the drop out, an additional 10% was applied and 37 subjects were recruited for each group. The study subjects were selected using a simple random sampling method. The intervention group were given a treatment of young coconut water. Young coconut water was collected from green-skinned coconuts

aged 6-8 months, calculated from flowering. Each woman in the intervention group consumed 300 ml of young coconut water every day for seven days. The control group consumed mineral water with one teaspoon of sugar added. To measure the morning sickness score, we used instruments of the *Pregnancy-Unique Quantification of Emesis and Nausea* (PUQE) questionnaire and the *Rodhes Nausea, vomiting, and retching* (RNVR) questionnaire.^{11,12} The anxiety was measured using the *Hamilton Anxiety Rating Scale questionnaire* (HARS).¹³ Other information including the number of pregnancy (gravida) and the history of gastritis during a one year period prior to the pregnancy were collected at the beginning of the research. All pregnant women participating in both groups also consumed a daily intake of vitamin B6 and vitamin B complex provided by the community health centre.

The morning sickness scores from the pretest and posttest were analyzed using the paired t-test. The instrument assesses compliance using an evaluation sheet. The difference of morning sickness scores between the intervention group and the control group were analyzed using the independent t-test.

RESULTS

Characteristics of the research subjects are described in Table 1. The majority of women had a moderate level of anxiety (64.9%) and were in their first pregnancy (64.9%). Most of the women completed senior high school (51.4%), had no history of gastritis (78.4%), and had no paid employment (51.4%).

Table 1: Characteristics of research subjects

No.	Variables Catagory	n	%
1.	Anxiety		
	Not present	2	2.7
	Mild	12	16.2
	Moderate	48	64.9
	Severe/very severe	12	16.2
2.	Number of pregnancy		
	Primigravida	48	64.9
	Multigravida	26	35.1
3.	Level of education		
	Elementary	6	8.1
	Junior high school	18	24.3
	Senior high school	38	51.4
	Higher education	12	16.2

Conted...

4.	History of gastritis		
	Yes	16	21.6
	No	58	78.4
5.	Employment		
	Unemployed/housewife	38	51.4
	Private business	24	32.4
	Government office	12	16.2

The mean difference of morning sickness before and after treatment in each group is presented in table 2. The morning sickness scores in the intervention group showed a higher reduction compared to the control group. Both groups showed a significant difference between the pretest and posttest scores (p -value < 0.05).

Table 2: Morning sickness scores of pretest and posttest using the paired t-test analysis

Group	Measurement		Mean difference (95% CI)	t	r
	Pretest	Posttest			
	Mean (SD)	Mean (SD)			
Intervention	22.76 (1.935)	11.19 (2.665)	11.57 (10.716-12.420)	27.535	0.0000
Control	22.11 (1.505)	20.00 (2.028)	2.11 (1.343-2.873)	5.588	0.0000

The magnitude effect of the treatment is shown in Table 3. The treatment received by the control group and the intervention group in reducing the morning sickness score showed a significant difference. The treatment of the intervention group who consumed young coconut water had a significant effect at p -value = 0.042. Consuming young coconut water provided a significant effect on decreasing symptoms of morning sickness in the first trimester of pregnancy.

Table 3: Effect of treatment on reducing morning sickness score using the independent t-test

Group	Mean (SD)	Mean difference (95%CI)	Statistics	
			t	p
Intervention	11.19 (2.665)	-8.81 [(-9.908) - (-7.713)]	-16.005	0.042
Control	20.00 (2.028)			

To assess the efficacy of the young coconut water compared to the placebo (mineral water with added sugar), we conducted a Man-Whitney test on variables of the anxiety score, the number of pregnancies, and the history of gastritis with the results shown in Table 4. No significant difference was found on the level of anxiety, number of pregnancies, and the history of gastritis among women with morning sickness.

Table 4: The result of Man-Whitney test on variables of the anxiety score, the number of pregnancy, and the history of gastritis on women with morning sickness

Variables	Morning Sickness		p-value
	n	Mean Rank	
Anxiety			
Not present	2	46.75	0.805
Mild	12	34.96	
Moderate	48	36.78	
Severe/very severe	12	41.38	

Conted...

Number of pregnancy			
Primigravida	48	37.78	0.878
Multigravida	26	36.98	
History of Gastritis			
Yes	16	40.53	0.523
No	58	36.66	

DISCUSSION

In our study, most of the women completed a secondary level of education and unemployed. A previous study in

Indonesia using the nationwide data also reported the similar characteristics of women who attended maternal health services,¹⁴ suggesting the representativeness of the study subjects. Most of the women in the present study were in their first pregnancy with a moderate level of anxiety. During the early weeks of pregnancy, women who experienced pregnancy for the first time may have a higher level of anxiety due to changes in their life.¹⁵ The increase of the estrogen, progesterone and chorionic gonadotropin during the first trimester of pregnancy reduces the motility of the stomach muscles and secretes more gastric acid. The gastric acid contains hydrochloric acid (HCL) that has a corrosive nature. The volume of HCL may increase every 4 hours resulting in the stomach power of hydrogen (pH) at 3.5, which may irritate the gastric mucosa. As a result pregnant women may feel symptoms of nausea, vomiting, bloating, discomfort in the stomach and no appetite, especially in the morning when the stomach is empty.^{2,4}

The increase in hormones leading to morning sickness has been suggested as the mechanism to protect the mother and the fetus from toxins which results in nausea, vomiting, loss of appetite and being sensitive to odors.¹⁶ Nausea and vomiting may reduce the level of potassium in the body.² Hypokalemia affects approximately 4.6% to 19.7% of pregnant women.² Hypokalemia may cause glucose intolerance, the functional disorder of heart, kidneys, and neurological interference, and the most severe cases may result in death.

Irritated, injured and inflamed gastric walls would hamper the absorption of water and sugar from food and cause the loss of fluids and some essential minerals, such as sodium, potassium, calcium, and magnesium. Losing fluids and electrolytes may cause headaches, foot cramps, and oedema among pregnant women. Severe dehydration due to lack of food absorption may cause impaired fetal growth, low birth weight (LBW) and even miscarriage.¹⁷

The results of our study showed the effectiveness of consuming young coconut water to reduce the symptoms of morning sickness. Young coconut water contains potassium at amounts of 7300 mg/l, which is sufficient for pregnant mothers who require 4700mg/hr.⁹ Potassium in water becomes a strong base of potassium hydroxide (KOH) when encountered with HCL, then form a neutralizing reaction which produces potassium chloride (KCL) salt and water.¹⁸ Since the potassium chloride salt is derived from strong acids and strong bases, the potassium chloride salt formed is neutral.

The neutralizing reaction will relieve the symptoms of nausea, vomiting, bloating and discomfort.¹⁸ About 98% of potassium is in the intra-cell fluid which is important for muscle activity.¹⁹ Lack of potassium in the body would affect the neo-muscular strength.¹⁹ As the potassium regulates muscle contraction, the motility of the stomach muscles could be maintained by consuming sufficient water containing potassium.⁹ Therefore, young coconut water, which is rich in potassium, has the potential to prevent the symptoms of nausea and vomiting among pregnant women.¹⁷

Young coconut water contains bioactive phytochemicals including tannin, which is a polyphenol compound with the capability of protecting proteins from degradation and from unsaturated fatty acids in the digestive system.²⁰ Tannin is an antidote substance that could break down toxins in the body. It also serves as an anti-bacterial agent which can eliminate *Helicobacter pylori* in the stomach that causes inflammation and chronic ulcers.²⁰ This substance is also known as an anti-inflammatory that reduces inflammation and the burning sensation in the stomach.^{20,21} Other than that, young coconut water also contains five important electrolytes such as sodium, potassium, chloride, calcium and magnesium. These electrolytes play an important role in protecting the body from dehydration and maintaining the electrolyte balance in the body. Drinking young coconut water can quickly restore lost body electrolytes.^{8,9} Therefore, the consumption of young coconut water for pregnant women is not only useful to reduce symptoms of morning sickness, but also helps to prevent dehydration.²²

CONCLUSION

Morning sickness is common during the first trimester of pregnancy. Consumption of young coconut water showed a significant effect in reducing the symptoms of morning sickness among women in the intervention group. Young coconut water could be used as an alternative to the chemical drug in minimizing the nausea and vomiting among pregnant women.

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Factors Affecting the Incidence of Chronic Energy Deficiency among Pregnant Women Attending the Pulubala Community Health Centre

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ABSTRACT

Introduction: Chronic Energy Deficiency (CED) is an indirect cause of maternal death which affects pregnant women in developing countries. The low nutritional status of pregnant women may result in a poor birth outcome. The purpose of this study is to analyse the factors that influence CED incidences in pregnant women.

Material and Method: This quantitative research employed a cross sectional design using a questionnaire, as well as the measurement of mid-upper arm circumference (MUAC) for the data collection methods. Fifty respondents attending the Pulubala community health centre in the Gorontalo district of Eastern Indonesia were recruited to participate.

Results: Most respondents were at the age where there was only a low risk of pregnancy complications, in addition to having poor nutritional knowledge, no previous experience with infectious disease, and having CED. Maternal age and knowledge of nutrition were significantly associated with CED. History of infectious disease had no statistical relationship with CED.

Conclusion: Pregnant women should be provided with nutritional education and micronutrient supplementation in order to improve their nutritional status.

Keywords: *chronic energy deficiency, pregnancy, Indonesia*

INTRODUCTION

Malnutrition affects physical activity and increases the risk of infection among pregnant women, which may result in a poor maternal outcome.¹ According to the World Health Organisation (WHO), worldwide, 30% of women of reproductive age suffered from anaemia, 50% had iron deficiency, and about 20% to 39% of women in low income countries had a low body mass index (<18.5 kg/m²) in 2011.¹ Mid-upper-arm circumference

(MUAC) has been used in various developing countries to identify malnutrition status due to the simplicity of the measurement method and its strong relationship to the low birth weight.² MUAC has also been used as an indicator to determine chronic energy deficiency (CED).

CED reflects poor nutritional status among pregnant women due to a lack of nutrient consumption. CED is considered to be the indirect cause of maternal death.³ In Indonesia, the prevalence of CED among pregnant women aged 15 – 49 years old, as measured in mid-upper-arm circumference, has increased from 33.5% in 2010 to 38.5% in 2013.^{4,5} Similarly, the CED prevalence has also increased among women of reproductive age who are not pregnant from 30.9% in 2010 to 46.6% in 2013.^{4,5} In Gorontalo, a province located in eastern Indonesia, the prevalence of CED was approximately 13.6% in 2017.⁶

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There are various factors influencing the nutritional status of pregnant women, such as dietary intake, physical workload, access to health services, metabolic system, parity, the use of oral contraceptives, household income and breastfeeding.^{7,8} Several changes occur in the body during pregnancy, including an increase in metabolism which requires various nutrients to help the growth of the fetus. Malnutrition may increase the risk of maternal complications among pregnant women including anemia, bleeding, low maternal weight, and susceptibility to infectious diseases due to having a low immune system.^{1,9} CED in pregnancy may affect the healthy development of the fetus and result in congenital defects, low birth weight, being stillborn, and higher infant mortality.¹⁰

To prevent CED among pregnant women, the consumption of a healthy and balanced diet is crucial. Women should be encouraged to consume foods containing adequate protein, iron and calories. Women should be provided with proper knowledge of CED and the nutrition required for pregnancy using the communication of information, education method. The provision of supplementary food including iron tablets, iodine supplements and other vitamins would help to promote healthy pregnancies. The present study aims to examine the effects of maternal age, knowledge on nutrition, and history of infectious disease with the presence of CED.

MATERIAL AND METHOD

The present research employed a cross-sectional design. The selection of subjects as the study sample was conducted using simple random sampling. A total of 50 respondents were recruited among the women attending pregnancy check-ups at the Pulubala community health centre in Gorontalo province. This health facility was selected due to having the highest prevalence of CED compared to other facilities within Gorontalo district. The inclusion criterion was that the participants were pregnant women willing to participate in the study. The data collection was conducted from October to December 2017.

CED was measured based on the MUAC values being lower than 23.5 cm, as suggested by a previous study for Africa and Asian setting.² The data of maternal age, level of knowledge, and history of infectious disease was

obtained from the questionnaire. The data was analysed using descriptive statistics and bivariate analysis.

RESULTS

As presented in Table 1, most of respondents aged between 20 – 35 years old (90%) which was considered to be the range of maternal age with a low risk of pregnancy complications. Most of the respondents had poor knowledge of nutrition (62%), and had no history of infectious disease (90%). The history of infectious disease describes whether the subject ever suffered from tuberculosis (TBC), diarrhea, or both. The majority of pregnant women in this study experienced CED, as indicated by a mid-upper arm circumference higher than 23.5 cm (72.0%).

Table 1: Characteristics of the study subjects

Variables	Number (%)
Maternal age (years)	
High risk (< 20, >35)	5 (10.0)
Low risk (20–35)	45 (90.0)
Knowledge on nutrition	
Poor	31 (62.0)
Good	19 (38.0)
History of infectious disease	
Yes	5 (10.0)
No	45 (90.0)
CED	
Yes (MUAC <23.5 cm)	36 (72.0)
No (MUAC > 23.5 cm)	14 (28.0)

Bivariate analysis was performed to describe the relationship between maternal age, knowledge of nutrition, and history of infectious disease and CED as shown in Table 2. Maternal age and knowledge on nutrition were significantly associated with CED (p -value < 0.001). History of the infectious disease was not significantly associated with CED. The presence of CED among pregnant women in the present study was influenced by maternal age and knowledge of nutrition. Among women with CED, the majority of them were at the age where there is a lower risk of pregnancy complications (100%), had poor knowledge on nutrition (83.3%), and had no previous experience of infectious disease (TBC and diarrhea) during pregnancy (88.9%).

Table 2: The relationship between maternal age, knowledge of nutrition, and history of infectious disease and CED

Variables	CED		X ² count	X ² table	p-value
	Yes (n, %)	No (n, %)			
Maternal age (years)					
Low risk (20 – 35)	36 (100.0)	9 (64.3)	14.286	3.84	0.000
High risk (< 20, >35)	0 (0.0)	5 (35.7)			
Knowledge of nutrition					
Poor	30 (83.3)	1 (7.1)	24.836	3.84	0.00 0
Good	6 (16.7)	13 (92.9)			
History of infectious disease					
No	32 (88.9)	13 (92.9)	0.176	3.84	0.675
Yes	4 (11.1)	1 (7.1)			

DISCUSSION

In our study, although most of the pregnant women were in the low risk maternal age group, (20 – 35 years old) most of them experienced CED. Our study subjects were dominated by those with poor nutritional knowledge. Most of them reported having no previous experience with TBC or diarrhea.

Age has been recognised as a crucial factor of CED.⁹ Based on the results of our study, the high prevalence of CED among women of the appropriate maternal age might relate to other socioeconomic factors¹¹ which were not investigated in the present study. Women from poor households and those with a low level of education would increase the risk of having poor nutritional status. Previous studies also highlighted the importance of maternal age for a positive pregnancy outcome.^{12,13} Being of a younger age than 20 years old or being older than 35 years old was also associated with poor maternal outcome.¹⁴ Age was associated with the use of maternal health care services.¹⁵ Women who had their first child at the age of 19 years old or older would be more likely to use health facilities.¹⁵ Therefore, despite having CED, the appropriate maternal age of the respondents may reduce the risk of them having a poor maternal outcome. For CED reduction, these women should be encouraged to regularly attend their scheduled antenatal care visits and receive all necessary and available supplementary nutritious food.

Knowledge on nutrition is a significant factor in relation to CED, as shown in the bivariate analysis results of the present study. The majority of women with CED had poor knowledge of nutrition. CED was

significantly related to the poor capacity to acquire knowledge due having a low level of education.¹¹ According to Notoatmodjo (2010), knowledge is the result of knowing and occurs after sensing a particular object.¹⁶ By having good knowledge of nutrition, pregnant women may consider selecting more healthy and nutritious food to consume. Knowledgeable women would be more obliged to take the supplements suggested by health workers and be more determined to deliver a healthy baby.¹⁷ As reported in a previous study, providing pregnant women with nutritional education statistically increased the gestational weight by 0.45 kg and lowered the risk of iron deficiency by 30%.¹⁷ Providing supplementary micronutrients and nutritious food, along with the nutritional education, statistically reduced the risk of preterm birth by 19% and increased birthweight by 105 g.¹⁷ Improving the nutritional status of pregnant women with CED, therefore, should adopt a strategy of delivering proper nutritional knowledge to the pregnant women and their families, as well as providing the essential micronutrients supplements and nutritious food. Pregnant women should be educated to select the most nutritious food from the locally available food supply.

Experience with infectious disease among the pregnant women making up the population was not significantly associated with CED, as suggested by our bivariate analysis. In the present study, women with CED reported having no previous experience with infectious disease, especially TBC and diarrhea, which therefore had no significant association with CED. However, previous studies suggested that there was a strong relationship between infectious disease and

malnutrition.^{18,19} Other studies highlighted the significant relationship between infectious disease, including hepatitis virus and tripanosoma cruzi infection, and poor birth outcome.^{20,21}

On the other hand, infection and malnutrition has a complicated interaction, as infectious diseases such as diarrhoea, AIDS and malaria may also cause malnutrition.¹⁹ Poor nutritional status has become the major cause of immunodeficiency due to being underweight, increasing susceptibility to infections. Despite strong evidence from the previous study, a significant relationship between infectious disease and CED did not present itself in the results of this study. A possible explanation for this is the small sample size within a single setting (Pulubala community health centre), which may contribute to this result. Due to the nature of our questionnaire, which only asked about their history of infectious disease in relation to TBC and diarrhoea, the pregnant women joining this study might have had other infectious disease but did not report it. Additionally, the pregnant women might not remember having diarrhoea.

CONCLUSION

Maternal age is a significant factor of CED. Most women of maternal age with low risk of pregnancy complications were reported to have CED. Other socioeconomic factors may confound this result. Knowledge of nutrition was also a significant factor related to CED. Pregnant women and their families should receive more sufficient information about nutrition, including the importance of micronutrient supplementation to generate a positive pregnancy outcome. In addition, upon the provision of nutritional education, women with CED should be provided with nutritious food to encourage them to consume a healthy diet. Although infectious disease was found to be an insignificant factor in this study, as most women reported having no history of TBC and/or diarrhoea, the existing high prevalence of CED in the study setting should be taken into account. Improving the nutritional status of pregnant women with CED would prevent the women from having maternal complications due to infectious disease.

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Implementation of Birth Preparedness and Complication Readiness (BPCR) in High Risk Pregnancies

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ABSTRACT

Introduction: Birth Preparedness and Complication Readiness (BPCR) is the Indonesia government program aimed at reducing the Maternal Mortality Rate (MMR) and Infant Mortality Rate (IMR). The program requires the active participation of pregnant women and their families, as well as the community. Health cadres are recruited from the community to help pregnant women and their families in monitoring their health status and recognising the early signs of pregnancy complications. Therefore, this study aimed to examine the effect of the factors related to the health cadre's perception and BPCR implementation in high risk pregnancies.

Method: The study employed an observational analysis with a cross sectional approach. 126 health cadres in Surabaya, Indonesia, were recruited as the study subjects. The data collection was carried out through interviews and observations using a structured questionnaire. The data analysis was conducted using univariate, bivariate and multivariate analysis.

Results: Based on the health cadre's perception, the implementation of BPCR was moderately satisfactory (52.4%). Most of respondents had a moderate understanding of the standard procedure and policy targets (48.4%). Most of the respondents selected moderate when rating the resource's availability (72.2%), interpersonal communication (85.7%), technical support (58.7%) and the attitude of the BPCR implementer (92.1%). From the path analysis, the BPCR implementation was significantly affected by the understanding of the standard procedures and policy targets, the technical support from the public health centres, the interpersonal/organisational communication, the attitude of the implementers, and the availability of resources.

Conclusions: The public health centre should provide a clear standard procedure and effectively communicate the BPCR program to the health cadres, pregnant women and their families, as well as to the community.

Keywords: *birth preparedness and complication readiness, health cadre, high risk pregnancy*

INTRODUCTION

Worldwide, about 20% of pregnancies have the risk of complications.¹ Similarly, the Indonesia Ministry of Health also estimated that approximately 15% of pregnancies in Indonesia have maternal complications ranging from mild to high severity level.² Since 1991, the Maternal mortality

rate (MMR) in Indonesia has decreased from 390 per 100,000 live births to 228 per 100,000 live births in 2007, but then made another increase to 359 per 100,000 live births in 2012.³ East Java is among the provinces in Indonesia with the highest MMR.⁴ Most of the maternal deaths in East Java were caused by eclampsia (31%), bleeding (25%), heart disease (12%), infection (6%) and for other reasons (26%).⁵

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Most maternal deaths are preventable.⁶ To reduce maternal mortality, the Indonesia Ministry of Health (MoH) launched the Birth Preparedness and Complication Readiness (BPCR) program. This program aims to improve awareness on the risk of pregnancy complications and was designed for pregnant

women and their families, health cadres, and health care workers.⁷ Using the BPCR sticker, every pregnant woman is monitored for their health status. The health care worker also provides health counseling and makes a childbirth plan with the expectant mother, their family and the community to improve both maternal and infant health.⁷ The involvement of the family, especially the husband in the maternal health program, significantly influenced the increased use of antenatal care.⁸

Through BPCR, health care workers can detect a high risk pregnancy complication early and suggest a safe childbirth plan to prevent poor maternal and newborn outcomes.⁹ The BPCR strategy has been adopted in various developing countries. Previous studies in Ethiopia, Nigeria, and Nepal have highlighted some factors influencing the success of BPCR implementation.¹⁰⁻¹² Place of living, distance to a health facility, level of education, level of income, knowledge of pregnancy complication signs, employment, attitude and number of antenatal care visits were among factors associated with the implementation of BPCR.¹²⁻¹⁴ In relation to the BPCR implementation in Indonesia, our study was conducted in order to analyse the factors influencing the BPCR in association with high risk pregnancies in Surabaya, Indonesia.

METHOD

This study employed an observational design with a cross sectional approach. The study population was drawn from health cadres in Wonokromo and Sawahan sub-districts in Surabaya, Indonesia. The recruitment of the study subjects was conducted through stratified proportional random sampling. 126 health cadres were invited to participate. The independent variables selected for this study were based on issues collected during the initial survey of BPCR program implementers in Surabaya, including the interpersonal communication between public health centres and the community-based health initiative, resource availability, technical support and training, the attitude of the BPCR implementers, and the understanding of the standard procedures and policy targets. The dependent variable was the implementation of BPCR among women with high-risk pregnancies.

The data was collected using a structured questionnaire and observation sheet. The structured questionnaire used close-ended questions, each with five scales ranging from very poor to excellent, while the observation sheet included a checklist sheet to measure the resource variables of facilities and infrastructure. The

data analysis was carried out using univariate, bivariate and multivariate analyses. The association between the independent and dependent variables was tested using the Chi Square correlation test. Path analysis was performed to assess the effect of the independent variables on the implementation of BPCR.

RESULTS

As shown in Table 1, most of the respondents had a moderate understanding of the standard procedure and policy targets (48.4%). Most of the respondents selected moderate when rating the resource availability (72.2%), interpersonal communication (85.7%), technical support (58.7%), the attitude of the BPCR implementer (92.1%) and BPCR implementation (52.4%).

Table 1: The frequency distribution of the variables of the respondents' perception on the factors influencing BPCR

Variables	Scale	Frequency	Percent (%)
Understanding the standard procedure and policy targets	Very poor	0	0
	Poor	11	8.7
	Moderate	61	48.4
	Good	54	42.9
	Excellent	0	0
	Total	126	100.0
Resource availability	Very poor	0	0
	Poor	35	27.8
	Moderate	91	72.2
	Good	0	0
	Excellent	0	0
	Total	126	100.0
Interpersonal/organisational communication	Very poor	5	4.0
	Poor	5	4.0
	Moderate	108	85.7
	Good	8	6.3
	Excellent	0	0
	Total	126	100.0
Technical support	Very poor	5	4.0
	Poor	47	37.3
	Moderate	74	58.7
	Good	0	0
	Excellent	0	0
	Total	126	100.0

Conted...

Attitude of the BPCR implementers	Very poor	0	0
	Poor	10	7.9
	Moderate	116	92.1
	Good	0	0
	Excellent	0	0
	Total	126	100.0
BPCR implementation	Very poor	8	6.3
	Poor	2	1.6
	Moderate	66	52.4
	Good	50	39.7
	Excellent	0	0
	Total	126	100.0

A bivariate analysis was performed to assess the correlation between the independent variables and the

dependent variables (table is not shown). An understanding of the standard procedure and policy targets was not associated with BPCR implementation ($p\text{-value}=0.529 > \alpha=0.05$). The availability of resources was associated with BPCR implementation ($p\text{-value} = 0.046 < \alpha = 0.05$). Interpersonal/organisational communication was associated with BPCR implementation ($p\text{-value}= 0.000 < \alpha = 0.05$). Technical support was not associated with BPCR implementation ($p\text{-value}=0.263 > \alpha = 0.05$). The attitude of the BPCR implementer was associated with BPCR implementation ($p\text{-value}= 0.000 < \alpha = 0.05$).

The pathway model of the BPCR implementation was employed to assess the effect of each direction of the relationship. Several goodness of fit tests were conducted, and the results suggested that the model fit the data, as presented in Table 2.

Table 2: Results of the Goodness of Fit tests

Goodness of fit test	Index criteria	Value obtained	Remark
Chi Square (X^2)	Count value $X^2 < \text{table value } X^2_{(5\%;1)}$	5,15 < 5,99	Model fit
Significance Probability	$\geq 0,05$	0,076 \geq 0,05	Model fit
Root Mean Square Error of Approximation (RMSEA)	$\leq 0,05$	0,042 \leq 0,05	Model fit
The goodness of fit index (GFI)	$\geq 0,90$	0,987 \geq 0,90	Model fit
The adjusted goodness of fit index (AGFI)	$\geq 0,90$	0,910 \geq 0,90	Model fit
Confirmatory Fit Index (CFI)	$\geq 0,90$	0,982 \geq 0,90	Model fit

The path diagram described the BPCR implementation in Figure 1, regarding implementation. BPCR implementation (Y) had a direct influence on the technical support of the public health centre (X4.support), the attitude of the BPCR implementers (X5.attitude), and had an indirect influence on the understanding of the standard procedures and policy targets (X1.standard), resource availability (X2.resource), and interpersonal/organisational communication (X3.communication). As seen in Figure 1, there are four pathways with significant relationships (as shown by the thick lines), including 1) X1.Standard \rightarrow X4.support \rightarrow Y; 2) X1.Standard \rightarrow Y. Implementation; 3) X1.Standard \rightarrow X3.Communication \rightarrow X4.support \rightarrow Y. Implementation; 4) X5.attitude \rightarrow Y. The pathway from X1.standard to Y had a total effect value of 3.93 and was unidirectional. The pathway from X2.resource to Y had a total effect value of 0.14 and was unidirectional. The pathway from X3.communication to Y had the total effect value of 0.57 and was unidirectional. The pathway from X4.support to Y had a total effect

value of 1.84 and was unidirectional. The pathway from X5.attitude to Y had a total effect value of 1.15 and was unidirectional.

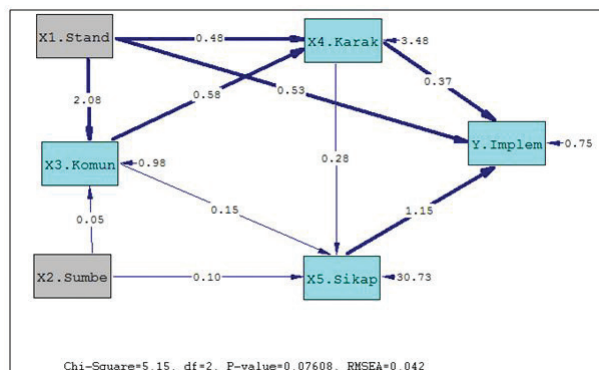


Figure 1: The pathway diagram of the effect value (pathway coefficient)

DISCUSSION

Our results showed that some of the factors describing the cadre’s perception on understanding the standard

procedures and policy targets, the technical support from the public health centre, the interpersonal/organisational communication, the attitude of BPCR implementers and the resource availability was significant in relation to BPCR implementation.

In this study, the interpersonal/organisational communication and the attitude of the BPCR implementers improved BPCR's implementation. According to Azwar (2010), communication in program implementation is crucial, as the extent of the communication received would influence the implementer in decision-making and in creating a conducive working atmosphere.¹⁵ Effective communication is the first step for successful policy implementation.¹⁶ A previous study also suggested that the program policies should be clearly communicated and socialised to the health cadres as the front-line staff, so then they can understand and actively help monitor women with high risk pregnancies.¹⁷ Having a poor understanding of the program could demotivate the program implementer in relation to good performance.¹⁸ Implementers that shown a good attitude would result in good performance, in relation to the program implementation.¹⁹

Communication is also influential to form the attitude of the implementers, as shown in their enthusiasm related to carrying out the needed tasks. Therefore, communication is not just an information delivery activity, but also an attempt to influence and strengthen the target's perceptions and attitude as desired. Good communication will increase the participation of pregnant women, increasing the early detection of a high risk to the pregnancy and preparing for a safe delivery.²⁰

To improve BPCR implementation, the health cadres require good technical support from the public health centre, as shown in the study results. This support can be in the form of formal or non-formal support. Formal support can be obtained from regular supervision via the public health centre, while informal support can be obtained from the daily interaction between the cadres and the village midwives.⁷ Supervision from a technical advisor would improve the implementation performance, as the technical advisor would have the opportunity to do a direct observation while the implementer would have a chance to provide a face to face consultation.¹⁵ Clear standard procedures and policy targets are a strong stimulus for successful policy implementation, leading

to the acceptance and willingness of the implementer to carry out the program.²¹

The resource availability in terms of health workforce and financial support is significant in relation to BPCR implementation in this study. The health workforce is central in implementing the health care program. Therefore, the availability, accessibility, acceptability, and affordability of the health workforce is crucial in promoting the success of the program.²² Sufficient and competent human resources, funds and the infrastructure facilities that are used optimally can facilitate the implementation process.¹¹ Resources such the workforce, finances, facilities, and infrastructure must be made available and sustainable in order to generate the expected outcome.¹⁶ This issue has been well-recognized by the Government of Indonesia who continuously strengthen the health workforce system at all levels with other sectors.²³

BPCR implementation involves activities that require the active participation of husbands, families and cadres (community) in planning safe deliveries and understanding the danger signs of pregnancy complications.²⁴ In Indonesia, the husband's participation as an alert husband or *Suami Siaga* in the safe motherhood program has improved antenatal care attendance and planning for delivery in a health facility.⁸

CONCLUSION

Based on the perception of health cadres on BPCR implementation, several factors including understanding the standard procedures and policy targets, the resource availability, the interpersonal/organisational communication, the technical support from the public health centre, and the attitude of the BPCR implementer has a significant effect on the success of BPCR implementation. The public health centre has a central role in providing and delivering clear procedure and policy targets within and for the BPCR program. Building effective communication between the health cadres and health workers in the public health centre, including the village midwives, can improve the attitude of the program implementers which leads to improved BPCR implementation. However, optimum BPCR implementation is impossible to achieve without sufficient resource availability, especially in relation to the health workforce and financial support.

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Access to Healthcare Facilities in Poor and Underdeveloped Areas in Nusa Tenggara Timur Province

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ABSTRACT

Background: The equality of access to healthcare facilities corresponds to the degree of public health. The degree of public health in underdeveloped areas and borders is still far behind other regions, one of the provinces which has many underdeveloped regencies is the province of Nusa Tenggara Timur.

Purpose: This study aims to give an overview of access to healthcare facilities from the perspective of resources and community capacity in Nusa Tenggara Timur Province (NTT) by using the perspective of supply and demand.

Method: This study is based on secondary data, which is the 2013 Basic Health Research conducted by the Health Research and Development Agency of the Ministry of Health of Republic of Indonesia. This uses the total population of all households in NTT with multi-stage and clusters sampling techniques, with 10,747 households sampled, which were selected based on the block census of the Central Statistics Agency (BPS).

Result: The most popular healthcare facility among the households is Puskesmas, with a proportion of 86.4%, and the least popular is Poskesdes with a proportion of 5.8%, while public knowledge on Puskesmas or Pustu nationally is 89.8%. The type of transportation that is most often used to go to the Puskesmas is motorbikes, with a percentage of 39% and the lowest is bicycles with 0.1%, but if the healthcare provider is a hospital, the type of transportation that is most often used is public transport, the furthest healthcare provider with travel time > 60 minutes is the hospital and the shortest is < 16 minutes which is Posyandu, while the transportation cost to the healthcare facility is Posyandu, with the cost of < Rp 10.000.

Conclusion: The location of healthcare providers relatively far from households contributes to the knowledge about the availability of health care providers, the travel time, the alternative modes of transportation used, and the costs incurred to reach the healthcare provider. Puskesmas and Posyandu are still the most popular healthcare facilities because they are well-known, cheaper and closer.

Keywords: *accessibility, equity, underdeveloped area, poor area, healthcare facility*

INTRODUCTION

The facts show that Nusa Tenggara Timur Province is one of the underdeveloped provinces, with many poor people, of more than one million, in 2016 (22.10%) and they live in the border and remote islands that have difficulty in getting their rights to health. System-oriented healthcare development is expected to prevent geographical imbalances in order to ensure quality and access to health services in the era of National Health Insurance. In addition, the basic need for a fair and excellent healthcare provider (preventing, promoting, curative, and rehabilitating) can be realized and finally it will enhance the quality of human resources in NTT.

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In order to develop people who live in bucolic and underdeveloped areas, solid support is needed, not only in one aspect, but the support must be integrated with financial support, planning, evaluation, exchange of information and coordination, technology, promotion, and extension of liability in terms of healthcare¹.

The key to development is the degree of public health care, the higher the public health status, the better the development. Nusa Tenggara Timur Province faces some health issues which contribute to the degree of public health, such as the reach of health care for poor and risky people (pregnant women, babies and toddlers) in NTT which is still low, the number of mortality of mother (192 cases), babies (1450 cases) and toddlers (1717 case) is high, the proportion of babies with severe malnutrition and lack of nutrition, including the phenomenon of “stunting”, and the increasing trends of non-infectious and infectious diseases (*double burden of diseases*). Life Expectancy in NTT (67.73 years old) is still below the national standard (70,81) in 2017. Generally, all these problems have an impact on NTT’s low quality of human resources development. It is reflected from the Human Development Index (IPM). IPM is an indicator of development in the field of economics, education and health which is calculated based on the rate of life expectancy, average time of education, literacy rate and per capita expenditure. Currently, the IPM of Nusa Tenggara Timur Province is increasing, where in 2009 the IPM is 67,26 and in 2017 the IPM increase to 67,73. In other words, the IPM increase 0,47 within 8 years. The increase of IPM that has been accomplished cannot reach the national average which is 70,81 in 2017. Based on the national data, since 2015 until 2017, NTT still hold on in the 31st position. Access to healthcare facilities in NTT is a crucial factor which needs to be improved.

This study illustrates a basic portrait of the ability of the community to access healthcare facilities that belong to their rights so that basic information can be leveraged.

RESOURCES AND METHOD

This study refers to the results of the 2013 Basic Health Research conducted by the Research and Development Agency of Indonesian Ministry of Health². The sampling technique used is a gradual and cluster with cross-sectional analytic observational survey approaches with selected variables related to community

accessibility to health services and resources that capture the condition of the community in reaching government-owned health facilities. The population in this study is all households in NTT Province and samples are taken from BPS Census Block with a total sample of 10,747 households. The NTT Province in this study was chosen with the consideration of regions that have high lagging, border and archipelago areas compared to other provinces, as well as the front porch of the Republic of Indonesia. At this time a descriptive analysis was carried out to obtain a special description of service accessibility in the district in NTT Province.

RESULTS

Access to healthcare facilities is described in 2 aspects, namely (1) community/household knowledge about the availability of health facilities (public hospitals, private hospitals, Puskesmas or supporting Puskesmas, doctor or clinic, midwife clinic or maternity clinic, Posyandu, and Poskesdes or Poskestren), and (2) affordability of healthcare facilities. Based on the results of Riskesdas 2013, it is known that NTT Province occupies the lowest position in Indonesia in terms of knowledge of the availability of health facilities, as presented in Figure 1.

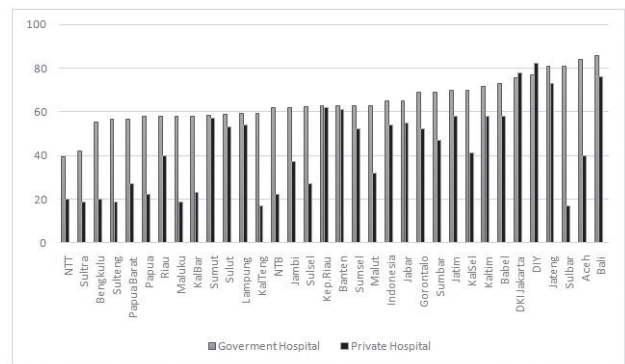


Figure 1: Proportion of Household with knowledge of the availability of Government and Private-owned Hospital based on Province of 2013

Meanwhile, the most popular healthcare facility at Regency level in NTT is Puskesmas/Pustu (86,4 %) ranges from 64,6% in Kabupaten Sikka to 99,6% in Lembata. While the least famous healthcare facility in entire NTT province is Poskesdes/Poskestren (5,8%) ranging from 0% in Timor Tengah Selatan and Sabu Raijua to 23,6% in Manggarai. More detailed information can be found in table 1.

Table 1: Proportion of Household Knowledge on the availability of healthcare facilities based on Regency/ City, Nusa Tenggara Timur, Riskesdas 2013

Regency/City	Keberadaan Fasilitas Kesehatan							
	Public hospital	Private Hospital	Pusk/ Pustu	Doctor/ Clinic	Midwife/ MH	Posyandu	Poskesdes/ Poskestren	Polindes
Sumba Barat	93,1	91,7	95,0	33,7	12,6	82,1	1,8	21,1
Sumba Timur	38,0	43,2	86,4	31,5	12,2	58,1	2,5	31,9
Kupang	23,8	10,9	89,8	8,9	3,0	13,8	0,2	1,0
Timor Tengah Selatan	36,4	8,5	92,8	6,8	0,9	42,2		12,9
Timor Tengah Utara	53,8	2,5	65,9	16,2	0,4	15,7	5,5	60,3
Belu	67,8	51,0	95,0	37,8	29,0	52,0	3,7	53,8
Alor	23,6	0,8	82,9	8,4	4,8	41,7	8,4	
Lembata	80,8	80,1	99,6	63,2	42,1	64,9	1,7	31,5
Flores Timur	72,6	28,2	94,3	40,2	4,8	52,3	5,7	28,4
Sikka	19,4	3,0	64,6	11,4	1,1	25,8	4,8	34,1
Ende	74,1	14,9	95,6	41,7	21,3	62,9	10,9	15,2
Ngada	48,2	1,3	84,4	13,3	6,2	29,3	10,5	31,9
Manggarai	32,7	20,9	80,7	16,2	5,5	35,5	23,6	4,5
Rote Ndao	52,8		96,8	34,6	1,9	31,4	5,1	
Manggarai Barat	1,2	0,6	77,4	5,5		3,9	6,3	8,1
Sumba Tengah	11,0	5,5	83,0	0,5		31,0	9,8	53,0
Sumba Barat Daya	6,6	59,0	73,8	22,7	4,6	27,4	1,2	12,3
Nagekeo	16,4	3,3	77,3	15,8	0,9	24,2	0,7	56,4
Manggarai Timur	15,3	4,4	89,1	6,3	11,7	66,5	12,0	3,6
Sabu Raijua	37,6		98,2	0,2	0	66,4		1,8
Kota Kupang	86,7	63,5	91,4	56,9	44,6	60,8	6,7	6,6
Nusa Tenggara Timur	42,8	23,7	86,4	22,8	10,3	42,1	5,8	21,8

Overview on the access to healthcare facility based on the transportation mode can be found in table 2.

Table 2: Percentage of Transportation Modes that are Used by the Households to Go to Healthcare Facility in Nusa Tenggara Timur, Riskesdas 2013

Healthcare Facility	Transportation Modes								
	Private car	Public transport	On foot	Motor cycle	Bicycle	Boat	Air transport	Others	More than one transport mode
Public hospital	2,3	41,6	1,6	39,9	-	0,3	0,0	0,3	13,9
Private hospital	2,3	39,5	3,9	39,4	-	0,2	0,2	0,2	14,4
Puskesmas/Pustu	1,1	23,6	28,8	39,4	-	0,2		0,1	6,8
Doctor/Clinic	3,5	28,9	7,4	52,1	-	0,1	0,0	0,0	7,9
Midwife/maternity clinic	2,4	30,7	17,7	43,6	-	-	-	0,1	5,5
Posyandu	0,6	3,9	78,0	14,2	-	-	-	0,1	3,2
Poskesdes/ Poskestren	0,5	3,9	80,1	13,1	-	0,2	-	-	2,3
Polindes	0,4	8,5	73,0	15,5	0,1	-	-	0,2	2,2

The table above indicates that the transportation mode that is mostly used by the households in Nusa Tenggara Timur to go to public hospital is public transport (41,6%), and the least used is bicycles, boats, air transport and “others” (each has a percentage of < 0,5%). Most of the 41,6 % respondents who use public transport are from Manggarai Timur dan, while only a few of them come from Kabupaten Kupang (14,1%).

Conted...

Puskesmas/Pustu	92,7	7,1	0,1	0,1
Docter/Clinic	77,9	20,5	1,4	0,2
Midwife/Maternity clinic	80,0	19,2	0,5	0,3
Posyandu	97,2	2,7	0	0,1
Poskesdes/Poskestren	92,1	5,3	0	2,6
Polindes	96,0	2,9	0,1	1,0

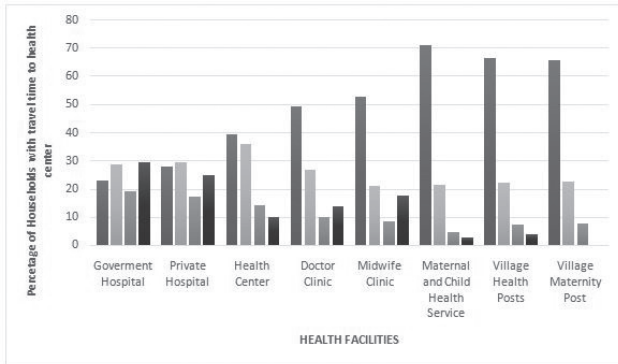


Figure 2: The Percentage of Travel Time of the Household to Go To Healthcare Facilities in Nusa Tenggara Timur, Riskesdas 2013

The above figure indicates that most of people who go to Posyandu (71%) have to travel for ≤ 15 minutes, while those who go to public hospital in Nusa Tenggara Province (29%) have the longest travel time, namely >60 minutes. Most of those who go to the hospital come from Manggarai Timur (96,3%) Regency and only a few of them who come from Alor (3,8%).

Among four categories of travel time to Poskesdes/ Poskestren and Polindes in the entire Nusa Tenggara Timur Province, the dominant category is the category of travel time of ≤15 minutes. The data concerning the accessibility of health care services based on the transport cost can be found in Table 3.

Table 3: Percentage of the Transportation Cost that Incurred by the Households to Go to Public hospital based on Regency/City, Nusa Tenggara Timur, Riskesdas 2013

Healthcare facility	Transport cost (rupiah)			
	10.000 ∨	10.000 ∧	50.000 ∧	200.000 ∧
Public hospital	57,7	37,5	4,1	0,7
Private hospital	65,2	31,2	3,0	0,6

The above table shows that more than half of the respondents (57,7%) incur travel costs of Rp. < 10.000,- to go to public hospital. The higher the transportation cost, the fewer people who choose such a transportation mode.

ANALYSIS

Access to healthcare facilities is the ability of each individual to seek health services that she/he needs. The healthcare facilities are generally established in a central regional position with consideration that it is easily accessible to most people. Thabrany, et.al. state that the travel time and distance to the healthcare facilities contributes significantly to the utilization of health funds³. Public accessibility to health services is affected by many factors that are very multidimensional. Accessibility is not only influenced by supply factors, such as the availability of health workers and facilities, but it is also affected by several factors such as geographical conditions and the scope of health insurance availability. These factors can be an obstacle if they are not managed and anticipated properly. Access to health services must be determined by the actual needs (demand) of health services rather than just the ability to pay or geographical location⁴. Formal health services are not enough. Communities in need must have access to health services available within a reasonable period of time. In addition, pursuing equity must go beyond access to medication and treatment, but also must examine variations in health status in different groups in society^{4,5}. Most of the regencies in NTT Province are situated in underdeveloped area, and the rest are situated at the border or remote island, such as Rote Ndao regency, Sumba regency, Belu regency and Alor regency. Some of the factors which hamper the accessibility of the community to fulfill their health rights are the location of the house, economic capacity, the availability of the road network, and modes of transportation which cause intrinsically and extrinsically minimal in service accessibility. These factors, according to Kumar, can affect the degree of public health^{6,7}.

The transportation mode that is mostly used is public transportation, although it is not available at all the time. As an alternative, other transportation modes such as motorbikes are used, considering the limited access of roads and house location⁷⁻⁹. In some cases, sick people who want to find medical treatment have to use any available transportation means^{7,10,11}. The government is still working on the improvement of infrastructure and bridges which are intended to refine access and shorten the travel time which can be achieved, at least in terms of supply^{5,12}.

In order to increase access, an intensive dissemination of information on the availability of healthcare facilities and its utilization must be delivered to the society to satisfy their health needs. In addition, the referral system must be improved, not only at the site of this study. Strengthening the referral system must be carried out through developing several hospitals in several regions in East Nusa Tenggara based on the proximity of the archipelago and keep accelerating Puskesmas accreditation in relatively isolated districts and increasing community participation in services at the Posyandu level. The majority of the respondents chose Puskesmas and Polindes because they are the closest to the respondent's residence. The choice of these two health facilities is related to the economic background of the respondent, the distance to the place of residence, and the availability of transportation in the village.

CONCLUSION

The highest percentage of public knowledge on the availability of government-owned healthcare facilities such as hospital and Puskesmas can be found in Kabupaten Sumba Barat, while the lowest percentage can be found in Manggarai Barat, in the entire NTT province, only 42,8% of the respondents who have knowledge of the availability of healthcare facilities such as hospitals, but 86,4% of the respondents were aware of the availability of Puskesmas, such as knowledge on the availability of healthcare facilities caused by the lack of information and geographical position of the existing healthcare facilities. Such limited knowledge contributes to the choice of transportation mode, which is mostly used to go to the healthcare facility, namely motorbike and public transport, while there are also some respondents who walk to healthcare facilities. The travel time that is spent by the household to get to the government-owned

healthcare facilities is relatively long and therefore, many people go to Posyandu instead (71%) because it is closer than the hospital or Puskesmas. Such choices contribute to the transportation cost which is the cheapest option of transportation cost incurred by most people to go to healthcare facilities. Thus, the lack of knowledge contributes to the type of healthcare facility chosen and which corresponds to the travel time and the cost incurred.

Ethical Clearance: This study had passed ethical clearance issued by Ethical Committee of the Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia.

Source of Funding: This study is self-funded research project.

Conflict of Interest: None.

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The Effect of Doctor Professionalism on the Quality of Medical Services at a First Level Health Facility

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ABSTRACT

Introduction: Professionalism is part of the Indonesian Code of Medical Ethics. Doctor professionalism can be achieved through mastering competencies that refer to the Standard Competency of Indonesian Doctor (SKDI). Competency is closely related to the quality of service. Service quality can be measured using the SERVQUAL method. Indonesia is currently implementing National Health Insurance where health services are carried out at first level of health facilities (FKTP) and FKRTL with a tiered referral pattern. This study aims to determine the effect of doctor professionalism on the quality of medical services in an FKTP-category clinic.

Method: This study is an analytic observational study with a cross-sectional study design. The population is from one of the FKTP-category clinics in Malang Regency with total sample of 234 people selected through systematic random sampling. The respondent is a patient who has been treated 3 times in selected FKTP. Data analysis is using Somers' d correlation test and linear regression test.

Result: From Somers' d test obtained value of $r=0.317$. The equality value of the quality of medical services obtained $Y=-1.515+X_1 0.187+X_2 0.197+X_3 0.179+X_4 0.216+X_5 0.172$. The equality value of doctor professionalism obtained $Y=-3.275+X_1 0.216+X_2 0.107+X_3 0.123+X_4 0.182+X_5 0.288+X_6 0.174+X_7 0.306$. It is apparent from these equations that professionalism of doctor affected the quality of medical services.

Discussion and Conclusion: The quality of health services refers to the appearance of health services, known as output, which is the final result of doctor and other professional personnel's actions on patients, in the sense of changes in health status and satisfaction both are positive and vice versa. Competency influences job satisfaction of service providers so that it will affect the service quality. Patients feel comfortable and calm when the doctor pays them attention and can answer patients' questions. Further emphasize on the assurance dimension and also the competency area of effective communication may need to be considered.

Keywords: Professionalism, competency, quality of medical service, SERVQUAL

INTRODUCTION

Professionalism is the attitude of a professional, and professional means doing something as a main job called a profession, meaning that the job is not a spare time filler or a mere hobby¹. Professionalism is a part of

the Indonesian Code of Medical Ethics (2012). An article regarding professionalism is contained in the Indonesian Code of Medical Ethics Article 8 "A doctor is obliged, in every medical practice, to provide competent services with full technical and moral freedom, accompanied by compassion and respect for human dignity". Assessment of doctor's professionalism can be done based on the points of view of doctors, patients, and nurses, where doctors assess their level of professionalism as lower than the assessment given by patients².

Arnold (2006) states that doctor's professionalism is demonstrated through clinical competence,

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communication skills, understanding of ethics and law that are built in the hope to implement the principles of professionalism³. Doctor competency in Indonesia refers to Indonesian Doctor Competency Standards, where doctors must understand and master seven areas of competence, namely: 1) Noble professionalism; 2) Self-awareness and self-development; 3) Effective communication; 4) Management of information; 5) Scientific foundation of medical science; 6) Clinical skills; and 7) Management of health problems. Good competence achievement is expected to provide satisfaction to patients through high-quality health services. High quality of health services is a must to get satisfaction from health service users. For health service users, the quality of health services and their satisfaction is formed from structured activities, not only performance or product quality, but also provides an overall organized image⁴.

The quality of health services needs to be maintained which generally can be stated that what is meant by the quality of health services refers to the level of perfection of health services. On one hand it can cause satisfaction to the patient, meanwhile on the other hand the procedure must be in accordance with the established code of ethics of professional standards⁵. Parasuraman, Zeithmal and Berry in Lupiyoadi (2001) concluded that there are five dimensions of service quality called SERVQUAL which consists of Reliability, Assurance, Tangibles, Empathy, and Responsiveness⁶.

Based on Law No. 40 of 2004, it is stated that every person has the right to social security to be able to fulfill a decent life, have basic needs fulfilled, and upgrade his dignity towards the realization of a prosperous, just, and wealthy Indonesian society. For this reason, based on Law No. 24 of 2011, formed a Social Security Administrative Body (BPJS) which in the health

sector formed Healthcare and Social Security Agency (Healthcare BPJS). The Minister of Health Regulation No. 71 of 2013 states that health service providers in the JKN program are in the form of First Level Health Facilities (FKTP) and Advanced Referral Health Facilities (FKRTL).

RESEARCH METHOD

Research Design: This study is an analytic observational study with a cross-sectional study design. The research was done at FKTP of “X” Clinic in Malang Regency in January - March 2018.

Research Population and Sample: The population and sample of this study were Healthcare BPJS members registered at FKTP “X” Clinic in Malang Regency. The calculation of sample size used the formula of the cross-sectional research sample, the population is known:

$$n = \frac{Z^2_{1-\alpha/2} p(1-p)N}{d^2(N-1) + Z^2_{1-\alpha/2} p(1-p)}$$

The sampling technique used systematic random sampling, where there were 234 samples. Selected samples are BPJS members registered at FKTP of “X” Clinic in Malang Regency who have used FKTP at least 3 times.

ANALYSIS OF RESEARCH RESULTS

In this study, data were obtained from interview results based on questionnaires conducted on the Healthcare BPJS members registered at FKTP “X” Clinic in Malang Regency. The data obtained from respondents’ answers will be processed, tabulated, presented in table form and then performed using the Somers’ d correlation test and linear regression test.

RESEARCH RESULTS

The results of the study can be described as follows:

Table 1: Distribution and level of Medical Services Quality at FKTP of “X” Clinic in Malang Regency

Service Quality	n	%
Less qualify	2	0.9
Qualify	184	78.6
Highly qualify	48	20.5
Total	234	100.0

Conted...

Reliability	Average value of each statement	Mean value of dimension
Doctors are very good at administering to your complaints	3.902	3.849
Doctors explain their actions	3.791	
Doctors communicate in a language that you understand	3.880	
Doctors answer questions about your complaints	3.855	
Doctors explain the given prescription or medication	3.816	
Assurance	Average value of each statement	Mean value of dimension
Doctors provide an explanation of how to prevent diseases	3.987	3.950
Doctors listen attentively to your complaints	3.949	
Doctors introduce themselves	4.004	
Doctors ask permission before taking actions	3.915	
The cost you spend is in accordance with what you get	3.897	
Tangibles	Average value of each statement	Mean value of dimension
The atmosphere of the doctor's practice room is very good	3.816	3.880
Neat doctor appearance	3.872	
Medical devices function very well	3.940	
Medical support equipment in the practice room is neatly arranged and in good condition	3.855	
The doctor's practice room is quite private	3.919	
Empathy	Average value of each statement	Mean value of dimension
You feel comfortable to speak to the doctors	3.966	3.906
Doctors try to calm you regarding your complaints	4.030	
Doctors wish you to get well soon	3.936	
Doctors try to explore the causes of your complaints	3.769	
Doctors listen to the story about your complaints	3.829	
Responsiveness	Average value of each statement	Mean value of dimension
Doctors give the freedom to choose an action after an explanation is given	3.966	3.942
Doctors are quick and responsive in taking actions	3.944	
Doctors give you time to ask before taking medical action	3.829	
Doctors are friendly and polite when taking actions	3.970	
Doctors are on time according to the informed practice time	4.000	

Table 2: Distribution and level of the Level of Doctors' Professionalism Based on Achievement of Doctor Competencies According to Healthcare BPJS members at FKTP of "X" Clinic in Malang Regency

Doctor's Professionalism	n	%
Professional	146	62.4
Very Professional	88	37.6
Total	234	100.0

Conted...

Competency Area 1	Average value of each statement	Average value of competency area 1
Doctors give greetings, are friendly and treat patients well	3.927	3.953
Doctors value patients' religion, age and physical condition	3.910	
Doctors are calm and able to communicate with other health workers	4.021	
Competency Area 2	Average value of each statement	Average value of competency area 2
Doctors appreciate other treatment methods	4.043	4.021
Doctors give a positive response to patient's opinion	3.979	
Doctors are aware of their own shortcomings	4.043	
Competency Area 3	Average value of each statement	Average value of competency area 3
Doctors can communicate with a language that is understood by patients	4.137	4.137
Doctors can convey information clearly	4.179	
Doctors deliver counseling in polite language	4.094	
Competency Area 4	Average value of each statement	Average value of competency area 4
Doctors are skilled in managing information from patients	4.081	4.079
Doctors are skilled at using IT devices	4.077	
Competency Area 5	Average value of each statement	Average value of competency area 5
Doctors possess knowledge on health problems related to patient complaints	4.047	4.073
Doctors are able to decide the necessary supporting examinations	4.064	
Doctors are able to determine the prognosis	4.120	
Doctors consider patient's ability to make decisions	4.060	
Competency Area 6	Average value of each statement	Average value of competency area 6
Doctors are skilled in carrying out anamnesis process	4.115	4.097
Doctors are skilled in carrying out physical examinations	4.077	
Doctors can decide a rational supporting examination	4.098	
Competency Area 7	Average value of each statement	Average value of competency area 7
Doctors are able to do IEC related to health promotion suitable for patient's condition	4.081	4.022
Doctors are able to do IEC related to health prevention suitable for patient's condition	4.077	
Doctors are able to do a fast and correct treatment	4.047	
Doctors are able to do IEC related to rehabilitation suitable to patient's condition	4.047	
Doctors make instructions that are easy to understand	3.859	

The five dimensions of SERVQUAL namely RATER have a significant effect on the quality of medical services. This is obtained by the result of regression equation $Y = -1.515 + X_1 0.187 + X_2 0.197 + X_3 0.179 + X_4 0.216 + X_5 0.172$. The professionalism of doctor is influenced by the seven areas of doctor's competency and obtained result of the regression equation $Y = -3.275 + X_1 0.216 + X_2 0.107 + X_3 0.123 + X_4 0.182 + X_5 0.288 + X_6 0.174 + X_7 0.306$.

The result of the Somers' d test showed significant result ($p=0.000$) that professionalism of doctor affected the quality of medical services at FKTP of "X" Clinic in Malang Regency with a value of $r=0.317$.

DISCUSSION

In table 1 it is known that most (78.6%) Healthcare BPJS members at FKTP of "X" Clinic in Malang Regency stated that medical services were already high in quality. Table 1 also shows that the five dimensions of quality have a high average value (3.880–3.950) with the highest average value on assurance dimension (assurance of service quality) with an average value of 3.950 (based on 5 categories of Likert scale).

This study is different from Aida's (2017) study of health services quality in a community health center, where only 58.5% of patients stated that the highest quality of service and the highest SERVQUAL dimension are empathy and tangible dimensions⁷. The result of medical services quality in this study was still higher than Ika's (2012) study which showed 64%-71% of PKMS outpatients stated that services in General Polyclinic of Surakarta Regional Public Hospital were good in quality, with the highest quality of service in the dimensions of responsiveness and empathy⁸.

Quality is the actual proper value of certain service units, both from the technical aspects (knowledge, skills, and medical or health technology) and interpersonal, which is the doctor-patient relationship: communication, empathy and patient satisfaction⁹. Doctors certainly will not be able to provide information related to patient health problems if they do not master the competencies. Mastery of competence in this study is based on the Standard for Indonesian Doctor's Competencies (SKDI) determined by the Indonesian Medical Council in 2012¹⁰.

Based on table 2 it is known that there were no patients at FKTP of "X" Clinic in Malang Regency

who stated that doctors were not professional, 37.6% of patients stated that medical services were carried out very professionally. This professional medical service is certainly supported by a fairly good mastery of competence. In this study the area of competence that was most mastered by doctors in area 3 based on SKDI is the competency area of effective communication, with an average value of 4.137 (based on a 5 category Likert scale). This is in accordance with patient assessment related to the quality of medical services, where the highest mean value is in the assurance dimension, meaning that doctors are able to develop good communication with patients so that they can understand the doctor's explanation, where in the end they will be able to decide the next management step based on previous explanations given by the doctor.

Ina's study (2012) on HR competency with hospital service quality states that positive responses from patients to the quality of doctor services can be known through the statement: "Patients feel comfortable and calm when doctors give their interest and ability to answer patient's questions"¹¹.

Tati's study (2016) of the effect of doctor service quality on patient loyalty states that doctors' technical ability is considered good by patients with a counted mean of technical ability of 38.84 with an ideal average of 27.00¹². This study is in line with Alit's study (2014) which states that 96% of patients assess the competence of doctors as good¹³. Competency influences job satisfaction of service providers so that later it will also affect the quality of service.

The results of the regression test revealed that all dimensions (RATER) had significant roles in the quality of medical services at FKTP of "X" Clinic in Malang Regency. In the regression test result it is known that each SERVQUAL dimension has an equal effect. The result of the Somers' d test revealed that doctor's professionalism has a moderate influence on the quality of medical services at FKTP of "X" Clinic in Malang Regency. This is in line with Alit's study (2014) that competence has a significant relationship with service quality¹³.

CONCLUSION

Doctors' professionalism provides a significant influence on the quality of medical services at FKTP of "X" Clinic in Malang Regency. The dimension that has

the highest influence on the quality of medical services is the assurance dimension (assurance of medical services). The competency area of effective communication has the highest influence on doctor professionalism in providing medical services to patients at FKTP of "X" Clinic in Malang Regency.

Ethical Clearance: This study had passed ethical clearance issued by Ethical Committee of the Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia.

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Conflict of Interest: None.

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Self-Help Group Therapy: The Enhancement of Self-Care Ability and Quality of Life Among the Elderly in Bali, Indonesia

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ABSTRACT

Worldwide, the number of people aged 60 years and over has rapidly increased along with the increase in life expectancy. An aging population faces challenges in relation to improving self-care ability and quality of life. This study has aimed to identify the influence of self-help group therapy on the self-care ability and quality of life of elderly people in Bali, Indonesia. We employed a quasi experimental analysis using a pre-test and post-test. A total of 25 retired military officers participated in the study. Two questionnaires (WHO-BREF and WHOQOL-OLD) were adopted to compare the self-care ability and the quality of life results before and after the self-help group therapy was implemented. The data was analysed using an independent t-test. The results showed that the self-help group therapy had a significant effect on the improved self-care ability among the elderly with a mean difference of 0.2, $t = 2.449$ and p-value of 0.02. The self-help group therapy also significantly improved quality of life with a mean difference of 11.7, $t = -8.476$, and p-value of 0.00. Empowering the elderly and their families as well as the community is strongly recommended in order to establish effective self-help group therapy for the elderly.

Keywords: *Self-help group therapy, elderly, self-care, quality of life*

INTRODUCTION

After six decades, the number of people aged 60 years or older has increased fourfold from 205 million in 1950 to 810 million in 2012.¹ Almost two in every three elderly people in the world live in developing countries.¹ Based on the 2010 national census, approximately 18 million or 7.6% of the Indonesian population is aged 60 years old or over. This was projected to reach 12.7% by 2050.² The increased elderly population is related to the increased life expectancy.² However, longer life expectancy has been challenged by health problems, primarily chronic non-communicable diseases.³ Various sociodemographic factors and shifts in disease burden from communicable to non-communicable disease has influenced strategies to improve the health of older adults.

According to the World Health Organization (WHO), improving the health status of the elderly is aimed to promote quality of life, which can be measured through physical health, psychological health and social and environmental relations.³ Promoting the quality of life among the elderly is conducted by empowering older adults with the capability to execute self-care and to maintain healthy daily life activities. A self-help group is a strategy that can be used to empower the elderly, to optimise the role of the elderly in providing mutual support and to share overcoming life problems.⁴ Empowering through creating activities in a group can boost self-confidence and self-esteem, as well as increasing the self-abilities of the elderly.⁵ By joining a self-help group, elderly women can learn skills to carry on their daily activities independently and adopt a healthy lifestyle which lead to an improved quality of life (QOL).⁶

In Indonesia, self-help groups for the elderly are established through a community-based activity for sharing problems and encouragement among members of the group. The integrated coaching post, or *Posbindu*, as one of the community health-based activities for

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monitoring non-communicable disease has been utilised to support the elderly in maintaining their health status and performing self-care.⁷ However, only the elderly who are physically active can attend the integrated coaching post. For the adults who stay alone at home and are unable to perform activities of daily living (ADL) independently, they cannot attend without support from other people. Therefore, this study aims to assess the effect of the self-help group on enhancing self-capability and quality of life among the elderly.

METHOD

To support the study aim, we conducted a quantitative study using a quasi-experimental research design with a pre-test and post-test. The sample of population studied was retired military officers aged 60 years or older who lived in Kuta Utara sub-district in Badung district, Bali, Indonesia. Selecting the retired military officers was based on the assumption that the elderly people would have a better physical condition than another group of people. A simple random sampling method was applied in selecting the study sample, resulting in 25 people recruited to participate in the study.

The data was collected for the pre-test and the post-test using two questionnaires, including the independence scale of Activity Daily Living (ADL) as measured by the Katz index, and quality of life as measured by a combination of the World Health Organisation Quality of Life Assessment (WHOQOL-BREF)⁸ and the WHOQOL older adults module (WHOQOL-OLD).⁹ The data analysis was performed using an independent t-test.

RESULTS

The majority of the study subjects were female (60%), with the mean of the respondent’s age being 73.6 years old. This finding confirmed the results of many reports that females have a longer life expectancy than males. The average age among the study respondents was higher than the current Bali life expectancy at birth which is 72.1 years old.¹⁰ Most of the respondents in our study were widows or widowers (62%). As our respondents were retirees, all of them were no longer engaged in active employment. Most of them lived with their extended families (72%). Most of the respondents had a secondary educational level (76%), while the remaining respondents had a higher education level (24%).

Based on the respondent’s answers to the WHOQOL-BREF and WHOQOL-OLD questionnaires during the pre-test and post-test, the scores of self-care skills and quality of life were analysed using the independent t-test and displayed in Table 1 and 2. A higher self-care score indicated that more self-care skills were unable to be conducted. Before the self-help group therapy, the mean of the self-care scores was 2.52, as shown in Table 1. After the therapy, the mean of the self-care scores was 2.32.

Table 1: The self-skill scores before and after the self-help group therapy

Self-care score	Before		After	
	f	fx score	f	fx score
2.00	17	34	18	36
3.00	3	9	6	18
4.00	5	20	1	4
Total	25	63	25	58
Mean score		2.52		2.32

From Table 2, the mean score of the quality of life increased from 73.2 before to 84.9 after the respondents joined the self-help group therapy. On average, the QOL scores increased by 1.7 points after the self-help group therapy was implemented.

Table 2: The scores for quality of life before and after the self-help group therapy

Quality of life score	Before	After
Minimum score	62	75
Maximum score	90	97
Average score	73.2	84.9

Table 3 shows that the mean change in self-care skills before and after the self-help group therapy was 0.2 with a standard deviation of 0.4 and a standard error of 0.8. The t value was 2.449 on the degree of freedom of 24. The significance level showed a p-value of 0.02, smaller than 0.05. This result explained that Ho was rejected and suggested the significant effect of the self-help group therapy on the ability of the respondents in performing self-care. The significant reduction of self-care therapy after the implementation of the self-help group therapy suggested the effectiveness of the therapy in promoting the respondents’ self-care skills.

Table 3: The results of the t-test analysis on the effect of self-help group therapy on self-care skills

X	SD	SE	t	df	Sig 2 tailed 95 %
0.2	0.40	0.8	2.449	24	0.02

Self-reliance and self-care capability reflects someone's ability to meet the needs of self-care as shown by their ability to perform daily activities. Activity of Daily Living (ADL) is a routine activity performed by humans. However, due to the aging process, the elderly often experience a decrease in their ADL ability.¹¹ ADL includes self-care such as bathing, dressing, toileting, transferring, continence and feeding.

Table 4 shows that the QOL mean score results had changed by -11.7 after the self-help group therapy, with a standard deviation of 6.91 and standard error of 1.38. The t value was -8.476 on the degree of freedom of 24. Further analysis yielded a p-value of 0.00 ($\alpha < 0.05$). This result concluded that H_a was accepted and H_o was rejected. There was a significant influence from the self-help group therapy on improving the respondent's QOL. A higher QOL score indicates an improved QOL. The mean change of the ADL score after the self-help group therapy was 0.2, reflecting the awareness among the members of the elderly group to share motivation and to educate one another in order to promote abilities related to self-care and quality of life. The self-help group therapy was effective in improving the respondent's QOL. Therefore, the activities of the self-help group among the elderly with impaired self-care compliance was very helpful in improving their ADL abilities.

Table 4: The results of the t-test analysis on the effect of the self-help group therapy on quality of life

X	SD	SE	t	df	Sig 2 tail 95 %
-11.7	6.91	1.38	-8,476	24	0.00

DISCUSSION

Most of our study participants were women and widows who lived with their extended families. According to Miller, losing a partner increases the risk of an elderly person experiencing more physical and psychological problems than those who still have a partner.¹² As a result, having no partner increases the

risk of illness and impaired self-care ability, which leads to a low quality of life.¹² Living in an extended family also increases the risk of stress, which also leads to a lower quality of life.¹³ On the other hand, ageing often brings in the consequence of declined anatomy and body functions, which affects self-care ability.¹² Improving the self-care ability would be beneficial for the elderly which also reduces the risk of having further chronic diseases.

Our results showed that the self-care score indicated an improvement of the elderly individual's ability to do self-care after the self-help group therapy. This result confirmed the results of some of the previous studies on the effectiveness of self-help group therapy on improve the elderly participant's ability to perform self-care.^{14,15} Caregivers have a potential role in improving the ability of the elderly to perform self-care through various interventions, such as family counselling, emotional support, education, skills training, communication, and self-reliance.¹⁶ A self-care intervention by caregivers who are non-nursing or medical professionals is sufficient to improve the elderly ability to perform self-care.¹⁶

The results of our study also showed that the respondent's quality of life status had significantly increased after the self-help group therapy, from an average score of 73.2 up to 84.9. A previous study among breast cancer survivors in Iran also reported the significant effect of peer support on improving quality of life.¹⁷ Optimum quality of life among the elderly can be interpreted as having an optimum functional condition which enables them to enjoy a meaningful, valuable, useful and happy life.¹⁸ Having an optimum quality of life can be achieved by providing the elderly with the ability to adjust and accept changes, adapt to functional declines due to ageing, to build a respectful environment, to ensure the rights of the elderly for a fair treatment, and to understand the physiological and psychological needs of the elderly by providing the opportunity and facilities for them to actualise their potential and abilities.¹⁸ Support from their family and close friends can help an elderly person to better adjust and accept their successes or failures in life.

Some suggested development tasks which support the improvement of the elderly's quality of life includes 1) adjusting to physical decline, 2) adjusting to retirement, 3) adjusting to the death of their spouse, 4) self-acceptance as an elderly individual, 5) maintaining life-satisfaction, 6) redefining the relationship between children and

family, and 7) finding ways to maintain their quality of life.¹⁹ Although this developmental task is common for the elderly, the capability of the elderly in adjusting to changes in their life differs from individual to individual. Self-help group therapy can facilitate the elderly in bettering adjusting to and accepting their condition.¹⁴

The aging process may cause some vulnerable elderly people to experience various physical complaints.¹² Their perception toward the pain feeling also affects their decrease in activity participation and their sleep quality. Sleep disorders were among the conditions complained about by the elderly in this study. A reduction in the number of neurons in the nervous system due to the ageing process causes changes in function, including the sleep cycle regulation. Sleep disorders among the elderly might be exacerbated by the shortening sleep cycle, medication effects, frequent bladder emptying, pain or psychological disorders.¹⁹ Without minimising the importance of medication to help the elderly reduce their physiological and psychological problems, self-help group therapy can be useful in reducing complaints related to the ageing process.¹⁴

CONCLUSION

The declining ADL and quality of life among the elderly with limited mobility affects the ability of the elderly to adjust and accept life changes due to the ageing process. Lack of access to health workers and low caregiver support increases the risk of the elderly having a lower quality of life. Self-help group therapy has been significantly effective in improving the self-care ability and quality of life of the elderly people in our study. Empowering the elderly and their families, as well as the community, is strongly recommended to establish effective self-help group therapy for the elderly of the population. Despite the significant results, it should be noted that our study has some limitations including the small sample size and the limited study setting. Further study is recommended in a more extensive study setting and with a bigger sample size.

Ethical Clearance: Ethical approval was granted by the Faculty of Public Health in Airlangga University, Surabaya.

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Conflict of Interest: The authors have declared that we had/have no conflict of interest.

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Healthy Nurses for a Quality Health Care Service: A Literature Review

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ABSTRACT

Healthy nurses are a key component when providing quality health care. This paper aims to review the factors that may relate to the physical and spiritual health status of nurses, and the extent to which health affects the work productivity of nurses which ultimately, has an impact on the quality of health services. We conducted a literature search via an online database and found 92 articles with keywords related to this topic. After the inclusion and exclusion criteria were applied, 15 articles were included in the analysis. Implementing a health promotion model is beneficial to encourage nurses practicing a healthy lifestyle behaviour and improve their health status. This includes creating a healthy work environment, physical activity, having regular meals as part of a balanced nutritional diet, having sufficient rest, and practising stress management.

Keywords: *healthy nurses, quality health services, health promotion*

INTRODUCTION

The nursing workforce contributes the largest portion to health professionals globally. The important role of nursing workforce in improving health outcomes has been widely recognised.¹ According to the International Council of Nurses (ICN), the nursing workforce is an integral part of the health system, therefore maintaining a sufficient number of nurses is a prerequisite for quality of care.² Nurses should actively focus on creating and maintaining a balance of physical, intellectual, emotional and social welfare, as well as professional and personal synergism in order to provide quality nursing care.³ However, the provision of quality nursing care has been challenged by the poor working environment, long working hours, workplace stress and unhealthy life style of nurses.⁴

Nurses have voiced their frustration at the high demand of quality nursing care when there is a staff shortage.⁵ The workforce shortage including nursing is a common problem in Indonesian public health facilities.⁶ According to the Indonesian Ministry of Health (MoH), as of December 2016, approximately 601,228 health workers including physicians, medical specialists, dentists, nurses, midwives, and pharmaceutical workers work in 15,263 health facilities throughout Indonesia.⁷ Although the nursing workforce is the largest proportion out of the health professionals (49%), the current nursing ratio is 113.4 nurses per 100,000 population.⁷ The nursing workforce density is still far below the national target of 180 nurses per 100,000 population, set for 2019.⁸ Working in a facility with poor staffing could leave the nurses exhausted, which impacts on nursing quality.⁵

The quality of the nurse is determined by the nurse's health status as has an impact on the nurse's productivity when providing health services. Several factors influence the reduction of employee productivity, including education level, physical and spiritual health status, the work environment, leadership, motivation and the equipment utilised.⁹ Poor physical and mental health status, as well as poor working conditions, have been shown to reduce nursing productivity in previous

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studies.^{10,11} This study aims to review the factors that may relate to the physical and spiritual health status of nurses, that in turn affect their work and productivity which ultimately has an impact on the quality of the health services that they provide.

METHOD

We searched for articles on online databases including Science Direct, Google Scholar, Proquest Health and Medical Complete, Proquest Nursing and Allied Health Source, Proquest Psychology Journals and Proquest Science Journals. We used keywords such as healthy nurse, quality of nursing care, and nursing productivity. The search engines generated a total of 92 articles. The following inclusion criteria were used to select the articles:

- Articles published in the last 10 years
- The topics relevant to the health of nurses as a support system in the quality of health services.
- Articles published in English or Bahasa Indonesian

After applying the inclusion criteria, 45 articles were selected. However, after studying the content, only 15 articles with a more detail discussion about the healthy behaviour of nurses related to supporting the quality of the provided health services were included in this literature review.

RESULTS

Four studies focused on the health status of nurses in relation to their behaviour in the work place. Eleven studies were concerned with the demographic characteristics and self-perception that influence lifestyle behaviour.

Health Status: Henwood, Tuckett & Turner (2012) conducted a cohort study involving 2,264 nurses in Australia and New Zealand in order to investigate the different effects from the physical activity of nurses in the workplace and their leisure time on their health status. Their study found that compared to nurses with normal working hours and leisure time, the nurses who worked longer with less leisure time were more likely to have a higher body mass index and took more days off due to sickness. They were also more likely to experience sleep problems, depression and anxiety.¹²

Schluter et al. (2011) described the demographics and health condition of 6,308 nurses and midwives in Australia and New Zealand. Their study revealed that approximately 30% of nurses and midwives had never had a health check-up within the last two years. The nurses and midwives also experienced sleep disorder (35.2%), severe depression (22%) and had upper back, neck and lower back pain (26.3%).¹³

Similarly, a study among hospital staff in South Africa reported that about 73% of health workers were obese and half of them had never made effort to reduce their weight. No significant difference of body mass index was found between the medical and non-medical staff members. About one third of the participating health workers had obesity-related non-communicable diseases and stress.¹⁴

A qualitative study of hospital nurses in South Africa reported that night shift nurses complained about being overweight and contracting non-communicable diseases as their main health problems. The nurses also complained about work-related problems such as back pain, exposure to tuberculosis and a stressful work environment. Being too exhausted was the main reason of the nurses for being unable to prepare healthy food and do physical activity.¹⁵

Lifestyle behaviour: Three studies have explored the lifestyle behaviour of nurses using the Pender health promotion model.¹⁶⁻¹⁸ McElligott et al (2009) observed certain weaknesses in relation to managing stress and physical activity among nurses. They found no significant difference between units of care, and demographic characteristics in the nurse's lifestyle and behaviour. The health promotion scores were significantly higher among the critical-care nurses than the medical-surgical nurses.¹⁶ Al-Qahtani (2014) conducted a study in Saudi Arabia which found that the majority of nurses were non-Saudis (98%) with approximately 5 to 10 years of working experience (38%). In assessing the nurse's lifestyle, they found that spiritual needs had the highest average score, while physical activity had the lowest average score.¹⁷ Another study by Nahm et al (2012) found that despite being at a higher risk of health problems such as being overweight/obesity due to the working environment, this issue was rarely addressed by the nurses.¹⁸

A study by Zapka et al (2009) examined the lifestyle of hospital nurses and their bodyweight. They found that

most of the nurses in their study were either overweight or obese, and did not apply weight management behavior. There was a significant relationship between demographic characteristics (age, gender, marital status, education, and history of hypertension), the self-perception of body weight and diet and physical activity behaviours.¹⁹

Two studies examined the relationship between the nurses' personal health practices and the perception of the self as a role model in health promotion. Hurley et al (2017), adopting the Miller and Dollard Social Cognitive theory, used the Self as a Role Model of Health Promotion (SARMHEP) questionnaire. Their study found a significant correlation between practicing a healthy lifestyle and the nurses' perception of self as the role model for health promotion.²⁰ Another study by Bakhshi et al (2015) reported that almost half of the study subjects promoted physical activity in their clinical practice. Perceived health status, the length of their clinical practice experience, clinical specialisation, and actual body weight were significantly associated with physical activity practices. On the other hand, in another study, the nurses described the obstacles preventing them from doing physical activity such as time, cost, exhaustion, low self-efficacy, and a lack of social support. However, the performance level and absenteeism showed no significant difference between nurses who actively did sports and those who did not.²¹

A study by Blake & Harrison (2013) explored the health behaviour of nurses and their attitude related to promoting health. Their study found that nurses with a normal body weight were more likely to achieve the recommended level of physical activity than the underweight or overweight nurses. Most of the respondents (79.1%) confirmed that nurses should be a role model in relation to health behaviour.²² Similarly, another study also found a significant high score in the general perception of health among healthy nurses rather than unhealthy nurses.²³

Malik, Blake, & Batt (2015) conducted a study to compare between registered nurses (RN) and pre-registered nurses (PRN) as health promoters in transforming their knowledge of healthy lifestyle into their attitude, in order to develop interventions for their patients. The RN group significantly had a healthier lifestyle than the PRN group. However, almost half of nurses in the both groups did not meet the recommended

level of physical activity, while about two thirds did not meet the recommended daily consumption of fruit and vegetables.²⁴

Hensel (2011) investigated the relationship between having a healthy lifestyle and self-concept among hospital nurses using the Nurse Self-Concept Questionnaire (NSCQ) and the Health Promoting Lifestyle Profile (HPLP II). The study found that each aspect of the nurse's self-concept was significantly related to the nurse's lifestyle. Communication and leadership were significantly associated with the nurses' health status.²⁵

DISCUSSION

Provision of health care service has the ultimate goal of improving the health status of the population. Satisfactory health care is achieved by the interrelatedness of the fulfilment of community needs and expectations (consumer satisfaction), what should be effectively delivered by the service providers (provider satisfaction) and efficiently organised by the service institution (institutional satisfaction).²⁶ A robust health care system require support from quality nursing care, which can only be delivered by healthy nurses. Healthy nurses represent a level of quality of nursing staff that can be measured in their physical, mental, social and spiritual abilities when providing quality health services.

From the studies reviewed, healthy nurses can be achieved by applying a holistic approach to health and organisational management. A holistic approach of the health promotion model for nurses can be used improve the healthy lifestyle behaviours. It also includes the establishment of a healthy work environment, opportunities to do sufficient physical activity, a regular and balanced diet, sufficient resting time, and stress management. A healthy work environment has a positive impacts on nurses such as increased work productivity, a lower rate of absenteeism, and improved organisational outcomes.^{10,12}

During working hours, nurses carry out physical activities including visiting patients, lifting patients and performing general nursing care which is assumed to be equal to moderate physical activity for 30 minutes.¹² However, the study results showed that the health outcome of nurses doing physical activity only during their working hours was worse compared to nurses who

did physical activity during their leisure time.¹² Some barriers for nurses to doing physical activity during their leisure time included a lack of time due to long working hours, and changes in their shifts.^{12,18} Nurses may also put in less effort to have or maintain the exercise habit.¹⁸ Poor eating habits among nurses in Saudi Arabia was related to being on the night shift rotation and facing high stress due to the high workload.²⁷

Having a sleep disorder may affect the health of the nurses which results in increased medical errors during their working hours at the cost of the patient's safety as well as burnout.²⁸ Nursing care requires a high quality of performance regardless of the long and irregular working hours involved, which causes an increased level of stress.¹³ High psychological demands, low decision authority, and low social support are the predictors of poor health among nurses working in hospitals.²⁹ High workload and staff shortages were the factors related to psychological disorders which were represented by a high rate of absenteeism among nurses.³⁰

CONCLUSIONS

Healthy nurses are crucial in increasing nursing care productivity in order to support a strong health care system. Promoting the health of nurses can be done by implementing a holistic approach to health and organizational management, including providing healthy work environment which enable nurses to adopt healthy lifestyle behavior. Nursing managers play a pivotal role to address these issues in the workplace.

In Indonesia, despite the long standing issue of staff shortage, adopting strategies related to a healthy work environment should be conducted by policy makers, hospital managers and nurse managers. A health promotion strategy should also be conducted in order to encourage the health behaviour of nurses, including doing physical activity, having regular meals with a balanced diet, having sufficient rest and practising stress management.

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The Support of the Family toward Children with Autism Spectrum Disorder

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ABSTRACT

Autism Spectrum Disorder (ASD) cases have increased worldwide. The family supports are crucial for the development of children with ASD. This study aimed to identify the support from the family toward children with ASD. A descriptive study was conducted involving 14 family members who had children with ASD. The variables of this research included informational, judgmental, instrumental and emotional support. The informational (92.8%), emotional (85.7%), judgmental (57.1%) and instrumental (85.7%) supports from families to children with ASD were good. Future research should undertake the study with a larger sample and examine them using different variables.

Keywords: *autism spectrum disorder; family support*

INTRODUCTION

It is predicted worldwide that 1 out of 160 children suffers from Autism Spectrum Disorder (ASD)¹. This prediction represents the average number and prevalence reported, as it has varied substantially across the total relevant research. A number of corresponding research studies have reported an ultimately higher number². Based on the studies of epidemiology conducted in the last 50 years, the prevalence of ASD appears to have soared globally. Over 1.5% of children were identified with ASD based on an extensive search in 11 different communities across the United States (Arizona, Arkansas, Colorado, Georgia, Maryland, Missouri, New Jersey, North Carolina, South Carolina, Utah, and Wisconsin) in 2012³.

There is no official survey on the number of children with ASD in Indonesia. However, in 2013, the

Indonesian Ministry of Health has presumed that the number of children with autism was over 112 thousand, with an age interval of 5 to 19 years old. This number was generated based on the calculation of autism prevalence being over 1.68 per 1,000 children under 15 years of age⁴. With the overall amount of children aged 5-19 years in Indonesia being over 66 million according to Indonesia's Central Bureau of Statistic in 2010, it generated the aforementioned number of 112 thousand. In 2015, it was expected that there were 12,000 children with autism or 134.000 persons on the autism spectrum in Indonesia⁴.

Based on the criteria of the Diagnostic Statistical Manual III-R of the World Health Organisation (DSM III-R WHO) in 2009, there were no less than 4.000 citizens of Surabaya city identified as suffering from autism⁵. In one of the Schools for Exceptional Children in the city of Surabaya, Galuh Handayani Elementary School in the 2016/2017, it was found that there were 27 students who had been considered as having autism.

Children with ASD require normal treatment, guidance, and individual orientation in order to learn how to socialize and play with their friends. This is so then they can adhere to acceptable age-appropriate behavior in order to not block their development. The growth of

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children is influenced by their surrounding environment, particularly their family, school and the society where they live through socialization⁶. The life of children is significantly determined by the support of their family. If the supports are good, their growth and development will be relatively stable. On the other hand, if the support is non-existent, their children will experience significant retardation which may impair their mental⁷.

The support of the family is an integral part of social support which categorized into four types, including informational, judgemental, instrumental and emotional⁸. Informational support can be instrumented in the form of the family seeking information regarding the child’s health and training the child to study in their daily life. Judgmental support can be realized in the form of the family giving the child the opportunity to do the activities that they find joyful. Instrumental support can be delivered in the form of the family to provide transportation and medication fees, with the family preparing for all of their daily needs. Emotional support can be realized through the family motivating the children to communicate with their friends and caring for their child with affections.

Positive support from their family may help to recover the social function of children with autism⁹. On the contrary, negative support from their family will result in unmanageable children who are unable to be properly orientated, educated and empowered which may result in unwanted behaviors. Unsupported children with autism will also experience a major drawback in achieving their tasks.

This study aimed to identify the support from the family toward children with ASD in Galuh Handayani Elementary School, Surabaya.

METHODS

This study was descriptive research, focused on describing the familial support of children with ASD in Galuh Handayani Elementary School, Surabaya. The process of the data collection was through observations of families with children with ASD. The participants in this research were parents whose children had ASD in grades 1-3 in the academic term of 2017/2018. Fourteen parents of 14 children were involved. The variables of this research included informational, judgmental, instrumental and emotional support.

The instrument of the data collection was a questionnaire with 24 different statements consisting of 6 statements for informational support, 7 statements for emotional support, 5 statements for judgmental support and 6 statements for instrumental support. The assessment method used a Likert scale modified through the following categories: “always” scored 3, “often” scored 2, and “sometimes” scored 1 and “never” scored 0. Later on, the accumulative score was converted into a percentage and interpreted as follows: good 76-100%, enough 56-75% and deficient <56%¹⁰.

The data was processed, tabulated, and analyzed in a descriptive manner. The data was served in the form of frequency distribution table and narrative in order to describe the visualization of familial supports to the children with ASD.

RESULTS

Table 1: Demographic data of family of children with ASD

Demographic Data	n	%
Age		
30-39	8	57.1
40-49	4	28.6
50-59	2	14.3
Sex		
Male	6	42.9
Female	8	57.1
Education		
College	12	85.7
Senior high school	2	14.3
Occupation		
Civil servant	4	28.6
Private employee	3	21.4
Entrepreneur	2	14.3
Unemployed	5	35.7
Sex of child		
Male	10	71.4
Female	4	28.6

As described in Table 1, most of the respondents were aged 30-39 years old (57.1%). The respondents’ sexes were mostly female but almost equal to the male with 57.1% and 42.9% respectively. Almost all the respondents graduated from college (85.7%). Also,

unemployed become the most occupation with 35.7%. Meanwhile, the sex of the children was mostly male (71.4%).

Table 2: Family support of children with ASD

Family support	n	%
Informational support		
Enough	1	7.2
Good	13	92.8
Emotional support		
Enough	2	14.3
Good	12	85.7
Judgemental support		
Poor	2	14.3
Enough	4	28.6
Good	8	57.1
Instrumental support		
Enough	2	14.3
Good	12	85.7

Based on Table 2, most of the family provided good informational, emotional, and instrumental supports to their children with 92.8%, 85.7%, and 85.7% respectively. However, in the judgemental support, the good support was still dominant (57.1%), but there was 14.3% poor support which absent in the other three kinds of supports.

DISCUSSION

1. Informational Support: Informational support is comprised of advice, orientation, suggestion or judgment over how an individual performs something¹¹. One of the support given by the family for the growth of the child is to deliver guidance in them developing proper behavior¹².

In this research, it was discovered that almost all of the children with ASD (93%) were equipped with the favorable informational support. The support given by their parents towards the growth of the children with ASD has been visualized in the form of proper behavioral guidance through appropriate orientation and the advice given to them. This was realized by the family by seeking information related to the child's health, educating the child and training them to deal with their daily activities such as learning how to eat and dress

themselves. This result is in line with research which shows that informational support was in the high category (52.1%)¹³. The particular research identified the connection between familial support and the behavior of children with autism. Out of 23 children with autism with low informational support, 60.9% behaved hyperactively¹³.

Social and informational support, which were both provided by the parental support cluster, were the most frequently reported necessities according to the parents of adolescents with growth disorders¹⁴. This informational support includes the search for information regarding the child's issue by the parents so then it can be delivered to the right person. This also allows them to give advice so then the impact gained by the parents means that they are able to control the negative behavior of their children.

The family has to deliver it by simplifying sentences that are understandable and not confuse them. Because communication disorders are commonly experienced by children with autism¹⁵. The informational support can also be delivered by giving them the right advice on the subject of their language so then the children favorably understand the advice given to them. This particular pattern implies that the support delivered by the parents guides them to the right behavior through orientation and the advice addressed to them¹⁶.

2. Emotional Support: Emotional support consisted of various expressive forms such as attention, empathy and the feeling of concern towards somebody¹¹. The form of emotional support was giving attention to them, such as greeting them, asking them about their condition, approaching and paying them a visit when the person is in need, asking about the condition of someone's feeling, listening to their grievances and also understanding and accepting the condition of someone as they are.

It was discovered that almost the entire children with ASD (86%) were provided with good emotional support. This result is can be observed from the approval of the family including the parents. The approval can be contextualized in the form of attention given by the parents to their ASD affected children including by prioritizing

the preparation of food for the children with ASD instead of their siblings who are non-sufferer to ASD and motivate the children upon lack of appetite. This result is against research which showed that the majority (56.25%) the emotional support given to the children with autism was situated in the low category¹³.

The emotional support can be identified by how far the attention is given by each parent boosts the confidence of the children, so the children do not feel inferior while performing social interactions and the family accept the children as they are¹⁶. The approval was in the form of more attention and affection toward them in comparison to other children. The emotional support would cause the supported recipient to feel comfortable due to the assistance that is apparent in the form of motivation, personal tenderness, and love¹¹. These emotions are what the parents perform on a daily basis, by assisting their children during home studying and asking them about their feelings.

3. Judgmental Support: Judgmental support influences the receiving individual to develop feelings of self-appreciation, confidence, and worthiness. The distribution of judgmental support from the parents can leverage the confidence within the children so that then children would not feel inferior upon staying outside of their home. It was identified that the majority of children with ASD (57%) in Galuh Handayani Elementary School are provided with good judgmental support. This result is in line with a study which pointed out that the majority (68.75%) of judgmental support from parents to their children with autism was in the high category¹³.

The parents are entitled to taking on full responsibility for the child's social progress¹⁷. The parents should start trusting their children and not limiting them in performing various things such as dining, showering, and dressing. These particular treats are aimed to enhancing their self-confidence so then they are capable of undertaking bigger tasks. Judgmental support can also be performed through attention and motivating judgment, which may support them in their jobs and tasks, achievements and attitude. As an example, the parents would allow them to participate in

activities that the children find joyful, including swimming and horse-riding, and embarking to school by themselves¹⁶. This judgmental support will be essential when the children are stressed, such as when the tasks that they endure are bigger than their natural abilities¹¹.

4. Instrumental Support: Instrumental support is performed by becoming the person whose help is expected when solving the problem that the children are facing steps forward, which is especially related to adapting to life¹². For example, when the parents provide instrumental support in the form of physiological fulfillment, the children will be motivated while studying at school¹⁸. It was discovered that almost the entire sample population of children with ASD (86%) in Galuh Handayani Elementary School were provided with favorable instrumental support. This result goes against a study which showed that the majority (52.1%) of instrumental support from the parents to their autistic children was situated in the low category¹³. The parents have the responsibility to act as an advocate, which means that the parent has the responsibility to support and advocate for their children's best interests unconditionally¹⁷. The variety of support which may be given by the parents including providing various types of treatment, encouraging them to exercise as part of a routine, and introducing as early as possible to transportation access and public spaces¹⁹. Through the aforementioned support, the aim is to assist in lessening the burden of the child by helping them to undertake particular activities such as studying and performing their daily habitual activities¹⁶. This is so then the parents of children with ASD are able to provide proper assistance to their children to help them to develop an adaptive attitude that is acceptable in the wider social sphere. The parents should be trained to use precise coping strategies which gives them the required coping skills to execute this effectively²⁰.

CONCLUSION

The conclusion of this research is that the informational, emotional, judgmental and instrumental supports from families to children with ASD in Galuh Handayani Elementary School were favorable. Future research should undertake the study with a larger sample and examine them using different variables.

Conflict of Interest: None.

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Family Factors Associated with Quality of Life in Pulmonary Tuberculosis Patients in Surabaya, Indonesia

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Abstract

Introduction: Pulmonary TB is an infectious disease caused by *Mycobacterium Tuberculosis*. The physical and psychological changes in patients with pulmonary TB can affect the patients's quality of life. The family is a key factor in relation to supporting successful treatment and recovery. This study aims to analyse the factors related to pulmonary TB patients quality of life.

Method: This research used an analytic observational design with a cross-sectional approach. A total of 73 respondents were recruited via the family members of patients with pulmonary TB using a simple random sampling technique. The data was collected using several questionnaires on the sociodemographic characteristics, family development stage, family stress & coping, environmental data and WHOQOL-BREF. The data analysis was performed using a Chi Square test.

Result: The results of this study showed that family factors significantly influence the quality of life of patients with Pulmonary TB, including the type of family ($p=0.000$), their level of education ($p=0.000$), employment ($p=0.001$) and monthly income ($p=0.002$). Other factors including the level of stress and coping and environmental health (healthy housing) were also significantly associated with quality of life ($p < 0.01$). Only the family development stage had no significant relationship with quality of life.

Conclusion: The significant family factors influence the quality of life among pulmonary TB patients, which reflects the need to strengthen the role of the family in promoting successful treatment. A family with social support from the community would help to improve the quality of life of pulmonary TB patients.

Keywords: family, pulmonary TB patients, quality of life, Indonesia

INTRODUCTION

Tuberculosis (TB) is a major communicable disease that claims 100,000 lives worldwide annually.¹ In 2017, Indonesia was ranked the third among listed countries with the highest TB burden.¹ The TB prevalence in Indonesia was estimated to be 600,000 cases with approximately 430,000 new cases per year.² The East Java Province was the top second highest district regarding the number of TB cases with a total number

of 21,606 cases in 2016.² Pulmonary TB is an infectious disease caused by rod-shaped bacteria (basil) known as *Mycobacterium Tuberculosis*.¹ Poor immune system, malnutrition, and HIV positive are among the risk factors of pulmonary TB.² According to the Indonesia Ministry of Health (MoH), the highest prevalence of pulmonary TB is among people older than 45 years old, who have a low level of education, and who are unemployed.³

TB easily infects other individuals through direct contact, coughing, sneezing, and sputum (droplet nuclei) from TB patients. As a result of living closely to TB patients, their families run the risk of TB infection. Because of worries from getting infected, the other family members may limit their contact with the TB patient which results in the individual feeling isolated, depressed and neglected.⁴ TB patients are often socially stigmatised which may affect their adherence to

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effective treatment.⁴ This psychological problem would increase the patient's stress, which affect their quality of life. The physiological changes experienced by TB patients affects their physical abilities and deteriorates their quality of life.¹ The World Health Organisation Quality of Life (WHOQOL) defines quality of life as an individual's perception of life in society in the context of the existing culture and value system, related to their goals, expectations, standards, and concerns.⁵ Quality of life is a very broad concept that is influenced by the physical condition of the individual, their psychological state, level of independence, social relations and environmental condition.⁵

Family factors are significant in relation to the TB cases. A previous study reported the significant association between TB and family-related factors, such as the number of adults in the household, having a single marital status, having a family history of TB, and living in a rented house.⁶ Understanding the family factors affecting the TB cases would improve the support and interventions required in order to promote the successful treatment of pulmonary TB. Therefore, this study aimed to investigate the relationship between family-related factors and quality of life among pulmonary TB patients.

MATERIAL AND METHOD

We employed an analytical observational design with a cross-sectional approach to investigate the relationship between family factors and the quality of life of patients with pulmonary tuberculosis in Surabaya city. This was a preliminary study carried out from March to July 2017. The study population was made up of the families of TB patients who accompanied the patient to the Perak Timur community health centre, Surabaya city, during the study period. The sampling technique used in this research was non-probability sampling using a simple random sampling technique. A total of 89 people attending the community health centre had a TB positive test. 73 people who had a family member with pulmonary TB were selected and agreed to participate in the study.

The questionnaire regarding sociodemographics, family development stage, family stress and coping, environmental data, and the WHOQOL-BREF instrument was used for the data collection. A bivariate analysis using a chi-square test was applied to test the relationship between the independent variables and quality of life.

RESULTS

The sociodemographic characteristics of the respondents have been presented in Table 1. The majority of the respondents were from a traditional family (86.3%). A traditional family, in this study, represents a nuclear family consisting of two parents and their children, while a non-traditional family reflects a single parent family or extended family.⁷ High school was the highest level of education attained by most of the respondents (39.7%). Most of the respondents worked as labourers or factory workers (65.8%), with a monthly income below IDR 1,000,000.

Table 1: Sociodemographic characteristics of the study participants, N = 73

Variables	N (%)
Type of family	
Traditional	63 (86.3)
Non traditional	10 (13.7)
Level of Education	
No schooling	6 (8.2)
Elementary	15 (20.5)
Junior school	14 (19.2)
High school	29 (39.7)
Higher education	9 (12.3)
Employment	
Factory workers	48 (65.8)
Self employed	10 (13.7)
Others	15 (20.5)
Monthly income (IDR)	
< 1,000,000	38 (52.1)
2,000,000-3,000,000	29 (39.7)
> 3,000,000	6 (8.2)

According to Duvall and Milller (1985), family life consists of eight stages, namely 1) new couple, 2) first child birth family, 3) family with pre-school children, 4) family with school children, 5) family with teenage children, 6) family with adult children, 7) middle age family, and 8) elderly family.⁸ As displayed in Table 2, most of the respondents were in the fourth family development stage (19.2%) and the fifth stage (17.8%) respectively. From their answers to the questions related to the level of stress, most of respondents had only a mild level of stress (69.9%), and none of the respondents indicated themselves as having a severe level of stress. The majority of the respondents lived in unhealthy houses (65.8%), but reported having a good quality of life (71.2%).

Table 2: Characteristics of the Respondents Based on the Family Development Stage, Level of Stress, Environmental Health and Quality of Life

Variable	N (%)
Family development stage	
Stage 1	6 (8.2)
Stage 2	3 (4.1)
Stage 3	5 (6.8)
Stage 4	14 (19.2)
Stage 5	13 (17.8)
Stage 6	12 (16.4)
Stage 7	10 (13.7)
Stage 8	10 (13.7)
Level of stress	
Mild	51 (69.9)
Moderate	22 (30.1)
High	0 (0.0)
Environmental health	
Healthy house	25 (34.2)
Unhealthy house	48 (65.8)
Quality of Life	
Poor	21 (28.8)
Good	52 (71.2)

We assessed the family-related variables including the type of family, level of education, employment, monthly income, family development stage, level of stress, and environmental health in relation to quality of life using the chi-square test. From the analysis results shown in Table 3, we found that the type of family, level of education, and monthly income were significantly associated with quality of life. No association was found between the family development stage and quality of life ($\rho=0.328$). Both the level of stress and the environmental health variables showed a significant association with the quality of life of TB patients.

Table 3: Bivariate analysis of the sociodemographic characteristics, family development stage, level of stress, environmental health, and quality of life

Variables	Quality of Life		p-value
	Poor (n; %)	Good (n; %)	
Type of family			

Traditional	12 (19.0)	51 (81.0)	0.000
Non traditional	9 (90.0)	1 (10.0)	
Level of Education			
No schooling	6 (100.0)	0	0.000
Elementary	15 (100.0)	0	
Junior school	0	14 (100.0)	
High school	0	29 (100.0)	
Higher education	0	9 (100.0)	
Employment			
Factory workers	10 (20.8)	38 (79.2)	0.001
Self employed	8 (80.0)	2 (20.0)	
Others	3 (20.0)	12 (80.0)	
Monthly income (IDR)			
< 1,000,000	5 (13.2)	33 (86.8)	0.002
2,000,000-3,000,000	15 (51.7)	14 (48.3)	
> 3,000,000	1 (16.7)	5 (83.3)	
Family development stage			
Stage 1	0 (0.0)	6 (100.0)	0.328
Stage 2	2 (66.7)	1 (33.3)	
Stage 3	1 (20.0)	4 (80.0)	
Stage 4	2 (14.3)	12 (85.7)	
Stage 5	5 (38.5)	8 (61.5)	
Stage 6	3 (25.0)	9 (75.0)	
Stage 7	4 (40.0)	6 (60.0)	
Stage 8	4 (40.0)	6 (60.0)	
Level of stress			
Mild	0	51 (100.0)	0.000
Moderate	21 (95.5)	1 (4.5)	
High	0	0	
Environmental health			
Healthy house	1 (4.0)	24 (96.0)	0.001
Unhealthy house	20 (41.7)	28 (58.3)	

DISCUSSION

In our study, several factors including the type of family, level of education, employment, monthly income, level of stress, and environmental health were significantly associated with the quality of life of pulmonary TB patients. Chronic disease affected the physical and mental health, which in turn decreased their quality of life.⁹ The quality of life decreased along with the emergence of the general symptoms of pulmonary TB such as coughing, fever with the exertion of sputum and mucus, and weight loss but improved after the

first month of treatment.² Therefore, the family has an important role to the patients' adherence to the whole TB treatment.

The type of family is significant in relation to the quality of life among patients with TB. A traditional family is founded based on the union of parents with or without children. Support from a spouse or children may increase the motivation of pulmonary TB patients to comply the treatment. The spouse can monitor the patients in taking their medication correctly and accompany them to the health facility in order to get their disease checked. In line with our study results, a previous study found that being single parent increased the odds of TB cases by 63% compared to being in a married family.⁶ The risk of TB cases also increased along with the increased number of adults in the household. Having more than 10 adults in the household increased the risk of TB cases by 2.67%.⁶

Level of education was also a significant factor related to the quality of life among TB patients. This result supported the findings of previous studies stating that level of education had a significant relationship with quality of life among patients with TB.^{10,11} Employment is significantly associated with quality of life among the TB patients in our study. Similarly, a previous study in India reported there to be a significant relationship between employment and the quality of life scores of active TB patients after a year of successful treatment.¹² Another factor of income level was significantly related to the quality of life level. In the same vein, a previous study also reported that TB patients considered the level of income as being an important factor in improving quality of life.¹³ These two factors are relevant, as having employment would enable the family of the TB patients to receive a certain level income as a form of sustainable financial support. Having a low income constrains some families in being able to afford enough food for the whole family. Moreover, a low income household only has a limited number of choices when fulfilling the nutritional needs of the family. Lack of nutrition affects the immune system, which increases the risk of having an infectious disease.¹⁴

According to Antonovsky (1979), stress is a response or a mental state from experiencing tension caused by a stressor or unresolved circumstances.¹⁵ Having social support from the social environment would prevent the TB patients from feeling isolated and

lower their level of stress.¹⁵ Quality of life has increased in line with the decreasing of the physical symptoms of TB patients. Stress from a chronic disease is not only experienced by patients with active TB, but also patients with latent TB.¹⁶ In latent TB, the TB symptoms are not visible, so the patients tend to be stressed and anxious about the given diagnosis.¹⁶ The results of a previous study in Indonesia also showed a significant relationship between social support and quality of life as reflected in the decreasing of life satisfaction felt not during the initial diagnosis, but after when undergoing the intensive phase of treatment.¹⁷

A healthy house represents good environmental health. A healthy house has an integrated physical, chemical, biological condition that enables the residents to attain optimal health.¹⁸ Therefore, a healthy house should meet requirements such as to fulfil physiological and psychological needs, and to prevent the transmission of diseases as well as accidents.¹⁸ A healthy house should have adequate lighting, either from natural or artificial light, adequate ventilation for fresh air circulation, and should enable the family members to feel comfort. It also should have a disposal system for garbage and household waste, as well as safe water and food that prevents disease transmission. Having a TB patient in the house increases the risk of TB transmission to other residents. Therefore, having a healthy house would minimise this risk. As reported by a previous study, poor housing conditions significantly reduce the level of quality of life among patients with TB and their families.¹

CONCLUSION

Our study results yielded a significant relationship between all of the family related factors and the quality of life among pulmonary TB patients. The type of family significantly affects quality of life. Being educated and engaged in paid employment was significantly associated with quality of life, as was the family level of stress and coping. However the family development stage showed no association with quality of life. Poor housing condition also affects the quality of life of patients with pulmonary TB. Considering the significant family factors, several strategies to improve the quality of life among these patients and their families should be implemented.

First, the patients should have an adequate level of knowledge and understanding about the disease and

the transmission of TB bacteria, so then they follow the treatment procedures and prevent further transmission. Second, the family should continuously provide a supportive environment with the community to help the patients recover from and fight TB transmission. This effort will minimise the stigma felt by the patients and increase their self-confidence. Community social support is very important in speeding up the healing process, and will increase the dignity of the patients and their families living within the community.

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Parenting Style Based on the Mother's Personal Mastery and the Mother-Child Attachment in Relation to Child Feeding Disorders: A Qualitative Study

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ABSTRACT

Child feeding disorders affect the child's developmental growth due to malnutrition. This study aimed to explore the mother's experience of having children with a feeding disorder in relation to their knowledge and attitude about child feeding. We conducted an observational study with in-depth interviews. Seven mothers of toddlers with eating disorders but without neurological delays agreed to participate. The mothers reported that their children started to have an eating disorder approximately from the age of 2 up to 6 months, and then the disorder worsened by the age of 12 months. Lack of knowledge about the development of child eating behaviour was observed among the mothers. Mothers expressed having anxiety and feeling stressed during feeding times.

Keywords: *child feeding disorder, eating behaviour, personal mastery, mother-child attachment*

INTRODUCTION

Feeding disorders are a common problem during infancy and the early childhood period that can lead to malnutrition and can be potentially life threatening in severe circumstances. This problem has been experienced by parents worldwide, and can cause stress and depression, especially for the mothers. Approximately half of the observed mothers reported having at least one child with a feeding disorder.¹ Feeding disorders affect approximately 20-30% of children with normal development and 80% of children with developmental delays.^{1,2} Vomiting food, eating non-nutritive substances, and food rejection are among the symptoms of feeding disorders in childhood and infancy.³ The disorders have a broad spectrum, ranging from a mild degree such as picky eating and food neophobia to a severe level of disorder as seen in children with autism.¹

Most parents consider that eating is a normal physiological process, but some children may have eating problems. Parents recognise eating in the simple context of the process of ingesting food individually, but they do not include feeding in a specific context that involves the relationship between the child and the adult who feeds them as well as the influence from the family and the surrounding communities.^{4,5} Eating in the feeding context involves several aspects including: 1) the swallowing reflexes and the adequate neurological function to regulate food boluses (solid or liquid) in the oral cavity; 2) tone, control and coordination of muscles during the feeding process; 3) the development of oro-motor functions and skills from the sucking stage to the chewing stage; and 4) the happy feeling and comfortable condition between the child and the adult who is feeding them.⁵

Children with feeding disorders are generally taken to the doctor at preschool age (2-3 years old), with the most complaints being focused on difficulty eating, picky eating (only eating a little and rejecting most types of food) or neophobia (fear of trying new foods).⁶ By the age of 2 years, children begin to reject foods that were previously acceptable because they prefer foods that are physically more attractive, both in colour and texture.⁷ The incidence rate of neophobia is the lowest in

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the infant period (4-7 months), but then increases rapidly in the age range of 2 to 6 years, especially in relation to the consumption of fruits, vegetables and meat.⁸ Feeding disorders for older children (age 8-11 years old) usually involve emotional eating, because eating is driven by an emotion but not hunger, which leads to excessive eating with a high consumption of sugar, fat, and energy.⁹

Some recent studies have reported that children with picky eating showed a negative reactions related to sensory food, especially related to the texture and aroma.^{7,8} Influences from their family and the environment form the children's taste for certain types of food and eating behaviour.¹⁰ Advertisements on food on the TV also influence the food preferences of children aged 5-7 years old.¹¹ Most of the food rejection cases among children were influenced by the lack of knowledge among their parents that the development of eating behaviour is crucial during the first three years of the child's life.¹⁰

Parenting style affects feeding style and feeding practices in the aspects of demandingness and responsiveness.¹² The parent's knowledge of the child's development is crucial in establishing the self-efficacy and competency of the parent, especially the mother.¹³ Personal mastery is obtained through a continuing learning process and comprised of the ability (skill) and the spiritual condition which forms a creative tension to combine expectations and reality to achieve a solution.¹⁴ Our study aimed to observe the mother's experience of having a child with a feeding disorder in relation to their knowledge of and attitude toward child feeding.

MATERIALS AND METHOD

The present study employed a qualitative method using a structured in-depth interview. The researcher, as the research instrument, asked the respondents the following questions: 1) what is the kind of food and how do you feed your child?; 2) Who has taken care of your child since your baby was born and who feeds him/her (including preparing formula milk or breastmilk); 3) When did you start training your child to eat? How do you know when your baby or child is hungry and full?; 4) When did you realise that your child had a feeding disorder?; 5) What are the signs of a feeding disorder that you noticed in your child? and 6) What do you do and feel when you encounter difficulties related to your child's feeding disorder? Some probing questions included problems during the eating process and the child's reactions during feeding time.

The study participants were recruited from a private health clinic in Surabaya, Indonesia using a purposive sampling. The inclusion criteria were women having a minimum of 1 (one) child under five years old with a feeding disorder within the year before the interview. The exclusion criteria were the mothers of children with neurological developmental and anatomic disorders, and other congenital abnormalities. Prior to the interview, the researcher explained about the study, the data protection, and the right to withdraw from the study. Written informed consent forms were submitted from the participants and their spouses. The interview was conducted either face to face or over the telephone based on the preferences of the participants. The mother's age ranged between 28 and 35 years old. The children's feeding disorders were perceived by the mother. Four participants were full-time housewives, one participant had a small home based business with her husband, one participant worked freelance, and one participant worked full time at a government office. All of the interviews were conducted in Bahasa Indonesian for approximately 60 minutes. The interviews were audiotaped and transcribed for the data analysis.

RESULTS

Based on the analysis of the interview transcripts, three themes emerged, including 1) selecting food and the feeding practice, 2) parenting and caring for the child, and 3) recognising and overcoming the feeding disorder.

Selecting food and the feeding practice: Three women reported providing exclusive breastfeeding (6 months of breastfeeding without other supplementary food). Three women reported feeding their babies by combining breastmilk and formula milk. Only one woman did not breastfeed due to problems with breastmilk production. According to the mothers who exclusively breastfed, their babies were fed regularly every 1.5 up to 2.5 hours. They fed based on what they understood as being the baby's need (crying as a sign of hunger). Some mothers explained that they combined breastmilk and formula milk because of their low production of breastmilk. One woman described that the stressful situation during the first week having the baby was due to difficulties breastfeeding and the inability of the baby to receive bottled milk. All of the mothers stated that 6 months old was the right time for their babies to learn about eating

food other than milk. They continued their belief that a baby crying was a sign asking for food while the baby's refusal of food would mean that they were full. For them, eating is a basic necessity and is a natural process for a human being without the need for learning.

Parenting and caring for the child: The exclusive breastfeeding mothers explained that they care for their babies by themselves without receiving help from other family members. Two women received help from their mothers, especially during their difficulties with child feeding. One woman received help from a competent baby sitter. One woman who fed her baby with formula milk received help from two housemaids.

With current advanced technology, the mothers described the use of smartphones or similar gadgets to help comfort their younger children during feeding time. A woman explained that "every time my baby makes a fuss during meal time, I would let her watch a video from my phone. She would stay calm and open her mouth." Another woman described that meal time was often like "a battle" to get their child eating, and considered that the smartphone was a "master weapon" used to win the battle. One woman said that she had not set up a regular meal time for her child and depended on her child's need. When her child refused to eat her meal, she would let her eat any of her favourite snacks to fill her child's stomach. She considered that the snacks also have "nutrition value", just like a regular meal.

Recognising and overcoming the child's feeding disorder: Almost all of the mothers stated that they recognised the feeding disorder when they started to introduce solid food at age 6 months. Their babies refused to open their mouths during feeding time, and only wanted to have milk. Two women said that they realised her child's feeding disorder as early as the age of 2 years old. Their children refused to eat, or they did not swallow food and quickly regurgitated it instead. Some mothers said that their children only wanted certain foods such as chicken nuggets and instant noodles, or other delicious snacks with a low nutritional value. At first, the mothers assumed that the refusal of food was merely due to learning to adapt to new food. The mothers started to feel stressed out when their children continued this behaviour and their body weight reduced.

To improve their children's appetite and willingness to eat, the mothers used various fun and interesting

ways to distract their children during meal times. The mothers gave them toys to play with, let their children watch cartoons on television, or took their children to eat outside the house. However, the mothers did not try to receive professional help and considered that having a feeding disorder was normal and that it would be over after their child started elementary school.

DISCUSSION

From the themes that emerged in our study, the mothers started to give solid food after the age of 6 months, reflecting their knowledge of the feeding development stages. However, they also emphasised that eating is an automatic process generated by the feeling of hunger due to the basic human need for food. In this case, the mothers interpreted the process of eating in children as "eating" and not "feeding", which does not realise the reciprocal interaction during the feeding process.⁵ Therefore, the mothers did not consider the crucial issue in recognising their baby's cues of hunger or full, and the concept of autonomy and individuality formed by the age of 6 months through to 3 years.² Due to autonomy and individuality, a 6-month-old baby refused to open his mouth when being fed¹⁵, selected certain foods by the age of 18 months (picky eating)^{7,8}, was only interested in advertised foods at the age of 5 – 7 years old¹¹, and had emotional eating by the age of 8-11 years.⁹

The authoritative parenting style is the most appropriate parenting style to prevent inappropriate practices that negatively affect the physiological and psychological health of the child.¹⁶ The occurrence of feeding disorders among children under five is influenced by the parenting style, including the mother-child attachment and personal mastery. In the concept of attachment, being physically close is not enough. In this study, some of the mothers received help in caring for their children either from their relatives or other helpers. According to the Bowlby concept of the Internal Working Model (IWM), the childhood experience with a parent (especially with mother) will affect a person's abilities and sensitivity in relation to caring for a child.¹⁷ The failure to thrive is more influenced by behavioural problems (eating behaviours) than a lack of food, child abuse, and neglect.¹⁷ Less sensitivity among the mothers in this study was observed from the beliefs of the mothers that an interactive relationship between mother and child would only happen after the child developed the ability

of verbal communication. Waiting until after the child can communicate verbally is considered to be too late because the autonomy and individuality of the child has formed at an earlier stage.¹⁷

Because of the lack of understanding and mental unpreparedness, mothers consider caring for their child to be tiring.¹⁸ Moreover, having a child with a feeding disorder causes the mother to feel tired, stressed and depressed.¹⁸ Mothers felt incompetent, desperate, and ashamed, which indicated a lack of self-efficacy.⁴ Feeling incompetent is common among mothers who have little knowledge about child development.¹³ In dealing with child feeding disorders, mothers give up and let their children have foods with a high glucose/salt /fat /calorie content.¹⁸ The importance of the mother's personal mastery was reflected in this study. Most of the mothers in our study had a limited understanding of the development stages of feeding, but did not seek further help or trusted information to overcome the problem. Instead, the mothers let their children shape their own eating behaviour as an automatic process. The mothers were unaware that they are the first teacher for their children to learn life skills from, including eating behaviour.¹⁹ Personal mastery is not just obtained from birth itself, but involves a learning process throughout life.¹⁴

CONCLUSION

Child feeding disorders occur as early as when the child is introduced to solid food. Children should be taught about eating behaviour as early as possible, by recognising the signs of hunger and fullness through reciprocal interactions between the parent or the caregiver and the child. The parent should have an understanding of the concept of personal mastery and the parent-child attachment in order to show compassionate caring toward their children. The parenting style influences the child's eating behaviour, therefore teaching the child appropriate eating behaviours since birth would minimise the occurrence of child feeding disorder. The reciprocal interactions during the first 3 years of life is crucial, including during the feeding time itself. Further research is recommended involving a more diverse population to gain more of an understanding about parenting style in relation to child feeding disorders.

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Factors Associated with Onset to Hospital Delay among Stroke Patients in the Emergency Department

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ABSTRACT

Ischemic stroke is the most common neuro-emergency in the world. The only treatment approved for an acute stroke is thrombolysis, which has a narrow window. Thrombolysis to treat acute ischemic stroke is under-utilised. There are many factors associated with delays in treatment. In Indonesia, thrombolysis is not commonly used for acute stroke treatment. The study aimed to know what time is needed from the onset of the stroke condition to the Emergency Department in a stroke patient and the factors associated with the hospital delays. All stroke patients admitted to Dr. Soetomo General Hospital and Universitas Airlangga Hospital between October 2016–March 2017, who agree to participate in the research and were aged >18 y.o. are included. We reviewed all of the subjects for the demographic characteristics, distance to hospital, stroke risk factors and clinical data. All of the subjects will be asked for the time of stroke onset and the time when the patient arrived at the emergency department. We will also measure the stroke using a specialised scale.

Results: There were 107 subjects included in this research. The data was inadequate in 4 subjects. The mean age was 55.97±11.9 years, and there were more women (54.2%) than men. The distance from the patient's home to the hospital was mostly <15 km (65.1%). 63.6% of the subjects were referred from other hospital or clinic. Most of the patients had hypertension (71.4%) and diabetes (31.7%). Onset from the ictus of the stroke to the Emergency Department was 712.3±1324.6 minutes. A factor associated with the delay was the medical services accessed before the patient was referred to the hospital (0.215; p=0.026) and their pre-admission score (0.242; p=0.012)

Conclusion: Time from onset to the Emergency Department was longer than the treatment time window for thrombolysis. The factors associated with the onset of hospital delays was primary medical services and the pre-mRS score.

Keywords: Acute stroke, thrombolysis, hospital delays

INTRODUCTION

Ischemic stroke is the most common neurological emergency in the world ¹. In 2008, stroke was the third leading cause of death ². In the US, there are 780.000 cases of stroke every year, and the cost of stroke treatment in 2008 was an estimated \$65.5 billion ¹. An estimated 88% of stroke patients have an ischemic stroke³. There are many stroke patients who remain functionally dependent after a stroke, although around 50-70% return to their previous functional status. There is a susceptibility to an increased mortality and morbidity after having a stroke¹. Stroke is also the leading cause of morbidity among adults. About 30% of stroke patients need assistance

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during their daily activities, and 16% need long-term hospital or home care ^{1,3}.

Thrombolysis using r-TPA is the only drug approved by the FDA for ischemic acute stroke treatment for all patients who meet the inclusion and exclusion criteria ³⁻⁷ by 30 days, 33 (14.7%). There is a strong correlation between arterial recanalisation and the improvement of neurological status in an ischemic stroke patient ¹. Iv-rTPA is recommended to be given within 3 hours of onset according to the NINDS criteria ⁸. Pool analysis from a NINDS-rTPA study concluded that earlier treatment with iv-rTPA correlates with a better outcome. According to the NNT ratio, iv-rTPA will benefit 8 patients out of 15, and for every 15 patients treated with iv-rTPA, only 1 patient will suffer an intracranial haemorrhage ⁴.

Although iv-rTPA is effective as a treatment for acute ischemic stroke, thrombolysis for acute stroke is still under-utilised; especially as there are many patients coming to the hospital beyond the treatment period. There is also the complexity of hospital bureaucracy involved^{1,9,10} in our tertiary care center, the time intervals preceding intra-arterial thrombolysis in order to accelerate and optimize the management of acute strokes. METHODS: Between January 1, 2000, and April 30, 2002, 597 patients with acute stroke were admitted to our stroke center. One hundred forty-eight patients underwent diagnostic arteriography, and 100 (16.8%). Chen et al. revealed that the factors associated with a delay in the community included a referral from another health facility, waking up with a stroke, having a stroke while having sex, the patient's address, transportation, history of stroke or coronary artery disease and the NIHSS score in the emergency department all had no predictive value ¹¹. Tan, et al. conducted a prospective study on 789 stroke patients and revealed that 26% of them had come within 2 hours of onset. A factor associated with hospital delays was a referral from another hospital, the stroke location, the onset of the stroke, the treatment in outpatient clinics and a lack of concern related to seeking help for stroke symptoms¹². Herlitz et al. reviewed existing stroke studies and acute myocardial infarction studies and showed that the onset of symptoms through to treatment for an acute stroke was longer than that for a myocardial infarction¹³ resulting in an infarction. Depending on the extent of the infarction, loss of organ function varies considerably. In both conditions, it is possible to limit

the extent of infarction with early intervention. In both conditions, minutes count. This article aims to describe differences and similarities with regard to the way patients, bystanders and health care providers act in the acute phase of the two diseases with the emphasis on the pre-hospital phase. METHOD: A literature search was performed on the PubMed, Embase (Ovid SP).

The chain of hospital services will prompt a good outcome in stroke patients, beginning with knowledge of stroke symptoms. The CASPR (the California Acute Stroke Pilot Registry) study showed that there was an increase in patients receiving thrombolysis from 4.3% to 28.6% ^{2,14}

Acute stroke services in the emergency department should be conducted in Triage with the same priority as a myocardial infarction or traumatic brain injury regardless of the neurological deficit severity. Service standards for acute stroke care according to the AHA/ASA guidelines are: from ER to meeting a medical doctor is less than 10 minutes; ER to meeting the stroke team is less than 15 minutes; ER to performing a CT scan is less than 25 minutes; ER to CT interpretation is less than 45 minutes; ER to thrombolysis is less than 60 minutes; and ER to admission to a stroke unit is less than 3 hours.

Thrombolysis in Indonesia is less frequently performed because there was no data available to determine the factors causing the ER admission delay in stroke patients. This study aimed to know the average time is from onset to ER admission in acute stroke patients.

METHOD

From October 2016 to March 2017, all acute stroke patients in Dr. Soetomo General Hospital and Airlangga University Hospital who were admitted to the ER were observed. All stroke patients older than 18 years old were included in this study. Stroke patients with mimicking conditions and who had a subdural haematoma were excluded. All patient data was collected including demographic data, the onset of the stroke, the duration of attack in order to know whether the patient had a stroke or a TIA, the distance from the patient's address to the hospital, the medical care received before the patient came to the ER, who was a witness to the stroke ictus, the response of patient after the stroke symptom onset, the patient or witness's knowledge about stroke attacks, the mode of transportation that patients used and the time taken to get

from the patient’s home to the ER. We also collected their history of past illness, the NIHSS score when they were admitted to the ER, their pre-mRS (The modified Rankin Scale), mRS and the type of stroke. All of the data was analysed statistically to determine the mean, SD and normality, and we conducted correlational analysis.

RESULTS

We included 107 subjects from the period of November 2016 – March 2017. The mean age of this research was 55.97±11.9. All of the demographic characteristics have been shown in Table 1. There were more women (54.2%) in this research, most of patients were from Dr Soetomo General Hospital (98%) and most of patients had a low income (89%). Our subjects mostly had a level of education of senior high school level (34%). Most of the patients had an address distance that was less than 15 km (64.5%) from the ER.

Table 1: Demographic characteristics

Variable	n	%
Sex		
Male	49	45.8
Female	58	54.2
Hospital		
Airlangga University Hospital	2	1.9
Dr. Soetomo General Hospital	105	98.1
Income		
< 5 million rupiah	96	89.7
>5-10 million rupiah	8	7.5
>10-20 million rupiah	2	1.9
Education		
No education	11	10.3
Elementary school	27	25.2
Junior High School	22	20.6
Senior High School	34	31.8
Diploma - degree	11	10.3
Post Graduate education	2	1.9
Hospital Distance from Subject home		
<15 km	69	65.1
>15 km	37	35.5
Medical care before ER		
Hospital or outpatients clinics	68	63.6
Home	37	34.6
Unknown	2	1.8

Hypertension was a common risk factor (74.8%) in our research, followed by diabetes (29.9%) and history of acute cerebrovascular accidents (25.5%) (Table 2). We decided that the time taken to come to the ER was less than 15 minutes, 15-29 minutes, 30-60 minutes and more than 60 minutes for the respective groups. The most common time taken to get to the ER was 15-29 minutes. Although most of the patients came to the ER around 15-29 minutes, the mean time needed to get to the ER was 712.12±1324.6. This means that more patients were actually in the group of over 60 minutes. Some of the patients got to the ER 2-3 days after the stroke attack.

Table 2: Stroke Risk Factors

Variable	n	%
Hypertension	76	71.4
Diabetes Mellitus	33	31.7
TIA	4	3.7
Stroke	27	25.2
Jantung	11	10.3

We used statistical analysis to determine the correlation between the time needed to get to ER and the factors such as age and stroke type. There was the NIHSS score, pre-mRS score, mRS Score, the patient’s income, their education level, the distance from the patient’s home to the Emergency Department and also the medical care that the patient got before patient arrived at the ER. We used Spearman’s correlation to analyse the variables. We found that the variables associated with ictus to hospital delays were pre-mRS Score (r=0.242; p=0.012), distance from the patient’s home r=0.195 (p=0.045) and medical care before ER (r=215; p=0.026).

Table 3: Time needed to ER

Variable	Mean ± SD	p
Onset to ER	712.12 ± 1324.6	0.00
Time needed at ER	239.5 ± 151.3	0.00

Table 4: Correlation between the factors associated with time to ER

Variable	r	p
Age	-0.065	0.51
Stroke type	0.162	0.1
NIHSS 1	0.045	0.649

Conted...

Pre-mRS	0.242	0.012*
mRS	0.034	0.731
Income	0.051	0.605
Education	0.105	0.284
Distance	0.195	0.045*
Medical care before ER	0.215	0.026*

DISCUSSION

Our research showed that women were more common than men, so our data is different to that from the previous research which concluded men suffer stroke attacks more than women^{9,15-17}. Gender is one of the unmodified risk factors for stroke. Our study showed that women are more common. We used a hospital-based study and we recruited our subjects using consecutive sampling. Most of the patients in our study were referred from another hospital, so our patients were selected from other hospitals or clinics. Data from the Ministry of Health in Indonesia also showed that men more commonly suffer a stroke than women¹⁸, but because of the referral system in Indonesia, the patients should go to primary care before being referred to secondary or tertiary care.

The mean age of our subjects was 55.97±11.9, so our subjects were younger than those of Chen, et. The most common stroke patient age was >65 years old. Our data showed that there is a trend for stroke patients to be of a younger age in Indonesia compared with other countries.

The income of our subjects was consistently less than 5 million rupias. This data shows that most of our subjects had a lower income, although the income of the subject didn't correlate with time to ER. Our subject's education mostly was of a lower education level that will affect their awareness of stroke signs and symptoms, also affect their awareness of needing to seek help at a hospital.

The risk factors in our study included hypertension, diabetes, TIA, stroke, and a history of coronary artery disease. Our results are similar to those of another study^{17,19,20}.

The time from ictus to the Emergency Department was 712.12 ± 1324.6. This data shows that our subjects, on average, came to the Emergency Department beyond time window needed for thrombolysis. This delay can be the result of the referral system in our country. The

factors associated with time to ER was only significant in relation to the Pre-mRS score ($r=0.242$; $p=0.012$). This shows that the status before ictus affected the patient coming to the hospital earlier. Another factor associated with time to ER was the medical care received before the patient came to the ER (0.215 $p=0.026$). This result shows that our subject maybe had an awareness about stroke and so they came to the primary medical services, but the referral system also delayed the subject coming to thrombolysis-ready hospitals. Chen et al. found that sex, the subject's address, mode of transportation and history of stroke didn't have a significant association with time to hospital¹¹. This result is similar to our results, although the distance from the patient's home was significant in our study. The distance from the patient's home could significantly shorten the time taken to get to the hospital, but this does not affect anything clinically because the average of our study showed that the time taken to get to the hospital was consistently beyond the thrombolysis time window.

CONCLUSION

We conclude that the time taken to get to the Emergency Department is longer than the thrombolysis treatment window and that the only variables affecting the time taken to get to the ER was the Pre-mRS and the medical care accessed before the Emergency Department. Our study had limitations as it was performed at the tertiary hospital using consecutive sampling. The intervention was performed before thrombolysis became commonly performed in Indonesia.

Conflict of Interest: None.

Ethical Clearance: The study passed ethical clearance from Ethical Committee of the Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia.

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Analysis of The Influence of Hersey-Blanchard Leadership and Nurse Maturity on Caring Behaviour Performance Based on Patient Perception

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ABSTRACT

The quality of nursing care services in Indonesia need to be improved particularly in caring behavior aspect. One cause for this factor is a lack of caring behaviour. Caring behavior as a form of nursing care toward the patient is described as an act that cares for or respects humanity in relation to those who are unable to meet their needs. This was an observational study with a cross-sectional design. Four inpatient rooms were utilized in this study, and each inpatient room was represented by the head nurse and associate nurse. The data obtained using the questionnaire instrument was analysed using Multinomial Logistic Regression ($\alpha = 0,05$). The results showed that the majority of the Head nurses of the inpatient rooms (37.5%) applying the selling leadership style. The nurse associate's maturity level was M3 (42.5%) and M2 (32.5%). Caring behaviour was mostly moderate (45%). The selling leadership style is the most applied leadership style conducted by the head nurse. The head nurses are less appropriate when it comes to applying the leadership style as it is related to the maturity level of the associate nurses, M3. A good level of caring behaviour is influenced by the leadership. The caring behaviour of the associate nurses can be improved by changing the style of the selling leadership into a participating leadership style, which is more appropriate when paired the maturity level of the nurse associate.

Keywords: *leadership style, nurse maturity level, caring behavior, nurse.*

INTRODUCTION

Quality of health services is the degree of perfection of health that fits with professional and service standards by using the available resources in the hospital in a reasonable, efficient, and effective manner. The services should also be safe and satisfactorily provided, based on norms, ethics, law and the local socio-culture with attention paid to the limitations and capabilities of the government, as well as society¹. The World Health Organisation (WHO) in 2006 launched Quality of Care: "a Process for Making Strategic Choices in the Health

System". The World Health Organisation states that there are six dimensions of health service quality that must be actualised by all countries, namely that health services must be effective, efficient, easily accessible, safe, timely and prioritise patients.

The quality of nursing care services in Indonesia is still unsatisfactory. This can be caused by several factors, among others being organisational factors and the nurse factors themselves in that they show less attention, less caring, are less responsive to the patient's complaints, are less motivating and pay less attention to the therapeutic attitude that would be beneficial for the patients. Caring behaviour as a form of concern from nurses to patients is described as an action that pays attention to or respects fellow human beings who are unable to meet their needs². Caring behaviour is a universal phenomenon that affects the way that humans think, feel and have relationships with others³.

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Leadership style is important due to its role in the organisation because the leader's behaviour will strongly influence changes and maintain the culture within the organisation⁴. Situational leadership style focuses on the relationship of leadership behaviour with the employees and was developed from a leadership concept that is oriented to focus on the leader and employee relationship. According to Hersey (1986), there are four styles: telling style, telling style, participating style and delegating style. Employees are a key factor in the organisation because their performance and behaviour will affect on the success or failure of the organization itself⁵. Low maturity level (M1) indicates that the person is unable, unwilling and also not confident. Maturity level M2 indicates being unable but there is a willingness and confidence. Maturity level M3 is being able but unwilling, and not confident. Maturity level M4 is being able, willing and confident.

Nurse's caring behaviour is still widely studied because there is still a high level of patient dissatisfaction related to the services of nurses who work in hospitals. The following is a preliminary survey showing the number of nurses who have not yet applied caring behaviour at X Hospital. The results of the preliminary survey in X Hospital Surabaya in its ICU inpatient room, maternal inpatient room, 3rd Floor inpatient room, and 4th Floor inpatient room showed that the nurse's caring behavior is still low.

METHOD

This study was an analytical observational study with a cross-sectional approach, using a questionnaire as the study tool. The variables studied were leadership style, employee maturity level and associate nurse caring behaviour while the respondents were all Head nurses, all associate nurses and all patients who had been hospitalised for 2 x 24 hours in 4 units of the ICU patient room, maternal hospitalisation, adult hospitalisation and children hospitalisation as well as being able communicate well. This study was conducted in 4 Units of the Inpatient Room at X Hospital in April 2018.

RESULTS

The age of the Head Nurses was all between the ages of 26 years - 30 years old (50%) and ≤ 25 years old (50%). The Head Nurses' age was in early adulthood, meaning that their attitude and behaviour was in a warm,

close and communicative relationship stage according to Erickson (Monk, 2001). This period is a period of transition related to physical, intellectual and social roles. The ages of the Associate Nurses was between 26 years - 30 years old (72.5%) and ≤ 25 years old (27.5%).

The education level of all Head Nurses (ICU room, adult hospitalisation, child hospitalisation and Head of Midwifery) was an associate degree or D3 (100%). Most of the Head Nurses at X Hospital had served as Heads for between 1-2 years (75%). All Head Nurses in the ICU, maternal hospitalisation, adult hospitalisation and child hospitalisation units of X Hospital were female (100%). The leadership style of the Head Nurses based on the Hersey-Blanchard approach showed that almost all of them had Selling (S2) as their leadership style (75%). The level of maturity of the Associate nurses in the four inpatient rooms of X Hospital showed a medium maturity level of M2 (75%). Most of the caring behaviour of the Associate nurses at X Hospital was at the level of moderate caring behaviour (45%). The influence of the Head nurses' leadership style based on the Hersey-Blanchard approach consisted of leadership style (Telling-Directing, Selling-Coaching, Participating and Delegating) on the caring behaviour of the Associate nurses in the 4 inpatient rooms of X Hospital via the following: telling in the 'less' category (50%), the selling leadership style influences the caring behaviour in the 'good' category (70.37%) and the participating leadership style influences the caring behaviour of Associate Nurses in the 'moderate' category (42.86%). The leadership style of the Head Nurses based on the Hersey-Blanchard approach had a significant effect on the Associate Nurses' caring behaviour with a 'good' category of 70.37% ($p = 0.004$), with particularly the selling leadership style having a significant effect on the Associate Nurses' caring behaviour with a 'good' category 38.7 times greater than telling, selling and participating leadership style.

The medium maturity level of the associate Nurses (M2) had more of an impact on the Selling leadership style (40%), the high maturity level of the Associate Nurses (M3) had more of an impact on the Participating leadership style (61.54%) and the very high maturity level of the associate Nurses (M4) had more of an impact on the Delegating leadership style (66.67%). The Associate Nurse maturity level, which included M2, M3 and M4, significantly influenced the Hersey & Blanchard leadership styles by 48.7% ($P=0.002$). The maturity level

of the medium category for the Associate Nurses (M2) influenced Selling leadership style 8.8 times greater than the Participating and Telling leadership style. The high maturity level of the Associate Nurses (M3) had an influence that was 19.8 times greater than the Selling, Telling and Participating leadership styles.

DISCUSSION

The characteristics of the Head Nurses is closely related to their choice of leadership style and is one of the important aspects that plays a role in shaping the behaviour and personality of the Head Nurses leading the inpatient units at X Hospital in achieving their goals. The description of the characteristics of the Head Nurses in this study included age, gender, length of work period and education level. The majority of the Head Nurses in this study were in the age group of < 30 years old. Head Nurses with an age < 30 years old were the early adult age group, and the attitude and behaviour of the Head Nurses was in a warm, close and communicative relationship stage according to Erickson. The education level of the Head Nurses in the 4 inpatient rooms (ICU, maternal, adult and child hospitalisation) was that the majority had a D3 education level (100%). The level of education of a leader will affect their ability to lead a unit in the hospital. If the level of education, experiences, and skills of the Head Nurse exceed those of the associate Nurses, then it is hoped that she will be able to provide guidance and motivate the associate Nurses⁶. The time serving as a Head Nurse in this study included the category of serving for 1-2 years as the majority. A Head Nurse who has served as a Head for a long time will certainly have more experience in leading her subordinates associate and her ability to manage an inpatient unit will be better compared with other who have not served as a Head Nurse for long. An experienced Head Nurse will certainly not experience difficulties leading an inpatient unit compared to nurses who have never previously served as a Head Nurses. The gender of the Head Nurses was all female (100%). Leaders of a different gender, male and female, will certainly have a different fundamental nature. Up to now, there is still a stereotype that a woman is considered to be less capable of being a leader^{7,8}. Female leaders will tend to use their feelings and act gently, while on the contrary, male leaders will tend to use their ability to think and act tougher. Female leaders can act as an agent who bring in changes⁹.

Situational leadership style based on approach of Hersey & Blanchard leadership style theory can be seen from the perception of the associate Nurses and the Head Nurse. The interactions within the same environment between the associate Nurses and Head Nurse will create the perception of the Head Nurse's leadership style on her behaviour. The majority of the Head Nurses in the 4 inpatient rooms of X Hospital use the Selling leadership style. The Selling leadership style applied by the Head Nurse is an appropriate leadership style when applied to employees who have lesser abilities but a high willingness to complete a task, which shows they are an employee with a medium maturity level (M2). The Selling leadership style influences individual performance, which will impact on organisational performance¹¹⁻¹³. In this study, leadership style based on Hersey & Blanchard significantly influences the caring behaviour of the Associate Nurses, but the effect is not as great as the influence of the Associate Nurses' maturity level. Selling leadership style applied by the Head Nurse is in accordance with the maturity level of the nurses in the 4 inpatient rooms of X Hospital. This means that it is consistent with Hersey & Blanchard's leadership style theory¹⁴.

The high maturity level of the Associate Nurses (M3) is more related to the participating leadership style, and the medium maturity level of the Associate Nurses (M2) is more related to the Selling leadership style. There is a match between applied leadership style with the level of employee maturity, which will make it easier to achieve any organisational goals, which also supports Hersey & Blanchard's leadership style theory¹⁴. The Head Nurse, as an effective leader in this theory, must be able to understand the situational dynamics and adjust her capabilities to the existing situation. The adjustment of the leadership style is the ability to determine the leadership style and behaviour needed when leading her subordinates based on a certain situation. The Head Nurse, as a leader in her unit, must be able to identify the maturity level of her subordinate Associate Nurses and have a high level of adaptability when observing a situation^{15,16}.

Based on the results of this study, it is known that the maturity level of the associate Nurses in the 4 inpatient rooms of X Hospital was of the medium maturity level (M2). The employee maturity level in this study also influenced the leadership style, as based on Hersey & Blanchard. According to Hersey & Blanchard, a leader

needs to understand her employees' level of maturity so then the leader will not apply the wrong leadership style in order to improve organisational performance¹⁷. To maximise the relationship of the Head Nurse as the leader with her subordinate associate Nurses, the Head Nurse must clearly determine the outcome, objectives, sub-tasks, and other specific tasks that will be completed by the associate Nurse. Without this clarity, the Head Nurse will find there to be difficulties related to determining the Associate Nurse's maturity level or the leadership style that must be applied to that maturity level. The caring behavior of the associate nurses in 4 inpatient rooms of X Hospital is more influenced by the leadership style rather than the maturity level of associate nurses. This explains the important meaning of head nurse's role as a leader in her unit to be able to influence the performance of associate nurses based on the leadership style that is matching the maturity level of associate nurses. The leadership style of the Head Nurse influences the caring behaviour of the Associate Nurses which is in accordance with the previous research conducted by Sfantou et al.,¹⁸. When leading subordinate associate Nurses, a Head Nurse must be able to distinguish the role between manager and actual leader because it is very contradictory¹⁹.

CONCLUSIONS

Hersey & Blanchard's leadership style has more of an influence on the caring behaviour of the associate Nurses than the maturity level of the Associate Nurses. The maturity level of the employee influences Hersey & Blanchard's leadership style. The higher the employee's maturity level, the more that the delegating leadership style becomes the most appropriate leadership style. Providing training on leadership style, supervising and evaluating performance periodically, providing guidance and support to the Head Nurse in relation to guiding and fostering the Associate Nurses in their role. Therefore, the skills and abilities, and the Associate Nurses' maturity can be improved.

Ethical Clearance: This study had passed ethical clearance issued by Ethical Committee of the Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia.

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Conflict of Interest: None.

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The Relationship of Socio-Economic and Genetic Factors with Toddler Stunting at Kenjeran Public Health Center Surabaya

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ABSTRACT

Introduction: Stunting is a chronic nutritional problem arising from a malnourished condition that accumulates over a long period of time with a z-score of less than -2 SD. The incidence rate of stunting in Indonesia year to year has increased. The purpose of this study was to analyse the correlation of socioeconomic and genetic factors with the incidence rate of toddlers stunting.

Method: This research used a cross-sectional approach. The study population amounted to 568 toddlers. The sample technique using stratified random sampling and obtained 145 toddlers as the sample. The independent variables were socioeconomic and genetic factors via the questionnaire instrument. The dependent variable was the incidence rate of toddler stunting using the microtoise instrument. Data analysis was conducted using the Spearman rho test. The results of this study indicate that socioeconomic and genetic factors are related to the incidence rate of toddler stunting.

Results and Analysis: The results of the factors are; father's education analysis to stunting toddler $p = 0,002 < \alpha = 0,05$, mother's education to stunting toddler $p = 0,001 < \alpha = 0,05$, father's job to stunting toddler $p = 0,000 < \alpha = 0,05$, mother's activity to stunting toddler $p = 0,013 < \alpha = 0,05$, family income to stunting toddler $p = 0,002 < \alpha = 0,05$ and genetics to stunting toddler incidence $p = 0,000 < \alpha = 0,05$. The implication of this research is that the prevention of toddler stunting can be achieved by giving information about nutritious food with a low price and a method of processing food well that is affordable.

Keywords: *Toddler with stunting, Genetic Factor, Social Economy.*

INTRODUCTION

Stunting is a chronic nutritional problem, arising from a malnourished condition that accumulates over a long period of time¹. Stunting, according to the WHO Child Growth Standard, is based on the length-for-age (L/A) or height-for-age (H/A) index with a limit (z-score) less than -2 SD. Stunting is associated with an increased risk of morbidity and mortality, and stunted growth². Nutritional deficiencies that have received a lot of attention lately include a chronic nutritional problem in the form of short children (stunting).

Based on a preliminary study conducted by the researchers via an interview in February 2018, it showed that the residents around the Kenjeran Public Health Centre have been given counselling about the practice of providing nutritious food for children via an Integrated Service Post by the health workers. However, parents still do not apply the practice of giving healthy or nutritious food to their children correctly. Parents only provide side dishes in the form of tofu and tempeh. The incidence of stunting in toddlers in Indonesia is still very high, which was 35.6% (18.5% very short and 17.1% short) in 2010 and increased in 2013 to 37.2% (18.0% very short and 19.2% short) for those who experienced stunting. According to the results from Basic Health Research 2010, East Java was one of the provinces with a high stunting prevalence of 35.8% (20.9% very short and 14.9% short). The same thing was also shown in the results of the Basic Health Research in 2013, where the prevalence of stunted toddlers in the province of East

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Java was included in the high group, which was between 30-39%³. The results of the preliminary study conducted at Kenjeran Public Health Centre Surabaya on February 15th, 2018 found that the results of stunting children in 2016 had a prevalence rate of 430 toddlers, or 14.78% (0.52% very short and 14.26% short).

One of the causes of stunting is socio-economic, where the family income influences the fulfilment of nutritional adequacy in toddlers which indirectly has an impact on their nutritional growth. Stunted children experience more disruption in carrying out their daily activities compared to children who are not stunted. Stunted children come from families with a low socio-economic status. Being of a low economic status is considered to have a significant impact on the possibility of children being thin and short⁴. Families with a good economic status can get access to better public services such as education, health services, and others so then they can affect the nutritional status of their children. In addition, the family's purchasing power is increased, so then the family access to food will be better⁵.

A nurse acts as an educator to the parents about the risk factors that causes the incidence of stunting in children, so it can minimise the incidence rate.

METHOD

This study used a non-experimental research design with an analytic observational study type which aimed to determine the relationship between the variables and to explain the relationships found with the cross-sectional approach. This is a type of research that emphasises on the measurement or observation of the independent and dependent variables one at a time, with a follow-up. The instrument used a questionnaire for the socio-economic data and a data questionnaire for the genetic factors related to the incidence rate of toddler stunting. The sampling technique used in this study was probability sampling via the stratified random sampling approach. The study was conducted at Kenjeran Public Health Centre, Surabaya.

RESULTS

The relationship of the socio-economic and genetic factors with toddler stunting at Kenjeran Public Health Centre, Surabaya, as shown in the table 1 below.

Table 1: Characteristic demography of respondents

Father's Education	Stunting Toddler Category				Total	
	Very Short		Short			
	f	%	f	%	N	%
Low (Junior High School and below)	34	45.3	41	54.6	75	100
Moderate (Senior High School)	15	25.4	44	74.6	59	100
High (Academy/College)	1	9	10	90	11	100
Total	50	34.5	95	65.5	145	100
The value of Spearman's rho statistic test was 0.002 (p = 0.05)						
Mother's Education	Stunting Toddler Category				Total	
	Very Short		Short			
	f	%	f	%	n	%
Low (Junior High School and below)	37	45.6	44	54.3	81	100
Moderate (Senior High School)	12	22.2	42	77.7	54	100
High (Academy/College)	1	10	9	90	10	100
Total	50	34.5	95	65.5	145	100
The value of Spearman's rho statistic test was 0.001 (p = 0.05)						

Conted...

Father's Occupation	Stunting Toddler Category				Total	
	Very Short		Short			
	f	%	f	%	n	%
Merchant/ Entrepreneur	22	52.3	20	47.6	42	100
Fisherman	25	78.1	7	21.8	32	100
Civil Servant/Soldier/Policeman	0	0	4	100	4	100
Private	3	4.8	59	95.1	62	100
Other	0	0	5	100	5	100
Total	50	34.5	95	65.5	145	100
The value of Spearman's rho statistic test was 0.001 ($p = 0.05$)						
Mother's Occupation	Stunting Toddler Category				Total	
	Very Short		Short			
	f	%	f	%	n	%
Unemployed	47	32.1	73	60.8	120	100
Merchant/ Entrepreneur	0	0	11	100	11	100
Civil Servant/Soldier/Policeman	0	0	1	100	1	100
Private	3	25	9	75	12	100
Other	0	0	1	100	1	100
Total	50	34.5	95	65.5	145	100
The value of Spearman's rho statistic test was 0.013 ($p = 0.05$)						
Family Income	Stunting Toddler Category				Total	
	Very Short		Short			
	f	%	f	%	n	%
Low < 2,500,000	43	42.6	58	57.4	101	100
Middle 2,500,000-3,500,000	5	14.3	30	85.7	35	100
High > 3.500.000	2	22.2	7	77.7	9	100
Total	50	34.5	95	65.5	145	100
The value of Spearman's rho statistic test was 0.002 ($p = 0.05$)						
Genetic Factors	Stunting Toddler Category				Total	
	Very Short		Short			
	f	%	f	%	n	%
Normal Parents	22	68.8	10	31.3	32	100
Genetic history of stunting family	15	35.7	27	64.3	42	100
Genetic history of stunting mother	4	11.4	31	88.6	35	100
Genetic history of stunting father	9	25	27	75	36	100
Total	50	34.5	95	65.5	145	100
The value of Spearman's rho statistic test was 0.001 ($p = 0.05$)						

Based on the results of the Spearman rho test, there was a significance value of $p = 0.002$ with a significance level of 0.01 ($p < 0.05$). It can be concluded that there is a relationship between the father's education, mother's education, father's occupation, mother's occupation, family income and genetic factors and the incidence rate of stunted toddlers at Kenjeran Public Health Centre, Surabaya (Table 1).

DISCUSSION

Malnutrition can result in a failure to thrive and stunting in children. It also increases morbidity and mortality, especially in vulnerable to nutrition and disease age groups, which is children under five (toddler). This is the group that suffers the most from malnutrition and the number in the overall population is quite large. Various factors that influence the nutritional status of toddlers includes a lack of food supply, poor quality in the environment, socio-economic conditions (income, level of education, and employment) and family culture, such as family upbringing, as well as knowledge ⁶.

Socio-economy is sub-divided into three; namely education, employment, and family income which will be discussed as follows. The high education level of the parents can change a person's diet, which ultimately affects the nutritional status of the family, including the children⁴. The level of formal education is a factor that determines whether or not someone easily absorbs and pursues the acquired knowledge⁷. This study is in line with the study of Aramico, Sudargo and Susilo (2013), which states that there is a relationship between the father's education and stunting ($p < 0.001$) and OR 3.37. The high education level of the parents can change a person's diet, which ultimately affects the nutritional status of the family. Researchers assume that a low level for the father's education, those who graduated from junior high school or below, can affect nutritional status.

Level of education will affect the knowledge that is possessed by someone. The low level of the mother's education will have an impact on her limited knowledge about a healthy lifestyle and the importance of nutrients for the health and nutritional status of their child⁸. The education of the parents will have a direct influence on childcare patterns, which will then affect the child's food intake. Parents with a better education tend to have the knowledge and ability to implement better knowledge than parents with a low level of education². These results are supported by Medhin's study (2010 in, Ngaisyah and Septriana, 2016) which stated that the mother's education level affects the incidence rate of stunting, showing that there is a significant relationship ($p = 0.000$) and OR 4.06. The level of education will make it easier for a person or society to absorb information and to implement it in their daily behaviour and lifestyle.

A job is work, namely a series of tasks, that generates money for someone⁹. The household's economic status

can be determined by the work performed by the head of the household. The type of work done by the head of the household will determine how much of the household finances will be used to meet the needs of the family¹⁰. Researchers assume that those with jobs that generate less money can cause the household's children to experience a nutritional imbalance. The father's occupation status can also reduce the time spent together with the child, so the attention paid to the child's growth and development will decrease.

The quality of the mother's service in the family is determined by the mastery of information and the factor of adequate time availability. These two factors can be determined by the level of education, social interaction and occupation⁷. Changes in modernity can affect the family institution. The number of women who work outside home is increasing, both for self-actualisation and to meet the household's economic needs¹¹. Researchers assume that mothers who are staying at home and not working can take care and pay attention to the health and needs of their toddlers, which can support their growth better. Meanwhile, mothers who work have less time to pay attention to the growth of their children, so they are at a risk of malnutrition. The lack of nutrition needed by these toddlers is due to the business of the parents and their focus on their work; the attention to their children is thus reduced. A good nutritional intake often cannot be fulfilled by the child because of the family's economic crisis factor¹².

An adequate family income will support the child's growth and development because the parents can provide for their children's needs, both primary and secondary⁷. This study is also in line with the study of Aramico, Sudargo and Susilo (2013) which showed the significant relationship between family income and nutritional status ($p < 0.05$). The value of OR=3.5 95% indicates that families with a low economic status have a 3.5 times greater chance of their child suffering from malnutrition than families with a high economic status. Other studies that are in line with this result explained that the low socio-economic status (household assets) of the respondents has a 21 times greater risk of causing stunting compared to those with a high socio-economic status. Researchers assume that a family income that is below the District/City Minimum Wage has an impact on the growth of the toddler. This leads to the inability of the head of the family to meet the nutritional adequacy of their toddler.

The parents' height is associated with the physical growth of the children. A mother with a short body is one of the factors associated with the incidence rate of stunting. In toddlers, height is influenced by genetic and environmental factors during the growth period¹³. This result is in line with the study conducted by Hanum et al (2014, in Aulia, 2016) which showed that more stunted children have mothers of a short height compared to mothers of a normal height. Researchers assume that the parents' height is related to the incidence rate of stunting.

However, there are still many environmental factors that affect a child's height. In addition, several other studies have shown that the factors of education and work are related to the characteristics of parents, which is a cause of the high number of problems encountered by short toddlers. This study was supported by Mulvani (in Miko and Al-Rahmad, 2017), in that people with a high level of education generally pay more attention to their health problems.

CONCLUSION

Based on the findings in this study and testing the results, it can be concluded that socio-economic and genetic factors have a relationship with the incidence of stunting at Kenjeran Public Health Centre, Surabaya. This research is expected to provide information on the minimum family income required without reducing the supply of balanced nutrition in children. Cheap nutritious food and a good method of food processing is important. In addition, people can understand the incidence rate of stunting experienced by their children and become able to apply good nutrition to their children in an effort to minimise the number of stunting incidences.

Ethical Clearance: This study had passed ethical clearance issued by Ethical Committee of the Sekolah Tinggi Ilmu Kesehatan Hang Tuah Surabaya, Indonesia.

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Cultural Religiosity as the Determinant Factor of a Successful Healthy City in South Kalimantan, Indonesia

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ABSTRACT

The concept and processes of a healthy city vary depends on the region. Each city should be allowed to develop and adapt to the uniqueness, culture and value of the respective society. This study aimed to explore the culture of community in Banjar, South Kalimantan, which related to realize healthy city. Qualitative research was conducted through community observation in the form of a documentation study, including an in-depth interview with several people and the respective community leaders. The data was analysed using the Miles and Huberman Model, including data reduction, data presentation and conclusion. There is the existence of a religious culture of the Banjar people of South Kalimantan. Religious cultures can be integrated into people's lives such as in the execution of healthy behaviour, which can be a determinant of a successful healthy city program.

Keywords: *cultural religiosity, healthy city, Indonesia*

INTRODUCTION

Health issue is significantly relevance to urban planning. Healthy urban planning could shape healthy social and environmental circumstances and vice versa, poor urban planning may contribute to the eruption of various diseases in the inhabitants within an urban area ¹. Urban issues do not only impact health and environment problems, but also be the key to achieve Sustainable Development Goals (SDGs) of creating favourable, safe and sustainable cities and residences (goal 11) ².

To overcome this health problem, a specific program is required. Public health programs, which maintain various relations between health services, residents and the urban area, are often not executed at a sufficient level. One of the programs initiated by the WHO was the "Healthy City Project" in 1986. This

project was later spread, swiftly covering more than 7,500 cities around the world and more than 1,200 cities in Europe have come to the same perspective in order to revitalise the approach to health issues in urban life ^{3,4}pleasant, and green built environment, but also one that creates and sustains health by addressing social, economic, and political conditions. It describes collaborations between city planning and public health creating a contemporary concept of urban governance? a democratically-informed process that embraces values like equity. Models, critiques, and global examples illustrate institutional change, community input, targeted assessment, and other means of addressing longstanding sources of urban health challenges. In these ambitious pages, healthy cities are rooted firmly in the worldwide movement toward balanced and sustainable urbanization, developed not to disguise or displace entrenched health and social problems, but to encourage and foster solutions. Included in the coverage: Towards healthy urban governance in the century of the city Healthy cities emerge: Toronto, Ottawa, Copenhagen The role of policy coalitions in understanding community participation in healthy cities projects Health impact assessment at the local level The logic of method for evaluating healthy cities Plus: extended reports on healthy cities and communities in North and Latin

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America, Africa, Europe, Asia, Oceania, and the Middle East Healthy Cities will interest and inspire community leaders, activists, politicians, and entrepreneurs working to improve health and well-being at the local level, as well as public health and urban development scholars and professionals. Part I: Foundations and Historical Backdrop -- Introduction: Aims and Objectives of this Book -- Paleo-Epidemiology, Nomadism and Sedentism: Health and the City -- Urbanisation and Public Health -- Health in Canada in the 1970s and 1980s: Hotbed of Innovation -- Healthy Cities Emerge: Toronto -- Ottawa -- Copenhagen -- Healthy Cities Grow: Development of International, National, Regional, Linguistic Networks -- Eleven Qualities a City Should Strive to Provide (1986).

The concept of a healthy city is both an old-fashioned and new concept. "Old-fashioned" means that human beings have attempted to create healthier cities since the earliest periods of urban civilization. "New" is manifested as the primary medium of health promotion – new public health – in the search of health for all⁵. Healthy city approaches have long been known as the most popular approach in the promotion of health⁴.

A healthy city is an operational measure from a social model which aims to overcome negative health determinants⁶. Health determinants are an important or essential factor used to increase health performance^{7,8}. The WHO European Healthy Cities Network has from its inception aimed at tackling inequalities in health. In carrying out an evaluation of Phase V of the project (2009-13). The WHO mentioned that a health determinant consists of the following: the social and economic environment and the physical and mental characteristics of the individual⁹.

The Human Development Index (HDI) data from the district of Banjar in 2015 was situated at rank 9 out of the 13 districts/cities existing in the province of South Kalimantan, and in 2016, the value of the HDI had relatively increased¹⁰. However, the rank slightly dropped to 10th. One of the primary causes was the health issue present, aside from education and the economy. In 2016, the achievement target of a sanitary and healthy lifestyle in the level of household was still stood in the percentage of 47.6% from the overall amount of 39.765 households observed¹⁰. Individual behaviour is shaped by culture¹¹.

Further, every city has the possibility to develop respective parameters in accordance with the situational

uniqueness, culture and values¹². Nevertheless, the research in this field is exceptionally limited, primarily in the context of the local government¹. Due to the concept of health, ill perceptions are deeply attached to the concept of culture, and so this pushes researchers to dive further into societal culture, particularly in relation to a healthy attitude in order to realise a healthy city in the District of Banjar, South Kalimantan Province. Through comprehending the particular societal culture of the city in question, it is further expected that precise interventions can be delivered to achieve an optimal level of health^{13,14}.

Thus, this study aimed to explore the culture of community in Banjar, South Kalimantan, which related to realize healthy city.

METHOD

Observation over the behaviour of society and in-depth interviews with the citizens and public figures of Banjar were conducted. The interviewed public figures consisted of chief of sub-divisions in municipal public health office of Banjar, director of a *pesantren* (Islamic Boarding School), chief-deputy of Healthy City Forum and chief of working cluster of Indarsari Urban Village. The interview was also conducted within wider society amounted to 15 individuals.

The questions prepared for this survey were open-ended. If the participants encountered difficulty when answering the questions or responded only briefly, then the researcher tried to deepen or follow up the information by requesting a further explanation about the participant's previous comment or requesting the participant to provide evidence from what they meant on the first occasion. The frequency and duration of interviews were in accordance with the initial commitment; around 60 to 90 minutes. However, it was limitless and manageable according to the situation and condition of the participants.

An unstructured passive participative observation was performed. The study did not use a default or systematically prepared instrument. A behavioural observation of the society and the condition of the physical environment were also conducted. Through observations, the researcher was equipped with a deeper knowledge in order to comprehend the data context across the entire social situation in order to be equipped with a holistic

and thorough perspective. The data was analysed using the Miles and Huberman Model, including data reduction, data presentation and conclusion.

RESULTS

The study was located in Banjar, one of the regencies in South Kalimantan. The Banjar lays claim to a popular designation called “The Piazza of Mecca”. The district has been visited by numerous scholars and the territory has been dominated by Muslims. However, there are a number of worshippers from various beliefs although on a lesser scale. In 2016, the citizens were made up of 99.20% Muslims, 0.27% followed Protestant Christianity, 0.25% followed Hinduism, and the rest followed Catholic Christianity and Buddhism/Animism with the percentage being 0.12% and 0.07% respectively and with other beliefs being 0.10%.

In 1835, during the government of Sultan Adam Alwasiqubillah, for the first time a sharia law was implemented in the sultanate of Banjar. Nowadays, Banjar has 19 sub-districts with 29 villages or urban villages situated in the city of Martapura. The motto of Banjar contains three key words of *baiman* (have religious atmosphere), *bauntung* (blessed by the God), and *batuah* (have noble characters).

The results show that the society of Banjar has a cultural uniqueness with a depth focused on religious values. In several areas in Banjar district territory, there were a number of Islamic boarding school. The other unique factor of this district was the written Arabic texts in the naming of public offices. This is supported by the result of an interview with one of the public figures in the society who said that:

“Banjar society tends to choose religious education such as in pesantren (Islamic boarding school), which commences from elementary level. The schools become the favourite of Banjar society, as it includes the subject of Arabic”.

Another similar statement came from another public figure, as follows:

“Banjar society views that formal school does not guarantee a wealthy life. It is different when it comes to learning religious subjects, hence worldly matters shall follow. This is a lead into a rewarding life. There are tons of people

in Banjar who did not go to formal school but they were able to become rich or sufficient economically”

South Kalimantan is popularly known as the city of a thousand rivers. One of the rivers is Sungai Barito, which passes through several areas in Banjar. From the observations, the particular river has been frequently used by the society as a means of transportation as well as in the fulfilment of their daily needs such as bathing, laundry washing, and defecating. Numerous people have been misusing it for unwise and deteriorating activities, such as disposing their trash in the river. Based on the results of a series of interviews from a number of informants from the civil sector of society, they revealed that the attitude of using the river for a variety of needs or to dispose of trash has been habituated and committed to over generations and therefore it is difficult to be corrected, primarily for those living in the periphery of the river. These facts can be identified from the account made by an informant from the civil section of society as follows:

“How about it? It has been habituated for so long, therefore it is difficult to be eliminated.”

Meanwhile, what has been conveyed by the public figure is not significantly different. The statement is as follows:

“Well... actually based on our perspective in our religion (Islam), it is crystal clear and comprehensive in detailing the ideas about health. In our culture, there is a saying that relates to ‘cleaning up’. However, because society preserves the river, there are still many people using the river to defecate in.”

Later on, from another public figure (religious), they revealed that among other things:

“There are have been so many students (santri) bathing in the river. Truly it is because such local culture has been difficult to change and eliminate.”

In relation to the previous efforts made by public figures and the local government, this matter has been conveyed by the municipal public health office.

“Truly, it is because socialisation has not been delivered intensively, so it is normal if the participation of society is still lacking due to the minimum level of understanding. The program of a ‘Healthy City’ originally belonged to society,

and the public health office as the authority should only act as a facilitator. The point is how it changes the behaviour of the society, whereas changing the attitude is not so simple.”

There is a willingness and hope from the religious public figures on this matter that the figures are able to assist in transforming society’s attitude to better behaviour as follows:

“Well, our hope is that we are going to be involved because for the time being, there are no invitations from the public health centres, the public health office and the other stakeholders to prompt discussion. If we are being involved, we will be forever grateful to be able to help. Hence, if our students are well-informed on health matters, they will extend this knowledge to others. That way, once they return home, they will be the role model in their villages and of course, be heard by their fellow villagers.”

DISCUSSION

The study discovered that the culture and religious values has been developed and dominated the structure of Banjar society. However, the religious values have not yet impacted holistically on their lives, including on the matter of health.

The pendulum definition or healthy statement has moved away from the medical model and returned to the social model which is not only focuses on individual but also considers the result of social, economic and cultural factors related to society^{15,16}. Many scholars had comprehended the prominence of culture to later on combine cultural content in the public health services¹⁷. According to Leininger, if the cultures of society do not fit with the health discourse, then the culture should be a subject for negotiation and need to be eliminated. However, if it is appropriate and able to support the health problems, then the particular culture should be preserved¹³.

Culture is a pattern of meaning. It is similar to the symbols that are historically distributed; a system of legacy that is consolidated, preserved, and developed by human-beings in the form of knowledge and attitude in their lives which is historically transmitted. One of the manifestations of culture can be contextualised in religion^{18,19}.

Religion is seen of as a structure of various beliefs and the implementation of custom which is integrated into the cultural life of society. It is a working framework used to comprehend and create decisions. Religion can be defined as a system of rational belief through practices and/or as a set of beliefs, rituals and morals^{20,21}. Religion can also be beneficial as a source of power to be abided by in the context of values and attitude. The majority of religions are equipped with a tradition involving certain beliefs and practices related to the afterlife and life attitude, either well or ill^{18,22}.

Islam is a religion which highly encourages human-beings to maintain cleanliness in life, to be healthy and to be environmentally-friendly. There are a number of verses in the Quran and Hadiths of the prophet, which contain various messages related to the encouragements. Health, with its respective paradigm, can be applied when disseminating information regarding the application of Islamic values, hence, there is no gap between the holiness of Islamic teaching with daily life attitude from the perspective of health²³.

CONCLUSION

There is a major power possessed by society, which is the capacity of social capital through culture in form of religious values. This particular matter can support and act as a determinant to actualise a healthy city if the society is capable of realising the particular values involved in the transformation of a healthy lifestyle and the existence of a favourable partnership between society and public figures.

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The Relationship between Response Time and Patient Survival with Emergency Treatment by the Code Blue Team

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ABSTRACT

Introduction: Code blue has a considerably prominent role in the management of emergency situations in the hospital setting. Rapid and appropriate management will affect the morbidity and mortality rate of patients during an emergency situation. This study aimed at analysing the relationship between time response and the survival of the patients who received emergency treatment by the code blue team in hospital.

Method: This research used a correlational design with a cross-sectional study approach. The sample of this study was 74 patients who received emergency treatment by the code blue team in RS PKU Muhammadiyah Yogyakarta within the period November 2015 - July 2017. The data was generated from secondary data. The analysis test of the data was undertaken by using a Spearman rank test with a 5% significance level.

Results: The average response time performed by the code blue team in emergency call management was 6.09 minutes and the survival of patients after obtaining the management of the code blue team was that 82.4% died and 17.6% were treated in an intensive room. The result of the Spearman test showed that there is a relationship between the response time and the survival of patients who received emergency management by the blue code team (p-value: 0.04).

Conclusion: The speed response of the code blue team in providing emergency management corresponds to the patient's survival. The faster the patient received treatment, so would the mortality rate decrease.

Keywords: *response time, survival, emergency, code blue*

INTRODUCTION

A patient's heartbeat stopping is one emergency situation which requires immediate treatment. It is expected that heartbeat cessation in the United States that occurred in the hospital setting ranged roughly between 250,000 to 750,000 cases per-annum with the percentage of successful resuscitation action between 0% - 59%¹. A delay in the treatment for heartbeat cessation patients will reduce the number of living patients² the average call rate was only 9.8 calls/ 1000 admissions. Anecdotal

feedback and a group-administered questionnaire conducted in July 2003 demonstrated a number of obstacles to initiating calls and the system was modified in October 2004. Specifically, emergency response calls were separated into Code Blue calls (for cardiorespiratory arrests. Factors which influence the level of successful resuscitation in a case of heartbeat cessation include the early detection ability, the arrival of the emergency group, the immediate activation of Cardiopulmonary Resuscitation treatment (CPR), the distribution of early-stage medication, the time-space between the heartbeat cessation moment and the distribution of defibrillation, the capacity of the emergency team, as well as the experience of team participation on related training courses¹. The outcome of this research unveiled that the time when heartbeat cessation occurs determines the level of sustainable living of the patient. Patients who experience heartbeat cessation on the evening or during the weekend have a lower living sustainability level, except for when in the emergency department and other

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intensive units (ICU, ICCU, HCU, PICCU, NICU) due to the constant presence of medical officers. Henceforth, the presence of the Code Blue team becomes important when in charge of emergency treatment across the hospital environment. In the presence of the Code Blue team, it is expected that the team can contribute to the enhancement of the patient’s living sustainability in an emergency ³. The Code Blue team is a group of individuals assigned to perform first hand treatment and precautionary measures on patients who experience heartbeat cessation or breathing disorders in the hospital environment ⁴.

The Code Blue Team performs emergency action treatment by involving medical personnel from multi-disciplinary backgrounds. It requires fine coordination and partnership as well as a singularity of perception during the treatment in order to attain maximum results⁵.

MATERIAL AND METHOD

This research was included in the category of quantitative research with a descriptive and correlational study approach which describes the relationship between response time and the patient’s survival ability in those who attained emergency treatment from the Code Blue team. The approach of this research was a cross-sectional study. The collection of the research data was performed using secondary data collected from the Code Blue’s medical record data in RS PKU Muhammadiyah Yogyakarta. The secondary data was generated from all patients whose received treatment from the Code Blue team between November 2015 to July 2017, amounting to 74 patients. The generated data included their identity, the status of the patient’s health, response time and the patient’s survival ability after receiving treatment from the Code Blue team. Response time is the time space between the relief request being made to the Code Blue team up to the commencement of the patient’s handling in order for them to receive treatment. Survival is the patient’s condition after receiving emergency treatment by the Code Blue team, including whether the patient is dead or alive (treated in an intensive care unit). Moreover, characteristic data collection was also performed by the Code Blue team whose personnel were standing by in the hospital. Data analysis was performed by analysing the relationship between response time and the patient’s survival ability through the Spearman Rho test with a level of significance of 95%.

RESULTS

The analysis results of the response time and emergency treatment success performed by the Code Blue team is shown in Table 1 below.

Table 1: The Average Response Time and Patient Survival Ability

No.	Variable	Result
1.	Response Time Average	6.09 minutes
2.	Patient’s survival after receiving emergency treatment by Code Blue	
	Died	82.4 %
	Treated in an intensive unit	17.6 %

DISCUSSION

Code Blue is one of the emergency services available in a medical hospital, established as an effort and strategy for the prevention of heartbeat cessation incidents, including the activation of the emergency system as well as the delivery of resuscitation actions during an emergency incident. In the enforcement of its system, Code Blue involves a variety of components which consist of human resources including medical and non-medical personnel, favourable facilities and an infrastructure including medical tools and medical drugs, the delivery system of Code Blue which consists of a Standard Operational Procedure as well as control and evaluation mechanisms. During its implementation, emergency activation in a medical hospital will be connected to a medical team assigned to commence with immediate basic and further assistance ⁶. The purpose of the Code Blue system is to intercept the occurrence of heartbeat cessation in hospital, to guarantee basic and further living assistance support swiftly and effectively as well as performing post-heartbeat cessation medical treatment in an optimal manner ⁷.

An emergency situation is a condition which threatens the life of a person and requires immediate relief. Swift and precise handling will be able to increase the living sustainability of a person, hence able to decrease the rate of mortality. The result of this research unveiled that there is a relationship between response time with the survival ability of patients who received emergency treatment from the Code Blue team. This is in line with the results of the previous research which

stated that response time is considerably influential on the living sustainability of patients who experience an emergency situation⁸ translated by some EMS operations into a goal of a response time of 8 minutes or less for advanced life support (ALS). Emergency calls with a response time of less than five minutes will increase the living sustainability of patients compared to a response time of more than five minutes⁹ this remains speculative and unreported. **OBJECTIVE** To determine the effect of current RTs on survival in an urban EMS system. **METHODS** The study was conducted in a metropolitan county (population 620,000). A response time of less than five minutes will prevent the occurrence of *brain damage*, hence, patients with heartbeat cessation will not experience physical defects, or death. The result of this research shows that early initiation by intervening through Basic Life Support and Advance Cardiac Life Support will repair the survival rate of the patient. Therefore, a delay in performing treatment will lead to a negative effect related to the survival ability of the patient^{10,11}.

The standard response time has not yet determined. However, a recommendation of response time has been delivered among other things; in four minutes, the patient has to be treated by CPR accompanied by the activation of *Automatic External Defibrillation*. Furthermore, in eight minutes, the patient has to receive definitive treatment and other supporting treatment which may elevate the living sustainability of the patient^{12,13}. The enhancement of response time is expected to increase the living sustainability of a patient by as much as 24%¹⁴. A response time with a duration of four minutes is connected to the refinement of Return of Spontaneous Circulation (ROSC)¹⁵. The patient's condition after the resuscitation measure can attain a minimum systolic pressure of 60 mm Hg and with palpability of the carotid pulse without CPR, although there are lethal arrhythmias; Ventricular Fibrillation (VF), Ventricular Tachycardia (VT), Asystole (AS), and Pulseless Electrical Activity (PEA) and the existence of electrical activity that is not palpable by pulse¹⁶. RISC after VF/VT, which is important to take into account, is the condition of hypoxemia and hypotension, as well as immediate diagnosis including medication due to the presence of ST – *Elevasi Myocard Infark* (STEMI). ROSC after PEA/AS, taking into account the condition of hypoxemia and hypotension, makes it necessary to perform therapy on the root cause of cardiac arrest¹⁷. Observations are

required after ROSC in order to determine several supporting aspects that will be physiologically able to preserve the circulation within the body.

The swift handling of a situation by the Code Blue team is influential towards life sustainability for the patient. It requires the favourable partnership of and coordination among the team members in order for the patient's treatment to perform as expected. The result of this research showed that there is no difference within the perception of each Code Blue team member toward the applied Code Blue system. The existence of difference was identified in matters connected to leadership, and the role and responsibility of each discipline of knowledge, experience as a team member of Code Blue, as well as the duration of being certified as Advance Cardiac Life Support (ACLS) personnel. Therefore, the effort of refinement related to providing sustainable training for the Code Blue team becomes significantly important in order to lift up the level of effectiveness and to refine the quality of the team⁵. In a number of hospitals, the performance of Code Blue is rare to be observed and evaluated. The composition of the Code Blue team is often interchangeable based on scheduling and rotation, hence, this enables the probability of a lack of partnership among the team members¹. In reality, coordination and partnership among the team members is one of the most prominent aspects to be undertaken in managing patients, giving favourable result as expected.

CONCLUSION

It was discovered that there is a relationship between response time and the survival of patients who received emergency treatment from the Code Blue team. Treatments for patients who experience an emergency situation should be performed immediately and precisely in order for the success rate of the treatment to be larger. This will impact on the patient's mortality rate

Conflict of Interest: The authors disclose no conflict of interest.

Ethical Clearance: The protocol of this research was approved by the Commission of Ethic, Research, and Health; Health Polytechnic; Ministry of Health; Malang City, in accordance with a recommendation letter over ethical approval (No.003/KEPK-POLKESMA/2017).

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The influence of Nurse's Knowledge Level on Behaviour Changes, Attitude and 5 Moments of Hand Hygiene Compliance

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ABSTRACT

Introduction: The five moments of handwashing, established by the World Health Organisation (WHO), are important to break the chain of transmission of disease. Human behaviour is influenced by two factors, namely behavioural factors and factors related to outside behaviour. Behaviour is formed from three factors: predisposing factors (knowledge, attitudes, beliefs and values), supporting factors (physical environment, availability or absence of health facilities) and reinforcing factors (in the form of the nurses' attitude and behaviour). This study aims to determine the effect of the level of knowledge of nurses in nursing homes on their attitude, behaviour and adherence related to the 5 moments of hand hygiene.

Method: This study used a questionnaire to measure the level of knowledge, attitude, behaviour and level of adherence of the nurses concerning the 5 moments of hand hygiene. The research design used a analytic cross-sectional approach. The respondents were all nurses at Panti Werdha Surya, and the sampling technique used was purposive sampling. The study was conducted between January and April 2018.

Results and Analysis: The data was analysed using a multinomial regression test. The results showed the influence of nurses' level of knowledge on attitudinal changes ($p = 0,000$). There was an influence from the nurses' level of knowledge on behavioural change and there was influence from the nurses' level of knowledge on compliance with the 5 moments of hand hygiene ($p = 0,000$) in an effort to prevent the transmission of shingles in nursing homes.

Conclusion: The level of knowledge of nurses needs to be improved continuously, so then changes in attitude, behaviour and adherence take place concerning the 5 moments of hand hygiene. This is as well as providing hand washing and rubbing facilities at each door within the nursing home.

Keywords: *Level of Knowledge, Attitudes, Behaviour, Compliance, Nursing home*

INTRODUCTION

An elderly individual, according to Article 1 number 2-3 Law Number 13 Year 1998 about the Prosperity of the Elderly, is a person who has reached the age of 60. Community groups including the elderly mostly now live in nursing homes, and there is a trend that society is continuously increasing in relation to life expectancy.

The elderly who live in a nursing home are susceptible to contracting infectious disease. This can be caused by the prevalence of organ function decline, the existence of dementia and incontinence, poor oral hygiene, and trouble swallowing¹.

Infectious diseases that commonly affect the elderly in nursing homes include pneumonia, urinary tract infections and skin and soft tissue infections. Pneumonia is still the main cause of morbidity and mortality in adults who are older, and, with an increase in age, it becomes the cause of almost half of all hospitalisations and related deaths^{2,3}. A population census from a statistics agency in 2010 showed that the elderly in Indonesia were counted as being 18,043,712; in other words, 7.68% of 237 million Indonesian citizens were elderly⁴.

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Hand hygiene is a main and important factor related to preventing the spread of pathogens and antibiotic resistance, whether in hospitals or in nursing homes, because the number of infections that can be transmitted through the hands of a caretaker is vast. Hand hygiene can prevent Health Care Associated Infections (HAIs) and increase the health of the elderly. Hand hygiene is a part of standard care that can decrease infections in the health team and also in the patients⁵. Washing of the hands is one of the effective steps undertaken to break the chain of infection transmission, hence the number of incidences of nosocomial infections and Health Care Associated Infections can be reduced⁶. Research results shows that effective education programs can increase knowledge, positive behaviour, the right practices when conducting prevention policies and infection control⁷. Non-compliance when concerning hand hygiene is a bad behaviour and one that can be controlled during training⁸. Health workers need more information and education on the prevention and control of infection, especially in relation to hand hygiene to increase the quality of the offered health services⁹. There is a relationship between the knowledge of a nurse regarding nosocomial infection with washing of the hands, as observed at the Inpatient installation in Dharmais Cancer Hospital in Jakarta¹⁰. Knowledge and behaviour are factors that relate to nursing practices and the prevention of nosocomial infections in phlebitis events in RSUD, Semarang¹¹.

The knowledge of a nurse about the 5 moments of handwashing is very influential and related directly the practice of handwashing. In the previous research, the knowledge of nurses on hand washing was still categorised as not good according to the results (70.5%)¹². The five moments of handwashing are not implemented well by nurses. This is supported by the research of Koeswo dan Pratama (2015), where it was shown that nurses do not wash their hands in the first moment by 52%, 50% in the second moment, 75% in the third moment, 69% in the fourth moment and 78% in the fifth moment. Previous research done by Pateda dan Rabbani (2013) showed the results that 16.7% of hand washing behaviour was in the good category, 24.4% was in the less good category and 59% was in the bad category. Supporting factors including physical environment and the available health facilities for hand washing that, when realised optimally, can ease the realisation of the positive attitude and behaviour of the health worker when it comes to doing the 5 moments

hand Hygiene¹³. The purpose of this research in general was to acknowledge the impact of the level of education of nurses on the attitude, behaviour and obedience of nurses in Surya Surabaya nursing home concerning the practice of the 5 moments of Hand Hygiene.

METHOD

The research design used was analytical and observational, using a cross-sectional approach. The population in this research included all executive nurse in Surya Nursing Home who had worked there for at least 2 years. The technique used to take samples was saturated sampling, where all the available population became the sample of the research. This research was conducted between January and April 2018. The data was taken using a research instrument in the form of a questionnaire about the characteristics of the nurse, and their level of knowledge, attitude, behaviour and obedience using a Likert scale model (5). Before we did the main body of the research itself, we conducted a validity test and questionnaire about the reliability beforehand. We then analysed the data obtained using a multinomial logistic regression test.

RESULT

Table 1: Characteristics of the respondents and the related variables

Variables	n	%
Sex		
Male	0	0
Female	100	100
Age		
21-30 years old	3	13,64
31-40 years old	18	81,82
41-50 years old	1	4,55
Education		
High School	17	77,27
Diploma 3	5	22,73
Working Time		
0-2 years	2	9,09
3-5 years	6	27,27
6-8 years	12	54,55
9-10 years	2	9,09

Conted...

Level of Knowledge		
Very Good	0	0
Good	1	4,55
Bad	19	86,36
Very Bad	2	9,09
Attitude		
Strongly Agree	1	4,55
Agree	2	9,09
Average	16	72,73
Disagree	3	13,64
Behaviour		
Very Supportive	2	9,09
Supportive	1	4,55
Average	17	77,27
Less Supportive	2	9,09
Level of Obedience		
Very Obedient	0	0
Obedient	1	4,55
Average	9	40,91
Disobedient	12	54,55

In Table 1, the respondents were categorised based on their sex, age, level of education and working time (n = 22). All of the respondents were female (100%), and almost all of the executive nurses were aged between 31 years old – 40 years old (81.82%). The level of knowledge of almost all of the executive nurses was that of high school (77.27%) and most of the executive nurse had worked for 6-8 years.

Based on Table 1, we can see that almost all of the nurse’s had a level of knowledge about the 5 moments of hand hygiene in the bad category (86.36%), and that only a few of the executive nurses had good knowledge (4.55%). Meanwhile the attitude of the nurses about hand hygiene being able to prevent the transmission of disease showed that most of them stated Agree (72.73%), and only a few of the executive nurses stated Strongly Agree (4.55%). The behaviour of the executive nurses in the context of supporting hand hygiene to prevent the transmission of disease showed that almost all of them stated Average (77.72%), and only a few stated Very Supportive (9.09%). The level of Obedience of the nurses in doing the 5 moments of hand hygiene found that most of them stated Disobedient (54.55%), and only a few stated Obedient (4.55%). This research shows that there is a meaningful

and positive correlation between the level of knowledge of the nurse about the 5 moments of hand hygiene and the obedience of physically doing the 5 moments of hand hygiene, with a strong level of correlation ($r=0,701$; $p=0,021$). This means that the lower the knowledge of the nurse about the 5 moments of hand hygiene, the worse the obedience of the nurse when it comes to doing the 5 moments of hand hygiene. The results of the multinomial logistic regression test showed that the level of knowledge of the nurses about the 5 moments of hand hygiene can only explain the quality change in the level of obedience but also that the impact of knowledge level is significant ($p=0,000$). Regarding the attitude of the executive nurses, there is a meaningful correlation between the attitude of the nurse about the 5 moments of hand hygiene and obedience when it comes to physically doing the 5 moments of hand hygiene, and it was shown that the power of the correlation is weak ($r=0,190$; $p=0,031$). This means that the better the attitude of the nurse about the 5 moments of hand hygiene, the better the level of obedience when physically doing the 5 moments of hand hygiene. The results of the multinomial logistic regression showed that the attitude of the nurses about the 5 moments of hand hygiene can be used to explain the impact of the attitude of the nurse about the 5 moments of hand hygiene by 10.7% and that the impact of the attitude of the nurse related to obedience is significant ($p=0,000$). Regarding the behaviour of the executive nurse and obedience when doing the 5 moments of hand hygiene, there was a meaningful correlation between the behaviour of the nurse and obedience, and the correlation was strong ($r=0,690$; $p=0,001$). This means that the more supporting behaviour that there is from the nurse regarding the 5 moments of hand hygiene, the better the level of obedience. The results of the multinomial logistics regression test showed that the behaviour of the nurses concerning the 5 moments of hand hygiene react with the obedience of the nurse and the 5 moments of hand hygiene by 13.8% and that the impact is significant ($p=0,000$).

DISCUSSION

The respondent’s knowledge regarding the 5 moments of hand hygiene is linked to their associated level of obedience ($p=0,000$). The higher the respondent’s knowledge about the 5 moments of hand hygiene, the more obedient the nurses were when it came to practising the 5 moments of hand hygiene ($r=0,701$). The impact of the level of knowledge had a big impact

on the obedience of the nurse by 10.1%. This shows that the impact on obedience comes from a different factor other than knowledge (89.9%). The finding of this research supports the previous research done by Al-Khawaldeh, Al-Hussami and Darawad (2015), who stated that education on hand hygiene will affect the knowledge, attitude and behaviour of paediatric nurses and NICUs in Zanjan hospitals¹⁴. Other than that, the awareness of nurses about the right way to wash their hands is a process that pushes them to adhere to hand hygiene situations. Hence, the quality of nursing care is affected by the knowledge, attitude and behaviour of the executive nurses who provide health care. Only a little part of this research was specially related with the nurses, although there is evidence that shows that the obedience of nurses related to doing the 5 moments of hand hygiene can be improved by the application of audits and increased knowledge and supervision, which will cause a change in the culture of the working environment and obedience to promote doing the 5 moments of hygiene the correct way¹⁵.

The research findings show that there is a gap in the level of knowledge of the nurses, which can be overcome with a short and more frequent training system, especially in hospitals. The guidelines on the 5 moments of hand hygiene are well known by nurses and well-promoted in hospitals. This is reflected by the positive attitude of the nurse and non-medical staff. Improving the compliance of the nurses can be done by training continuously¹⁶. The nurses need to remember the lessons from their study experience, because this will be effective at increasing their knowledge and understanding that this will also affect their behavior in a positive way. This means that the importance of the individual's experience has a bigger impact than formal teaching methodology¹⁷.

CONCLUSION

The knowledge, attitude and behaviour of executive nurses has a significant effect on the obedience of executive nurses concerning the 5 moments of hand hygiene. Other than the level of knowledge, attitude and behaviour of the individual nurse, it is suspected that age and working time also affects the obedience of the executive nurse. Training and the periodic delivery of information is needed whether by electronic media or via practice to increase the level of knowledge of nurse is important, so then nurses will be more obedient

at adhering to the 5 moments of hand hygiene. Other things that can increase the obedience of the nurse concerning their adherence to the 5 moments of hand hygiene is by supplying all doors with hand rub to ease the implementation of the 5 moments of hand hygiene.

Ethical Clearance: This study had passed ethical clearance issued by Ethical Committee of the Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia.

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Conflict of Interest: None.

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The Role of Posyandu Cadres in Improving the Growth and Development of Toddlers in RW VII Puskesmas Mojo, Surabaya

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ABSTRACT

Introduction: Posyandu cadres have an important role as health care providers who are located near to the targeted Posyandu. When the Posyandu cadre enters information on the KMS (Card Toward Health) is less clear, resulting in the implication of the Posyandu not performing well. The purpose of this research is to analyse the relationship between the Posyandu cadre's role in promoting growth and the development of toddlers in Puskesmas Mojo, Surabaya.

Method: This study used a cross-sectional research design. The population under study in this research were all Posyandu cadres and toddlers registered in the RW VII area, resulting in 38 Posyandu cadres and 38 toddlers. The type of research was analytic, using the Spearman Rank statistical analysis.

Results: The majority of the Posyandu cadres performed well (68.6%), and more than half of the toddlers (71.4%) had good growth based on anthropometric measurements. The majority of the toddlers (74.3%) had normal development in accordance with the pre-screening questionnaire that was developed (KPSP). The statistical test used, the Spearman rank, showed the value of $r = 0.29$, $p = <0.05$, which means that there is a relationship between the role of the cadres and the growth and development of toddlers according to their nutritional status. The role of the cadres with the development of relations based on KPSP was $r = 0.12$, $p = <0.05$, which means that there is a relationship between the role of cadres with the growth and development of toddlers by KPSP. There is a need for sustainable activities by involving the active participation of the parents in the early detection of toddler growth and development. Further studies involving the role of the parents, cadres and toddlers is suggested.

Keywords: *Posyandu Cadres, Growth and Development, Toddlers.*

INTRODUCTION

A real form of community empowerment is the presence of various forms of Community-Based Health Service (UBKM) in each working area of Puskesmas. The Community-Based Health Services (UBKM) with

the most tangible role that has been able to develop in the society is Posyandu. Posyandu consists of a 5 priority program (KB, KIA, nutrition, immunisation, and diarrhoea prevention) and has been proven to possess leverage in decreasing the mortality rate of infants and mothers. The development and improvement of the service quality very much depends on the role of the community, which consists of the cadres. Cadres have a very big function in Posyandu, starting from the succession of the Posyandu, mediating with the supporting institution of the Posyandu, serving as an executive planner, and as an advisor along with a trainer to motivate the community who are taking a part in the activities of their local Posyandu.

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The success rate of Posyandu goes along with the hard work of the cadres who have volunteered themselves to organise their local Posyandu. The lack of training to improve their sufficient skills has resulted in a lack of knowledge regarding the role of the cadres, a lack of information and no coordination between the officer and cadres in the operating of Posyandu, which might result in a low attendance number of toddlers. This will also lower the scope of early growth detection in toddlers¹. The role of the cadres is very important as they hold the responsibility of implementing the programs of Posyandu. If the cadres are passive, then the implementation of Posyandu will not be able to run smoothly and result in the undetected nutritional status of toddlers. This will indirectly impact the success rate of the Posyandu program, especially in terms of analysing the growth of toddlers.

In 2013, only 40% of at least 250,000 Posyandu in Indonesia were still active and only around 43% of toddlers' health status was analysed. Meanwhile, the number of active cadres in Posyandu was found to be 205,227². The passiveness of the Posyandu cadres is happening in Posyandu Kecamatan Mojo as well. The lack of presence in relation to the Posyandu cadres' role will surely be impactful, whether directly or not. The direct impact to the child will be the insufficient examination of their growth and development which will impact on the unmonitored health status of the child. The indirect impact for the cadres is the unclearness of KMS filling in, and accordingly the implementation of Posyandu will be irrelevant. The goal of this research is to analyse the role of Posyandu cadres in improving the growth and development of toddlers.

METHOD

The type of research used was an analytical correlation with a cross-sectional research design. The population under research was all Posyandu cadres and toddlers registered in the RW VII working area, which was made up of 38 persons and 38 toddlers. The samples were several cadres and toddlers of RW the VII Puskesmas Mojo working area in Surabaya, with the criteria of the sample being that the cadres were willing to participate and that the 2-3 year-old toddlers were willing to be researched. The active cadres in the Posyandu program numbered 35 respondents, gathered using a *simple randomised sampling* technique.

The independent variable is the role of the Posyandu cadres in improving the growth and development of toddlers in the RW VII Puskesmas Mojo working area of Surabaya and the dependent variable is the growth and development of toddlers in the same working area. For the growth category, there was normal nutrition status, lack of nutrition status, and malnutrition status. Meanwhile, for the development category, there was excessive development, normal or relevant development, and a lack of development or deviation. To determine the value of the relationship between the Posyandu cadres and the monitoring of the growth and development of toddlers, we used the statistical correlation test of *Spearman Rank*.

RESULT AND DISCUSSION

Table 1: Frequency distribution of the Posyandu cadres' characteristics in the RW VII Puskesmas Mojo working area in Surabaya in September–October 2017

Age	Number	Percentage
Early Adult (26 – 35 years old)	3	8.6
Late Adult (36 – 45 years old)	14	40
Early Elderly (46 – 55 years old)	10	28.6
Late Elderly (56 – 65 years old)	6	17.1
Seniors (Above 65 years old)	2	5.7
Total	35	100
Education	Number	Percentage
Elementary School	6	17.1
Junior High School	9	25.7
Senior High School	16	45.8
University	4	11.4
Total	35	100
Period as Cadres	Number	Percentage
Less than a year	-	-
1 – < 5 years	15	42.9
5 – < 10 years	12	34.3
10 – < 15 years	4	11.4
≥ 15 years	4	11.4
Total	35	100

Conted...

Cadres Training	Number	Percentage
Never	26	74.2
1 – 3 times	7	20
4 – 6 times	1	2.9
> 6 times	1	2.9
Total	35	100
Cadres Knowledge	Number	Percentage
Good	25	71.4
Average	8	22.9
Bad	2	5.7
Total	35	100
Sex	Frequency	Percentage
Male	17	48.6
Female	18	51.5
Total	35	100
Age	Frequency	Percentage
>12 – 18 months	6	17.1
>18 – 24 months	7	20

Conted...

>24 – 36 months	22	62.9
Total	35	100
Cadres' Role	Frequency	Percentage
Good	24	68.6
Average	9	25.7
Bad	2	5.7
Total	35	100
Toddlers' Nutrition Status	Frequency	Percentage
Good	25	71.4
Deficient	5	14.3
Bad or malnutrition	5	14.3
Total	35	100
Toddler growth	Frequency	Percentage
Relevant	26	74,3
In Doubt	7	20
Deviation	2	5,7
Total	35	100

Table 2: Cross-tabulation of the cadres' role in relation to the growth and development of toddlers of the age of 1–3 years old based on their nutrition status in the Posyandu RW VII Puskesmas Mojo working area in Surabaya

Role	Nutrition Status						Total	
	Bad		Average		Good			
Role	n	f	N	f	N	f	n	F
Bad	0		2	100	0		2	100
Average	2	22.2	2	22.2	5	55.6	9	100
Good	3	12.5	1	4.2	20	83.3	24	100
Total	5	14.3	5	14.3	25	71.4	100	100

Table 3: Cross-tabulation of the cadres' role and the development of toddlers in the age range of 1–3 years old based on KPSP in the Posyandu RW VII Puskesmas Mojo working area in Surabaya

Role	Nutrition Status						Total	
	Good		Average		Bad			
Role	n	f	n	f	n	f	n	f
Good	0		1	50	1	50	2	100
Average	1	11.1	4	44.4	4	44.4	9	100
Bad	1	4.2	2	8.3	21	87.5	24	100
Total	2	5.7	7	20	26	74.3	35	100

Based on Table 1, nearly half of the cadres, 14 cadres (40%), were 36 – 55 years old. Nearly half, 16 cadres (48%), were high school graduates and nearly half, 15 cadres (42.9%), had been a cadre for 1 - <5 years.

Nearly all, 26 cadres (74.2%), had never been trained as a Posyandu cadre and nearly all, 25 cadres (71.4%), had a good level of knowledge with regards to understanding and improving the growth and development rate of

toddlers. Based on Table 2, it can be seen that there is a tendency of a good cadre role being associated with the good nutritional status of toddlers and vice versa. The results of the statistical test of Spearman Rank was in the number of $r = 0.029$ with $p = < 0.05$, which means that there is a link between the role of the cadres and the growth and development of toddlers based on their nutrition status. Based on Table 3, it can be seen that there is a tendency for a good cadres' role to be followed by good KPSP in the toddlers, and vice versa. The results of the statistical test of Spearman Rank was in the number of $r = 0.012$ with $p = < 0.05$, which means that there is a relationship between the cadres' role and the growth and development of toddlers based on KPSP.

DISCUSSION

The organisation of the Posyandu cadres consists of equal job distribution between the cadres in relation to preparing and implementing. Meanwhile, the organisation of the cadres in relation to the growth and development of toddlers is the measurement of their weight and the measurement of LILA and KMS filling along with KPSP, which are the activities of the cadres in relation to detecting the growth and development of toddlers. The deviation of the toddlers' weight in those who were not weighed was discontinued if a lack of protein was found. They were given additional food, prevented diarrhoea in the toddlers, made OER and supervised and socialised related to the toddlers' health. The Posyandu cadres are the health provider closest to the Posyandu, and so the frequency of meeting with the cadres is more than meeting with any other health assistant. Therefore, the cadres should be active in many activities, not only in the context of implementation but also in subjects related to the organisation, like event planning, note taking and reporting on the cadres' meetings³.

Based on this study, the results show that there is a significant relevancy between the role of the cadres and the growth of the toddler. The analysis of the relationship between the cadres' role and the nutrition status of the toddler shows $r = 0.029$, meaning that there is a relevancy between the cadres' role and the development of the toddler based on their nutrition status.

According to the research of Purwanti and Rasyid (2014), their study also showed the relevancy between the cadres' role and the nutrition status of the toddlers. This happened because the cadres are volunteers chosen

from and by society to work for the health of society. Nutritional activity in the Posyandu is one of the main activities and generally becomes the priority when implementing the Posyandu's activities. Nutritional service in Posyandu is done by the cadres. This activity includes weighing the individual's body mass, recording the weighing result in KMS for the early detection of growth deviation, nutritional socialisation, PMT and vitamin A supplying. In the Posyandu activities, the cadres have a very important role aside from organising the activities of the Posyandu (administrator) and providing education (educator). The cadres also empower the activeness of mothers who have toddlers, prompting them to come to the Posyandu (motivator). Posyandu cadres are the closest health provider in relation to the Posyandu activities, and seeing the cadres directly is done more frequently than seeing any other health assistant⁴.

The role of the cadres is very important because they are responsible for the implementation of Posyandu activities and programs. If the cadres are passive, then the implementation of the program in Posyandu will also move stagnantly, impacting on the nutrition status of infants and toddlers (below 5 years old) as it cannot be detected properly. The presence of the cadres' role is to be able to facilitate society in decreasing the rate of malnutrition. Moreover, it also contributes to decreasing the mortality of mothers and toddlers by utilising the skills and facilities relevant to the improvement of the nutrition status of toddlers⁵. The role of the cadres impacts on the nutrition status of the toddler, meaning that if the cadres' role is high, so does the negative nutrition status of toddlers decrease.

Based on the statistical Spearman Rank test, the result shows that there is a significant relevancy between the cadres' role and the development of the toddlers. The analysis result of the relevancy between the cadres' role and the toddlers' nutritional status shows $r = 0.012$, meaning that there is a relationship between the cadres' role and the growth and development of toddlers based on KPSP.

The development of the toddler may be impacted by many external factors. For instance, the role of society and the health service. One of the roles of society in relation to health services is through Posyandu⁶. Posyandu also has many important roles in relation to optimising the development of the children, given to the

cadres as part of a strategic institution, since through Posyandu, they encounter many health problems such as nutrition and birth control, including the toddlers bearing developmental disorders⁷. The child's development is related to changes in the children, including changes that are physical, cognitive, emotional and even psychosocial. This development shows the quality of the available human resources (SDM) in relation to the next steps. Accordingly, a child is hoped to be able to reach an age-paralleled development phase⁸. The government has undertaken many attempts in relation to this, including implementing the SDIDTK program. Such a program includes an evaluation of the child's development by using KPSP as an obligatory activity in Posyandu.

CONCLUSION

The results have shown that most Posyandu cadres play a good role in relation to improving the growth and development of the toddlers in the Puskesmas Mojo working area in Surabaya. The growth and development of the toddlers can be seen through their nutrition status and KPSP monitoring, which also experienced an improvement and can be thus categorised as well done. The good role of the Posyandu cadres will impact the growth and development of the toddler based on their age. Thus, it is advised that continuous training and briefing for the cadres needs to be done in order to improve the knowledge of the cadres, especially in relation to early growth detection and the development of the toddlers. For the health cadres, it is hoped for all of them to become active in training and briefing so then there will be an improvement in knowledge overall, especially registering the KMS and KPSP given by the Puskesmas.

Ethical Clearance: This research has passed the ethical test conducted at the Ethics Committee of the Health Polytechnic of Ministry of Health at Surabaya.

Source of Funding: This study is a self-funded research project

Conflict of Interest: None

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Analysis of the Implementation of Pregnancy-related Health Care Services Through the Continuum of Care Approach in Puskesmas Bukittinggi City

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ABSTRACT

Introduction: Maternal mortality was related to 303,000 complications in pregnancy and childbirth in 2015. In the City of Bukittinggi, the number of maternal deaths in that year was three people. For 2016 to reduce the mortality rate, the WHO and other organisations in various countries advocate for the Continuum of Care program, which provides care in a sustainable and integrated manner.

Method: This research study was qualitative with a phenomenological approach. This research was carried out in the working area of the Bukittinggi City Health Office with the study time being July - October 2017. The data was obtained from in-depth interviews with two kinds of informants, namely key informants and supporting informants. This interview was conducted semi-structurally (semi-structured interviews). The data analysis used the Collaizi method.

Results: The results of the input, processing and output research showed that the Continuum Of Care program for pregnant women and postpartum mothers in the Bukittinggi city health centre was well-implemented because it was supported by the performance of the health workers and supported by the government. It was concluded that the Continuum of Care program at the city health centre of Bukittinggi was well-implemented.

Keywords: *Continuum Of Care, Maternity Services, Postpartum Maternal Health Services.*

INTRODUCTION

Based on the estimation of the UN Secretary-General, the maternal mortality number has decreased by 44 per cent from 385 to 216 per 100.000 survived childbirth. This means that the yearly average rate has decreased by 2.3 per cent. Less than 5.5. per cent of the yearly rate needed to reach the three per four-fold decreasing of the number of maternal deaths in for 2015 in Millennium Development Goal number 5¹. Almost all of the maternal deaths (99 per cent) happened in developing states².

The concept of Continuum of Care was first established in 1970, stating that the period of pregnancy, maternity, postpartum and through to being elderly are all related to various types of nursing service. The purpose of Continuum of Care is to improve the probability of the mother receiving proper care during labour, in addition to professional nursing care before, during, and after labour so then the risk of death or disability will be suppressed for both the mother and the newborn³.

In the city of Bukittinggi, the maternal mortality rate in 2016 was 3 deaths. This number has decreased from 2015, in which the rate was 7 deaths. The maternal mortality number has had a fluctuated graphic since 2014, with the number of 1 death then increasing rapidly in 2015 to 7 deaths, before decreasing in 2016 to 3 deaths. From January 2017 through to June 2017, 1 death in relation to maternal mortality has been recorded. This is pursuant to the purpose of the 2015 SDGs (*Sustainable Development*

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Goals) on the third point, which is to ensure a healthy life and to maintain the prosperity of all persons of all ages. Thus, the approach that uses the *Continuum of Care* will be done⁴. The SPM target (Minimum Standards Services) of Bukittinggi is 95%. Accordingly, the K4 coverage of 2016 still needs to be improved in order to reach this target. The goal of this study is to analyse the implementations of the treatment of mother and child by using the continuum of care approach.

METHOD

This research was a qualitative research on the treatments for pregnant women, mothers in labour and postpartum mothers through the approach of *Continuum of Care* during 2016 through to 2017. This research was conducted in the working area of Bukittinggi Public Health Service, between July and October 2017. The informants in this research consisted of the key informants, who know and possess the basic information needed in the research. The key informants of this research were 1 Head of the Public Health Service and 7 Heads of the local Puskesmas. The main informants were 7 people from each Puskesmas in charge of KIA, and 1 person in charge of KIA. The supporting informants consisted of 7 postpartum mothers.

The instrument of the qualitative research study was the researcher herself. Because the researcher is the main instrument in the research, the relationship between the researcher and the informants is an intensive one. The instruments and the supporting utilities used to collect the data were in the form of an interview guide, document examination list, notation utilities (book and pen), recorder and camera.

RESULTS

From the data analysis, the researcher found there to be 3 theme clusters which explain the problem of the researcher. The first theme cluster was about INPUT (program policies, the availability of the human resources, funding, facilities and infrastructure), the second was about PROCESS (the treatment of pregnant women and the treatment of postpartum mothers) and the third cluster was OUTPUT (coverage of the K1-K4 visit, coverage of the mother/child rights fulfillment, the coverage of labour assistance PN/Non PN and the coverage of KF1-KF3 visits).

Input:

1. Policies: Based on the interviews, it can be concluded that the policies about the health assistance in Bukittinggi refer to the vision and mission of the Mayor of Bukittinggi, as there are no specified policies and all of the indicators need have been stipulated in the form of RPJMF, strategic plans and a work plan. The purpose of the health service policy is to improve access to sufficient health services for everyone at each stage of life with the approach of there being one unity of service (*Continuum Of Care*) through a comprehensive intervention (promotive, preventive, curative and rehabilitative)⁵. The researcher has assumed that the analysis of the health service policy in Bukittinggi is being implemented sufficiently by the leader and the program holder of each health care sector, because each sector of health coverage in Bukittinggi has been fulfilled. It shows that the health workers in Bukittinggi work and provide services to the community, pregnant women and postpartum mothers based on the existing standards and indicators.

2. Human Resources (SDM): Based on the interviews, it can be concluded that the availability of human resources to implement the KIA program in Bukittinggi is enough, whether in the Public Health Service Berdasarkan or in the Puskesmas in Bukittinggi. Health workers are the spearhead of the implementation of the health service program. Accordingly, the placement of health assistants needs to be in a strategic position, which therefore shall be ruled on clearly and assertively. The availability of competent resources is not enough if there is no sufficient support in relation to the proper facilities and infrastructures⁶. Based on the assumptions of the researcher, an analysis of the availability of human resources in implementing the KIA program in the working area of Bukittinggi was enough, and the collected data shows that the amount of resources in the working area of public health service and Puskesmas is sufficient.

3. Funding: Based on the interview, it can be concluded that the source of funding for the implementation of the KIA program in the public health service or the Puskesmas came from

APBD, APBN, BOK and BPJS. Meanwhile, for the KIA program, the source of funding was from DAK. The availability of funding is enough for the public health service and Puskesmas. Based on the assumption of the researcher, the availability of funding for the KIA program is enough when from the government in the form of APBD, APBN, BJPS, JKN or BOK. In this case, the public health services or Puskesmas do not receive any other source of funding, such as from entrepreneurs or the private sector, or from any other non-binding source of funding.

4. Facility and Infrastructure: Based on the interview, it can be concluded that the facilities and infrastructure of the KIA program in Bukittinggi Puskesmas is enough. The organiser of the Puskesmas can handle the existing obstacles swiftly, because the sufficiency of facility and infrastructure in the Puskesmas is one of the requirements accredited to the Puskesmas. Most of the Puskesmas in Bukittinggi have been accredited. The researcher assumed that, based on the interview, the analysis on the sufficiency of the facilities and infrastructure of the Puskesmas in Bukittinggi was enough. This statement is supported by the other informants who explained that there have been no complaints or problems while undergoing treatment in the Puskesmas via the midwives.

Process:

1. Health Care for Pregnant Women: Based on the interview, it can be concluded that the health care for pregnant women in the KIA program of the Puskesmas in Bukittinggi has been implemented and going well. There have been no complaints or problems voiced by the visiting patients or from those who taking medication whether in the health service, via the midwife, or in the Puskesmas in Bukittinggi. Pregnancy assistants prioritise continuous care. (*Continuum of Care*). Based on Mansjoer (2000), routine pregnancy checks will help the mother to monitor the growth of the baby⁷. The mother can do this each month to see whether or not the baby is growing normally and is active in the womb. The researcher assumed that from the interview, the analysis of the status of health care for pregnant women in

the Puskesmas in Bukittinggi has encountered no problems. Healthcare for pregnant women in many Puskesmas in Bukittinggi is considered to be enough to fulfil the coverage of health care for pregnant women, such as the K1-K4 visits. The involvement of the cadres and the activeness of the midwife supports the proper implementation of health care for pregnant women.

2. Health Care for Maternity services: Based on the interview, it can be concluded that the health care for maternal services in Puskesmas Bukittinggi has been implemented properly as there have been no complaints or problems in relation to the treatment from the patients helped by the midwives of Puskesmas or those helped by the private midwives in the working area of Puskesmas Bukittinggi. The researcher has assumed that from the interview, there are no problems in relation to the analysis of the healthcare provided for maternal services in Puskesmas Bukittinggi. Most of the maternity ward patients received more assisted care continuously from the same midwife, but there were also those who received care from different midwives, moving from one to another according to the personal preference of the patient.

3. Health Care for Postpartum Mothers: Based on the interview, it can be concluded that the health care for postpartum mothers in Puskesmas Bukittinggi has been implemented properly as there have been no complaints or problems in relation to the service provided from the patients who were helped by the Puskesmas midwives, or those who were helped by the private midwives in the working area of the Puskesmas in Bukittinggi. The following is based on Kikuchi *et al.* (2015), in their study about the *Continuum Of Care* of mother, infants, and toddlers in Ghana⁸. The postpartum period (the first six weeks after birth), especially the first 48 hours, is very important for the health and survival of the mother and infant. A lack of a skilled health care during this period may cause death or illness. The researcher assumed that from the interview, the analysis of the healthcare for postpartum mothers in Puskesmas Bukittinggi aligned with the healthcare of maternal health services.

Output:

1. K1-K4 Visit Coverage: Based on the interview, it can be concluded that K1-K4 visits in the KIA program in Puskesmas Bukittinggi has been implemented properly, as there have been no complaints or problems from the visiting patients. The interview with the informant showed that most of the K1-K4 visits in Puskesmas Bukittinggi were done on routine. The importance of K1 examination is related to the role of the mother in realising the targets of health development, so there is synergy is in relation to the role of the government in suppressing the Maternal Mortality Rate (MMR) and the Infant Mortality Rate (AKB), which are still considered to be high (Kementerian Kesehatan RI, 2014). Based on the assumption of the researcher from the interview, the K1-K4 visits in Puskesmas Bukittinggi are close to fulfilling the coverage needed. The coverage of K1-K4 visits is a policy from the ANC (treatment during pregnancy) program and each mother receives antenatal care in accordance to the existing standard.

2. Coverage of TT Immunisation: Based on the interview, it was concluded that scope of TT Immunisation for mothers in Puskesmas Bukittinggi is complete; the informants were multiparous pregnant mothers who had completed each course of vaccination. The data from the Health Service stated that the average pregnant mother registered in Puskesmas Bukittinggi had completed their TT vaccinations. According to the WHO (2015), if a woman had never had a tetanus immunisation jab before, then she needs at least two injections during her pregnancy (first during the first antenatal visit, second is 4 weeks later). Based on the assumption of the researcher, the importance of knowing about TT vaccination needs to be understood by the mothers, because even though it may be their second pregnancy, after a two-year gap, the mother needs to be vaccinated again.

3. Scope of Birth Assistance from the Health Workers: Based on the interview, it was concluded that maternal services in Puskesmas Bukittinggi were helped by health workers such as Doctors and midwives. Thus, there was no data or reports detailing health assistance provided by a shaman. Based on the assumption of the researcher,

there are no more shaman birth assistance in Bukittinggi, because the data shows that most labours were assisted by a health assistant, which will help the suppression of AKI in Bukittinggi. Labour assisted by a health assistant is realised in a civilized society.

5. Coverage of KF1-KF3 Visit: Based on the interview, it can be concluded that most of the informants have done postpartum visits as per routine, but there are still some who do not go the postpartum visit routinely. The visits are done at least 3 times during the postpartum period. The activities to be done consist of the early detection, prevention, intervention, and handling of postpartum problems⁶. Based on the assumption of the researcher, the awareness of the Bukittinggi people is already very good, as they have done what they were told to do by the health workers and in accordance with health promotion.

CONCLUSION

Overall, the INPUT (program policies, availability of the human resources, funding, facilities and infrastructures) from this research has been fulfilled well so it sufficiently supports the implementation of PROCESS (treatment of pregnant Women, treatment of the maternal services, and the treatment of postpartum mothers). This efficient implementation has resulted in OUTPUT (coverage of K1-K4 visits, coverage of the mother/child rights fulfilment, the coverage of labour assistance PN/Non PN and the coverage of KF1-KF3 visit) which are in accordance with the existing standards that have ensured the prosperity of the people in proper continuance and within the organisation.

Ethical Clearance: This study had passed ethical clearance issued by Ethical Committee of the STIKes Fort De Kock, Indonesia.

Source of Funding: This study is self-funded research project.

Conflict of Interest: None.

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Feeding Care Patterns of Mothers Working as Shellfish Peelers on Children's Nutritional Status at Integrated Health Posts in Coastal Areas

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ABSTRACT

Introduction: Working mothers can influence the nutritional status of their children. Nutritional status is a condition that is influenced by the intake of nutrients in food needed by the body. Nutritional status is very important for the process of growth and development in children. The nutritional status of a toddler is influenced by several factors such as parenting.

Method: The research design used an analytical observation with a cross-sectional approach. Samples were taken using a simple random sampling technique obtained as many as 40 respondents in the mother group, where they all worked as shellfish peelers. The instruments of this study were the Feeding Pattern questionnaire and Nutrition Status assessment using the Anthropometry observation sheet. The data was analysed using the Spearman Rho test.

Results: The results showed that there was a relationship between feeding, the parent working as a shellfish peeler and the nutritional status of the child. The Spearman Rho test results were $\rho = 0,000$ ($\rho < 0.05$).

Discussion: The implication of this research is that there is a relationship between the parenting style of the mother working as a shellfish peeler on the nutritional status of the toddler. It is expected that the research respondents can improve the provision of feeding by paying attention to the nutritional needs of their toddlers.

Keywords: *Toddler Nutritional Status, Eating Pattern, Working Mother.*

INTRODUCTION

Regarding nutritional status prevalence according to the WHO in 2013, globally it was estimated that in 101 million children under the age of five (toddlers), 15.7% are underweight and 6.6% are overweight¹. Nationally, in 2013, the underweight prevalence was that 19.6% were severely malnourished and 13.9% were undernourished². Based on the Millennium Development Goals (MDGs) indicator, the number of severely malnourished children that an area of city must achieve by 2015 is 15.5%³. The East Java Province is still categorised as an area with

one of the highest severely malnourished percentages, at 4.8%⁴. In the 2013, the severely malnourished percentage was 19.6%. In 2014, there was a significant increase, up to 14.8%. Sidoarjo Regency's children under five showed a percentage of severely malnourished children with weight in accordance to age being under the red line weight as much as 1.02% (1.072). This is less than what was 1.22% (1,298 children) in 2013. Based on the weighing of children under five done throughout 2013, the number of malnourished or underweight children was 5.25% (weight according to the age Z-score between > -3 year primary school to < 2 year primary school as per the Kartu Menuju Sehat a card used in Indonesia to keep track of a child's growth monthly), which is on the yellow stream above the red line. The results showed that 91.54% were well-nourished (normal weight), 1.98% were over-nourished (overweight) and 1.22% were severely malnourished (very underweight). For the malnourished percentage, 2014 showed a percentage of

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4.92% which was less than 2013, which was 5.25%⁵. The researcher’s interview with the nutritional staff on the 22nd January 2018 at Sedati Sidoarjo’s Integrated Health Post revealed that there were 84 Children Under Five Integrated Health Posts in 16 villages, where 3 children under five suffered from severe malnutrition with comorbidities. There were malnourished children in several other villages. From the interview with the Village Midwife (Bidan Desa) in Gisik Cemandi Village, there were 11 children under five (7.3%) out of 150 children under five that were malnourished. The interview with Belanak and Dorang Gisik Cemandi village Integrated Health Posts group revealed that the total number of mother’s working as shellfish peelers and stay at home mothers who had children under five were as many as 88 people, separated into 44 (50%) mothers working as shellfish peelers and 44 (50%) stay at home mothers.

The interaction between being malnourished and infection may cause deadly disease cycles and a worsened nutritional status⁶. One of the ways to increase children under five’s nutritional status is by giving supplementary feeding. Supplementary feeding may be given to children under five from 6 months up to 23 months and 29 days with a skinny nutritional status, which is measured based on the weight index according to their height and a minus 3 deviation standard (-3DS) to less than minus 2 deviation standard (<-2DS), for 90 days. Supplementary feeding of skinny children under five may be local supplementary feeding and even factory supplementary feeding in the form of breastfeeding companion biscuits (biscuit MP-ASI). Once their weight has reached normal or in accordance to their height, supplementary feeding will be discontinued. Hereinafter, the children may consume the family’s balanced nutrition, which will be done under weight monitoring to avoid the chance of children under five falling back into the skinny nutritional status⁷.

A mother’s working status certainly affects their children’s growth and development. Mothers who work have many options. There are mothers who choose to work at home and there are mothers who choose to work outside or far from home. The latter must be able to manage their time for their family because a mother’s main task is to manage household affairs including looking after, managing and guiding children⁸.

Nutrition in children under five must be fulfilled, because nutrition will affect the toddler’s growth in future. Stay at home mothers have more time for their

toddlers than working mothers. This is because working mothers must split their time to play the role of a working mother and a housewife. The solution given by the researcher was to give counselling to mothers working as shellfish peelers and stay at home mothers on the correct feeding care patterns to avoid malnutrition in children under five.

Based on the background description and supported by the preliminary studies which have been done, the writer is interested in doing research on the relationship between the feeding care patterns of mothers working as shellfish peelers on children under-five’s nutritional status at integrated health posts in coastal areas.

METHOD

The research design used in this research was an analytical observation that looked for a relationship between the variables with a cross-sectional approach. This kind of research emphasises on the independent and dependent data measurements one at a time.

The population in this research was mothers working as shellfish peelers with children under five at Belanak and Dorang Gisik Cemandi village Integrated Health Posts. The sampling technique used in this research was sampling randomly sampled mothers working as shellfish peelers with children under five, thus fulfilling the inclusion criteria of 40 respondents.

The tools used to collect the data were questionnaires for the demographic data and feeding care patterns along with nutritional status observation focused on children between the ages of 12-60 months using an anthropometrical table. Bivariate data analysis was used to find out the relationship between the feeding care patterns of mothers working as shellfish peelers and the children under five nutritional status. This research used a Spearman Rho statistical test.

RESULTS

Table 1: Demographics of the respondents

Mother’s Age	Frequency (f)	Percentage (%)
<20 years old	0	0
20-30 years old	24	60.0
>30-40 years old	14	35.0
>40 years old	2	5.0
Total	40	100.0

Conted...

Last Education	Frequency (f)	Percentage (%)
Tidak Sekolah	0	0
Primary School	1	2.5
Junior High School	18	45.0
High School	21	52.5
Graduate	0	0
Total	40	100.0
Family Income	Frequency (f)	Percentage (%)
<Rp1.000.000	3	7.5
>Rp1.000.000-2.000.000	17	42.5
>Rp2.000.000-3.000.000	17	42.5
>Rp3.000.000	3	7.5
Total	40	100.0
Number of Children	Frequency (f)	Percentage (%)
1	19	47.5
2	17	42.5
3	4	10.0
>4	0	0
Total	40	100.0
Mother's Job	Frequency (f)	Percentage (%)
Shellfish Peeler	40	50.0
Total	40	100
Toddlers Age	Frequency (f)	Percentage (%)
12-18 months old	6	15.0
19-25 months old	8	20.0
26-32 months old	9	22.5
33-39 months old	8	20.0
40-46 months old	3	7.5
47-53 months old	2	5.0
54-60 months old	4	10.0
Total	40	100.0

Conted...

Gender	Frequency (f)	Percentage (%)
Male	18	45.0
Female	22	55.0
Total	40	100.0
Birth Order in Family	Frequency (f)	Percentage (%)
First Born	19	47.5
Second Born	17	42.5
Third Born	4	10.0
Fourth Born	0	0
Fifth Born	0	0
Total	40	100.0
Weight	Frequency (f)	Percentage (%)
1-5 kg	6	15.0
6-10 kg	8	20.0
11-15 kg	9	22.5
16-20 kg	8	20.0
21-25 kg	3	7.5
26-30 kg	2	5.0
Total	40	100.0
Height	Frequency (f)	Percentage (%)
65-74 cm	1	2.5
75-84 cm	10	25.0
85-94 cm	15	37.5
95-104 cm	10	25.0
105-114 cm	4	10.0
115-114 cm	0	0
Total	40	100.0
Children's Health History	Frequency (f)	Percentage (%)
Tuberculosis	0	0
Measles	4	10.0
Malaria	1	2.5
Others	0	0
None	35	87.5
Total	40	100.0

Table 2: The Relationship between the Feeding Care Pattern of Mother’s working as Shellfish Peelers on their Toddler’s Nutritional Status at Gisik Cemandi Sedati Sidoarjo Village Coastal Area Integrated Health Post

		Toddlers Nutritional Status of Working Mother’s Status			
		Malnourished	Nourished	Over-Nourished	Total
Toddlers Feeding Care Patterns of Working Mother’s	Less or Deficient (<60%)	5	0	0	5
	%	100.0	0	0	100.0
	Enough (60-80%)	0	3	0	3
	%	0	100.0	0	100.0
	Good (>80%)	0	31	1	32
	%	0	96.9	3.1	100.0
	Total	5	34	1	40
	%	12.5	85.0	2.5	100.0
Spearman Rho Value Statistic Test 0,000 ($\rho = 0.05$)					

DISCUSSION

Based on the data on the feeding care patterns of mothers working as shellfish peelers related to their children’s under-five nutritional status at Gisik Cemandi Sedati Sidoarjo Village Coastal Area Integrated Health Posts, as shown in the table above, there were 5 respondents (100.0%) that did not conduct good feeding care patterns, resulting in malnutrition in the respondent’s toddler. A further 3 respondents (100.0%) that did enough in relation to the feeding care pattern had well-nourished toddlers, and 1 respondent (3.1%) had a good feeding care pattern that resulted in over-nutrition. Nutritional status is a condition that is caused by a balanced status between nutrient intake and the number of nutrients required by the body for the running of its biological functions such as physical growth, development, activities, health care etc. A toddler’s nutritional status is affected by many factors, both direct and indirect. Direct causes that affect nutritional status are nutrition intake and any infections suffered by the toddler. Indirect causes include food availability, while keeping in mind the parent’s job and income, parenting and care patterns, the available health services and environmental health. The three indirect causes are related to the level of education, knowledge, and family skill⁹. The researcher argues that a working mother must be wise in relation to time management, because her time will be divided between work, childcare and domestic chores. This case is proven by the research results as shown above, on how the mother’s that were working as shellfish peelers had toddlers who were malnourished. The mothers in coastal areas stated that there is difficulty when their role as shellfish peelers made them unable to feed their children on time.

The link between the feeding care pattern of mother’s working as shellfish peelers on children under five (toddlers), is as shown in the Spearman Rho statistic test result in Table 13; $\rho = 0,000 < \alpha = 0.05$ as a comparison. The coefficient correlation between the variables gained from the statistics test was 0.771, which means that there is a strong correlation. H1 was therefore accepted, statistically showing that there is a relationship between the feeding care patterns of mothers working as shellfish peelers on their toddler’s nutritional status at Gisik Cemandi Sedati Sidoarjo Village Coastal Area’s Integrated Health Post.

CONCLUSION

Based on the results of this research, the outcome is that regarding nutritional status, the mothers working as shellfish peelers with toddlers did not do well at taking care of their child’s nutrition and they lacked a proper feeding care pattern. The toddlers of mothers working as shellfish peelers suffered from malnutrition because the mother’s activities were more important than looking after and paying attention to their toddler’s nutritional intake.

Ethical Clearance: This study had passed ethical clearance issued by Ethical Committee of the Sekolah Tinggi Ilmu Kesehatan Hang Tuah Surabaya, Indonesia.

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Conflict of Interest: None.

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The Relationship between Socioeconomic Status and Personality Type with Depression in Adolescents

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ABSTRACT

This study aimed to identify the relationship between socio-economic status and personality type in relation to the occurrence of depression in adolescents. The samples of this study were high school students, as many as 248 persons. The study was carried out in six high schools in Bukittinggi City, Indonesia. This study applied a mixed methodology using a sequential exploratory design. The quantitative study was conducted using questionnaires with a correlational design and the cross-sectional approach. The qualitative study used an in-depth interview as the data collection method. The independent variables in this research were the personality type and socio-economic status. Meanwhile, the dependent variable was depression. The data was analysed using Chi-square analysis. The odd ratio was applied to identify the relationship significance of the independent and dependent variables. The results shows that there were significant relationships between socioeconomic status and depression ($p=0.002$; OR 2.241) and between personality type and depression ($p=0.000$; OR=1.935). The incidence rate of depression within adolescents relates closely to the factor of socioeconomic status and personality type. Therefore, adolescents are expected to understand themselves further to not trigger depressive incidents.

Keywords: *depression, personality type, socio-economic status.*

INTRODUCTION

Depression has attracted global concern in recent decades. Depressive people usually have lower productivity. They will have a negative impact on society, the nation, and the country if it is in a developing stage¹. Depression is the primary cause of suicide and it is ranked in 6th position concerning the primary mortality causes in the United States².

On a global scale, depression is the top cause of disease and vulnerability in adolescents aged 10-19 years old³. The World Health Organisation predicted that depression will be second of world health problem in 2020⁴. The prevalence of depressive disorder in

adolescents generally stands at around 3-9% and this rises to 20-25% in the late stage of adolescence⁵. The results of the CDC survey in the United States mentioned that during 2009-2012, the incidences of depression aged between 12-17 years old stood at 7.6%⁶ 2009-2012. During 2009-2012, 7.6% of Americans aged 12 and over had depression (moderate or severe depressive symptoms in the past 2 weeks).

The Indonesian Basic Health Research (2013) unveiled that the percentage of the population who experience a high-level mental disorder (psychosis/schizophrenia) in Indonesia totalled 1,728 individuals. The prevalence of Indonesian citizens with a high-level mental disorder was 1.7 per-mille. In North Sumatra, the prevalence of residents who experienced high-level mental disorders was 1.9 per-mille, higher than national value. Meanwhile, in Bukittinggi, the prevalence of high-level mental disorder incidents was 0.7 per-mille⁷.

In addition, the prevalence of emotional mental disorders in Indonesia in residents aged between 15-24 years old stood at 6%. Meanwhile, for the area of

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North Sumatra, for residents aged 15-24 years old who experienced emotional mental disorder in Bukittinggi city, the prevalence was 1.1%⁷.

Emotional mental health of adolescents needs to be taken into attention⁸. Once neglected, it will trigger major vulnerability in relation to stress and life pressure. Henceforth, the adolescents may experience social, emotional and behavioural issues such as depression, learning troubles, adolescent delinquency, and drug addiction⁹.

Depression is a common mental disorder which has the symptoms of sorrow, a loss of interest or joyfulness, guilt, sleep disorders, a decrease or increase of appetite, tiredness, and a loss of concentration⁴. If the symptoms of depression are not identified as early as possible, it will inflict heavier emotional mental problems including social function and quality of life disorders as well as suicide-based mortality¹⁰.

Adolescents who experience depression will continue to suffer repeatedly into their adult life stage if they are not healed. Depression is characterised by chronic symptoms. Major depression disorder or heavy depression is distinguished by symptoms which interrupts the ability of someone to work, sleep, study, eat, and to enjoy delightful activities¹¹.

The research carried out in Turkey unveils that the middle-lower socio-economic group possess a lower depression level significantly compared to the middle-upper class. Mothers with low and high social levels spend less time with their adolescent children¹².

Considering these issues, this study aimed to identify the relationship between socio-economic status and personality type with the occurrence of depression in adolescents.

METHODS

This study applied a mixed methodology with a sequential exploratory design. The quantitative study was conducted using questionnaires with a correlational design and cross-sectional approach. Meanwhile, the qualitative study used an in-depth interview, also known as an informant-based interview. The sample of this research was adolescents residing in Bukittinggi City from six different schools, as many as 248 correspondents. The collection of the data in this research was using questionnaires. The variable of depression was measured using *Inventori Depresi*

Remaja or Adolescence Depression Inventory scale, while personality type was measured using Jung's Type Indicator Test to find extrovert or introvert personalities.

RESULTS

Table 1: Respondent's Demographic Character (n = 248)

Respondent's Character		f (n=248)	%
Mother's Education			
a.	Elementary Dropped Out	6	2
b.	Elementary	24	10
c.	Middle	25	10
d.	High School	102	41
e.	Diploma	33	33
f.	Bachelor	47	19
g.	Master	6	2
h.	Doctorate	5	2
Father's Education			
a.	Elementary Dropped Out	6	2
b.	Elementary	25	10
c.	Middle	30	12
d.	High School	116	47
e.	Diploma	13	5
f.	Bachelor	42	17
g.	Master	12	5
h.	Doctorate	4	2
Mother's Occupation			
a.	Housewife	146	59
b.	Civil Servant	50	20
c.	Entrepreneur	31	13
d.	Farmer/Labour	5	2
e.	Etc.	16	6
Father's Occupation			
a.	Unemployed	9	4
b.	Civil Servant	56	23
c.	Entrepreneur	98	40
d.	Farmer/Labour	41	17
e.	Etc.	44	18
Housemate/Guardian			
a.	Parents	206	83
b.	Boarding House/House Rent	25	10
c.	Relative	17	7

Conted...

Parental Status			
a.	Complete accompanied	202	81
b.	Complete unaccompanied	26	11
c.	Incomplete	20	8

1. Univariate Analysis

Table 2: Frequency Distribution of the Respondent's Characteristics

Variable	Frequency (n=248)	%
Depression		
a. Depressed	150	60.5
b. Undepressed	98	39.5
Personality type		
a. Extrovert	130	52.4
b. Introvert	118	47.6
Socio-Economic Status		
a. High	122	49.2
b. Low	126	50.8

2. Bivariate Analysis

Table 3: The Relationship between Personality Type and Depression

Variable	Depression				Total	
	No		Yes			
	f	%	f	%	F	%
Extrovert	61	46.9	69	53.1	130	100
Introvert	37	31.4	81	68.6	118	100
Total	98		150		248	

Table 4: The Relationship between Socio-Economic Status and Depression

Variable	Depression				Total	
	No		Yes			
	f	%	f	%	f	%
High	60	49.2	62	50.8	122	100
Low	38	30.2	88	69.8	126	100
Total	98		150		248	

3. Multivariate Analysis: Multivariable analysis was used to oversee the relationship between the independent variable and dependent variable

simultaneously, controlled by an external variable with $p=0.25$ toward bivariate analysis. The statistic test applied was logistical regression analysis with a confidence interval (CI) 95%.

Based on the undertaken bivariate analysis, it can be extract the next variable candidate which may be entered into the next phase.

Table 5: Multivariate Variable Candidate

Variable	p-value	Status
Personality type	0.000	Significant
Socio-Economic Status	0.002	Significant

Based on Table 5, the Multivariate Variable Candidate, all of the variables conformed to the p value < 0.25 . After the logistic regression test was undertaken, the results came up as follows:

Table 6: Analysis Results of the Conditional Logistic Regression

Variable	Coefficient	p-value	OR (Lower-Upper)
Personality type	0.628	0.055	1.874 (0.986-3.561)
Socio-Economic Status	0,993	0.003	2.700 (1.411-5.165)
Constant	-2.441	0.000	0.087

DISCUSSION

1. Univariate Analysis: From the results of the research in Table 2, it attained the data which explains that around 150 students (60.5%) experienced depression and 98 students (39.5%) were did not have depression. According to the WHO (2002), children and adolescents were included as being a vulnerable group for depression due to various symptoms caused by internal and external factors¹³.

The most common adolescent's personality types was the extrovert type, amounting to 130 students (52.4%). Those with the introvert personality type made up 118 students (47.6%). Students with an extrovert personality are equipped with openness of the mind and are sociable. This differs to the introvert type of student, who tend to be closed-

off in personality and eschewed from the social environment. Adolescents with an introvert personality encounter difficulty socialising with their friends. They tend to be unconfident when dealing with their friends ¹⁴.

The socio-economic status of students is largely low, amounting to 126 students (50.8%), with those of a high status numbering 122 students (49.2%).

2. Bivariate Analysis: The relationship of Personality Type with Depression

In Table 3 above, it obtained the data that as many as 61 respondents (46%) had an extroverted personality type and were not experiencing depression. In contrast, 81 respondents (68.6%) with introvert personality type experienced depression. The results of the data analysis unveiled a significant relationship between personality type and depression in adolescents. This was obtained from the value of OR=1.935 (CI 95% 1.151-3.254) and $p = 0.000$. The introvert personality type had a 1.9 times higher chance of experiencing depression compared to those with an extroverted personality.

This is in line with the research carried out by Sukmana Putra and Alit Ariyani (2011), which obtained the relationship between personality type and stress level ¹⁵. The risk factors related to the occurrence of depression in adolescents may be driven by the adolescent's personality. With an introverted personality, adolescents are unlikely to open up to their parents. Hence, they are more vulnerable to depression ¹⁰. The personality factor is one of the factors which drives depression in adolescents ¹⁶.

From the interview results conducted with high school students in Bukittinggi, it can be inferred that students are unlikely to socialise with their friends and tend to be closed off.

One of the influential factors for the emergence of stress is personality. Personality can be defined as a set of way of thinking, feeling, and attitude which is often performed in the process of continual adaptation to what is occurring in one's life. People with an introverted personality tend to live in their own world. Their interaction with

their external environment is poor, they have a closed personality and find it difficult to socialise with others. Often, they withdraw into themselves within a crowd ¹⁵.

The researcher's assumption implies that adolescents with an introvert personality type are more likely to experience depression compared to those with an extroverted personality. They are more closed-off compared to those who are extroverts. They tend to be ignorant of the outside world. The helplessness of introverted adolescents to adjusting to their environment and friends at school inflicts a pressured feeling. They then withdraw themselves from social circumstances due to their inability to adapt to the demands of the circumstances in which they live. Their discouragement to join the community is based on their self-judgment as a different person. They are scared to misbehave in their group. Adolescents with this type of introverted personality are expected to be able to socialise within their environment. Levelling up the sense of confidence of adolescents may support introverted adolescents in adjusting to their environment as well as transcending negative thoughts such as rejection from their friends. Positive thinking may increase the sense of confidence of adolescents in order for them to be able to socialise with their friends.

In Table 4 above, it obtained data in which 60 respondents (49.2%) with a high socio-economic status were at a low risk of depression. Meanwhile, 88 respondents (69.8%) respondents with a low socio-economic state experienced depression. The results of the data analysis showed a significant relationship between socio-economic status and depression obtained from the value of OR 2,241 (CI 95% 1,332-3,771) and $p=0,002$. Those with a low socio-economic status had a 2.2 times greater chance of developing depression compared to those of a high socio-economic status.

This research is in line with the research carried out by Koster et al (2006), who mentioned that people with a low socio-economic status have a two times greater chance of encountering depression compared to those of a high-level socio-economic status ¹⁷. A research by Lorant et al. (2003) unveiled

that a low level socio-economic status is statistically correlated to depression¹⁸ more disability, and poorer access to health care. Among psychiatric disorders, depression exhibits a more controversial association with SES. The authors carried out a meta-analysis to evaluate the magnitude, shape, and modifiers of such an association. The search found 51 prevalence studies, five incidence studies, and four persistence studies meeting the criteria. A random effects model was applied to the odds ratio of the lowest SES group compared with the highest, and meta-regression was used to assess the dose-response relation and the influence of covariates. Results indicated that low-SES individuals had higher odds of being depressed (odds ratio = 1.81, $p < 0.001$).

The researcher's assumption implies that the condition of socio-economic status is correlated to the depression rate of high school students across Bukittinggi city. This is driven by the unstable economic situation which provokes negative thoughts among adolescents over their lives. Henceforth, when one's desire is unfulfilled, it inflicts depression on the adolescent. There is a high pressure related to education needs and the need for additional tools to accelerate the learning process of students¹⁹. The failure to comply with these needs due to the economic situation of the parents will trigger anxiety in the adolescents over the potency of dropping out of school. Therefore, this feeling will trigger the feeling of being pressured. Moreover, another factor is the demands of the adolescent's lifestyle. Adolescents have the tendency to imitate their friend's lifestyle. They have the tendency to own what is being owned by their friends²⁰. However, the economic condition of their parents makes them unable to fulfil their demands. This unfulfilled desire will inflict a feeling of disappointment in the adolescents hence, they feel ignored and it triggers a sense of depression.

Adolescents are expected to be able to possess a mature way of thinking when dealing with problems. This is primarily related to their parent's financial condition. The adolescent's anxiety toward their financial condition can better be transcended into a wise attitude and having the willingness to support lowering the burden

of their parents, such as by seeking a scholarship. Adolescents are expected to not be desperate when dealing with their problems.

3. Multivariate Analysis: According to Table 5, the multivariate variable candidate of all variables satisfied the value of p value < 0.25 . After the logistic regression test was performed, it obtained the results as follows. In Table 6, the results of the analysis via *conditional logistic regression* obtained that the most influential variable toward the incident rate of student depression was socio-economic status with p value = 0.003 and an OR value of 2.700. Socio-economic status changed, by 2.7 times, the incidence rate of depression.

Inferred from the results of the analysis, the multivariate variable of socio-economic status has a greater chance in relation to its correlation to depression. According to the researcher's assumptions, economic condition is considerably influential on the psychological condition of an individual. Life demands gradually increase every day. Henceforth, the unfulfilled livelihood provision of a person will affect their psychological condition, primarily in adolescents.

CONCLUSIONS

Based on the results of this research, it was identified that the incident rate of depression in adolescents correlates closely with socio-economic status and personality type. It is suggested that adolescents should be more aware of their self-concept and understand their family economy, while learning to accept the situation.

Conflict of Interest: None.

Ethical Clearance: The study passed ethical clearance from Ethical Committee of the STIKes Fort De Kock, Bukittinggi, Sumatera Barat, Indonesia.

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Consumption Patterns, Energy Adequacy, and The Nutritional Status of Softball Players

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ABSTRACT

Softball is a competitive sport which requires the players to have a combination of strength, speed and agility. Nutrition and hydration can have a significant impact on the performance of the softball players. The present study aimed to analyse the relationship between consumption patterns, nutritional knowledge, physical activity, and nutritional adequacy with the nutritional status of softball players. An analytic observation within a cross-sectional study design was employed on a sample of 20 softball players from Surabaya State University. The respondents were recruited through simple random sampling. The research variables included energy intake, eating frequency, vegetarian diet, caffeine or soft drink consumption, fast food consumption, food restrictions, infectious disease, nutritional knowledge, energy adequacy and nutritional status. The anthropometric measurements of the athletes were used including body weight and height, consumption pattern data using the 2x24 hours recall method and a food frequency questionnaire, physical activity data using the IPAQ (International Physical Activity Questionnaire) method, and data on knowledge and infectious diseases using a questionnaire. Energy adequacy was calculated by comparing the average energy consumption with the Nutrition Adequacy Rate. Nutritional status was measured using Body Mass Index (BMI). The data was analysed to examine the relationship between the explanatory variables and the dependent variables using the Spearman Rank Correlation Test. Energy intake, eating frequency, and the knowledge of nutrition had a positive significant correlation with energy adequacy. Physical activity was negatively correlated with energy adequacy. Infectious disease was negatively correlated with nutritional status, while energy adequacy was positively correlated with nutritional status.

Keywords: *consumption pattern, athletes, energy adequacy, nutritional status, Indonesia*

INTRODUCTION

Softball requires athletes to have a combination of strength, speed and agility, in addition to sharp focus, quick reactions and a determination to win. An appropriate dietary intake is crucial for softball players to build their physical strength and to improve their athletic performance.¹ Strategies used to enhance the adequacy

of energy can help to maximise exercise and muscle performance. The nutrient intake required by an athlete is determined by the exercise load, the athlete's specific needs, training objectives, body composition, health and the growth of young athletes.² A balanced nutritional diet in accordance with the exercise requirements is beneficial for softball players. The energy and carbohydrate intake of players should be adjusted with the daily exercise load.

Sources of nutrient intake during softball exercise are recommended to come from highly nutritious foods such as cereals, fruits, vegetables, low-fat dairy products, lean meats and poultry, fish, nuts, seeds, nuts and so on. The consumption of food with a low nutritional value such as soft drinks, snacks, cakes, biscuits, and fried foods should be restricted or limited. Meal timing is the key to success. Portion control and inter-meal intervals can help to improve nutrient absorption and regulate appetite.

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To achieve maximum performance in sport, athletes require an optimal training system that includes the availability and adequacy of nutritional intake in accordance with the type of sports being undertaken. An adequate level of nutritional intake is a fundamental prerequisite for athletes, as nutrition and physical exercise result in optimum achievements.³ The present study aimed to analyse the relationship between consumption patterns, knowledge of nutrition, physical activity, and the adequacy of nutritional intake with nutritional status in the context of softball athletes.

METHOD

Our study employed an analytic observational research approach using a cross-sectional design. The population in this study was made up of softball players from the State University of Surabaya. The research sample included 20 active softball players. We applied simple random sampling to recruit the participants.

The variables in this study included energy intake, meal frequency, vegetarian diet, consumption of caffeine/soft drinks, food restrictions, infectious diseases, nutritional knowledge, energy adequacy, and nutritional status. The data of the variables were collected from the measurements of the anthropometric data (body weight and height), consumption pattern data using the 2x24 hours recall method and food frequency questionnaire, physical activity data with the IPAQ (International Physical Activity Questionnaire) method, and questionnaires about their level of nutritional knowledge and history of infectious disease. The level of energy adequacy was calculated by comparing the average energy consumption with the Nutrition Adequacy Rate. Nutritional status was measured using the Body Mass Index (BMI) with the formula weight (kg)/height (m).

The data was analysed using both descriptive and inferential statistics. The Spearman Rank Correlation Test was used to assess the relationship between all of the independent variables and nutritional status. The statistical analysis was done using the SPSS program version 22.

RESULTS

The consumption pattern can be seen using the type of food and eating frequency questionnaire, as shown Table 1. More than half of the respondents (55%) consumed staple food (rice) twice a day. Protein-based foods were meat, poultry or eggs or soya beans in the form of tempeh and tofu consumed twice a day by most of the respondents (60% and 50% respectively). Most of the respondents only ate vegetables once a day (45%).

Most of the respondents consumed fruit twice a week (50%) and milk three times a week (60%).

Table 1: Type of food and eating frequency

n = 20

Type of food	Eating frequency	n (%)
Grains (rice)	2 times a day	11 (55)
	3 times a day	9 (45)
Meat, poultry, eggs	1 time a day	7 (35)
	2 times a day	12 (60)
	3 times a day	1 (5)
Legumes/beans	1 time a day	2 (10)
	2 times a day	10 (50)
	3 times a day	8 (40)
Vegetables	1 time a day	9 (45)
	2 times a day	5 (25)
	3 times a day	6 (30)
Fruits	1 time a day	3 (15)
	2 times a week	10 (50)
	3 times a week	7 (35)
Milk	1 time per day	4 (20)
	3 times a week	12 (60)
	never	4 (20)

Based on the information of the type of food and eating frequency, the researchers calculated the estimated energy intake. Table 2 shows that the average food consumption of the respondents was 2892.25 ± 323.30 kcal with a meal frequency of 1 – 2 times a day. Most respondents rarely had a vegetarian diet (50%) and one focused on fast food (90%), but they often consumed caffeine or soft drinks (50%). Most of them had no dietary restrictions (90%) and had not had any infectious diseases within the last 3 months (65%). The majority of the respondents had good energy adequacy (65%), moderate physical activity (55%), and normal nutritional status (85%).

Table 2: Variables of the respondent's characteristics

Variables		n (%)	Mean ± SD
Energy intake (food consumption)	2500–2999 kcal	14 (70.0)	2892.25 kcal ± 323.30
	3000–3499 kcal	5 (25.0)	
	3500–4000 kcal	1 (5.0)	

Conted...

Eating frequency	1-2 times a day	11 (55.0)	
	3 times a day	7 (35.0)	
	>3 times a day	2 (10.0)	
Vegetarian diet	Never	7 (35.0)	
	Rarely	10 (50.0)	
	Frequent	3 (15.0)	
Caffeine/soft drink consumption	Never	1 (5.0)	
	Rarely	8 (40.0)	
	Frequent	10 (50.0)	
	Always	1 (5.0)	
Fast food consumption	Rarely	18 (90.0)	
	Frequent	2 (10.0)	
Food restriction	No	18 (90.0)	
	Yes	2 (10.0)	
Infectious diseases	Never	13 (65.0)	
	Rarely	3 (15.0)	
	Frequent	4 (20.0)	
Knowledge of nutrition	Good	12 (60.0)	
	Poor	8 (40.0)	
Energy adequacy	Good	13 (65.0)	
	Poor	7 (35.0)	
Physical activity	low (< 600 MET- minutes a day)	1 (5.0)	
	Moderate (600 - <1500 MET- minutes a day)	11 (55.0)	
	High (1500 - <3000 MET- minutes a day)	8 (40.0)	
Nutritional status	Underweight (BMI: <18.5)	2 (10.0)	
	Normal (BMI: 18.5 - <24.9)	17 (85.0)	
	Overweight (BMI: 25 -<27)	0	
	Obese (BMI ≥27.0)	1 (5.0)	

Remark: MET : Metabolic equivalents; BMI : Body Mass Index

Table 3 shows the relationship between the explanatory variables and energy adequacy. The significant relationship was shown by the p-value <0.05. Each variable of energy intake, eating frequency,

and knowledge of nutrition showed a significant positive correlation coefficient with energy adequacy. Conversely, physical activity had a significant negative correlation coefficient to energy adequacy. A higher level of physical activity will reduce the level of energy adequacy.

Table 3: The relationship between the explanatory variables and energy adequacy

Variables	Correlation Coefficient (r)	p-value
Energy intake	0.619	0.001
Eating frequency	0.736	0.000
Vegetarian dietary	-0.100	0.676
Caffeine/soft drink consumption	0.131	0.582
Fastfood consumption	0.000	1.000
Food restriction	-0.245	0.299
Knowledge of nutrition	0.599	0.005
Physical activity	-0.536	0.015

Table 4 shows that there was a significant negative correlation (p value <0.05) between infectious diseases and energy sufficiency with nutritional status. Getting an infectious disease will lower the participant’s nutritional status. The energy adequacy had a positive significant correlation coefficient with the nutritional status. Having better energy adequacy will improve their nutritional status.

Table 4: The relationship between energy adequacy, infectious disease and nutritional status

Variables	Correlation Coefficient (r)	Sig.
Infectious disease	-0.568	0.009
Energy adequacy	0.691	0.001

DISCUSSION

In our study, a higher energy intake, more sufficient eating frequency, and a higher knowledge of nutrition significantly increases the level of energy adequacy. Conversely, a higher physical activity level will lower the level of energy adequacy. This finding signifies the importance of the adequate consumption of nutritious food for softball players. To achieve optimal physical and mental performance, athletes are recommended to consume food with sufficient energy to fulfill their nutritional needs.^{4,5}

Food consumption pattern reflects the quantity and type of food that is commonly consumed in a certain frequency and at particular time intervals.⁶ It relates to the eating habits learned in childhood and tends to remain in adulthood. Selecting foods that are rich in micro nutrients will reduce the risk of nutritional deficiencies that affect health.⁷ The energy required by athletes during exercise can be met through various sources of energy that can be stored in the body from burning carbohydrates and fats with a 5% contribution from protein breakdown.⁸ Carbohydrates can be stored in the muscles and liver as glycogen, which can be used as a source of fuel for the brain and muscles during physical activity.⁹ The right selection of food with fibre, various vitamins and minerals including vitamin B, iron, calcium and folate can help to ensure that the body has enough energy to move and recover from injuries.⁹

Knowledge of nutrition is associated with the consumption of nutritious foods. A previous study reported that good nutritional knowledge was significantly associated with a consumption of a low-fat diet.¹⁰ Another study found that higher nutritional knowledge was strongly associated with reading nutritional information on food products.¹¹ However, parental knowledge about milk products did not predict the amount of milk consumed.¹¹ Nutritional education for school children influenced changes in their dietary behavior after more than 2 years.¹²

Physical activity and exercise contributed to the total daily energy expenditure approximately between 25% and 50%.¹³ Active transportation (walking and cycling) is inversely associated with overweight or obesity.¹⁴ Continuous physical exercise require athletes to maintain a balance between food intake, energy expenditure and additional energy from high physical activity.¹⁵ Specific aspects such as the type of sport, special skills or player position, training schedules and competition calendars, categories and special objectives, which differ from the general population, must be considered when determining the daily energy expenditure.¹⁵

In the second relationship analysis between infectious disease, energy adequacy and nutritional status, both showed a negative and positive relationship respectively. Malnutrition, as well as overnutrition, may affect the immune response to infection.¹⁶ On the other hand, infectious diseases also affect nutritional status, including anorexia, gastrointestinal disease, and other chronic or parasitic infections leading to anemia.¹⁷

Food intake will affect the performance of athletes, where athletes with a poor nutritional status cannot be optimal in their performance.¹⁸ In relation to training, energy adequacy should balance with the increased energy expenditure in order to maintain the athlete's recommended nutritional status.¹⁹ Other physiological conditions that determine the athlete's performance including heart rate, blood pressure, somatotype and hydration status should be taken into account.²⁰⁻²²

Other variables studied in the present research including vegetarianism, caffeine/soft drink consumption, fast food consumption, and food restrictions had no correlation with energy adequacy. However, low vegetable consumption but the high consumption of fast food and caffeine or soft drinks among softball players in the present study should be highlighted. Soft drinks can stimulate the appetite or suppress satiety because of the high glycemic index.²³ A previous study in the United States found a positive relationship between the consumption of soft drinks and energy intake.²⁴ Similarly, fast food has been rapidly accepted, especially among students and young people, due to the convenience, good taste, and quick preparation as well as massive advertisements as reported in studies conducted in India and Australia.^{25,26} Low food intake, an unbalanced household food distribution, and recurrent infections are among the main causes of malnutrition, however, food restriction and poor understanding about food significantly contribute to malnutrition.^{27,28}

CONCLUSION

Softball players are required to achieve optimum performance during both training and competition. A higher energy intake, more sufficient eating frequency, and a higher knowledge of nutrition are significantly correlated with an increased level of energy adequacy. Conversely, a higher level of physical activity will lower the level of energy adequacy. Moreover, suffering from infectious disease as well as having poor energy adequacy is significantly correlated with low nutritional status among softball players. Therefore, managing their consumption patterns and energy adequacy is crucial for softball players.

Ethical Clearance: Ethical approval was granted by the School of Public Health in Airlangga University, Surabaya.

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Conflict of Interest: Nil.

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ABSTRACT

Softball is a competitive sport which requires the players to have a combination of strength, speed and agility. Nutrition and hydration can have a significant impact on the performance of the softball players. The present study aimed to analyse the relationship between consumption patterns, nutritional knowledge, physical activity, and nutritional adequacy with the nutritional status of softball players. An analytic observation within a cross-sectional study design was employed on a sample of 20 softball players from Surabaya State University. The respondents were recruited through simple random sampling. The research variables included energy intake, eating frequency, vegetarian diet, caffeine or soft drink consumption, fast food consumption, food restrictions, infectious disease, nutritional knowledge, energy adequacy and nutritional status. The anthropometric measurements of the athletes were used including body weight and height, consumption pattern data using the 2x24 hours recall method and a food frequency questionnaire, physical activity data using the IPAQ (International Physical Activity Questionnaire) method, and data on knowledge and infectious diseases using a questionnaire. Energy adequacy was calculated by comparing the average energy consumption with the Nutrition Adequacy Rate. Nutritional status was measured using Body Mass Index (BMI). The data was analysed to examine the relationship between the explanatory variables and the dependent variables using the Spearman Rank Correlation Test. Energy intake, eating frequency, and the knowledge of nutrition had a positive significant correlation with energy adequacy. Physical activity was negatively correlated with energy adequacy. Infectious disease was negatively correlated with nutritional status, while energy adequacy was positively correlated with nutritional status.

Keywords: *consumption pattern, athletes, energy adequacy, nutritional status, Indonesia*

INTRODUCTION

Softball requires athletes to have a combination of strength, speed and agility, in addition to sharp focus, quick reactions and a determination to win. An appropriate dietary intake is crucial for softball players to build their physical strength and to improve their athletic performance.¹ Strategies used to enhance the adequacy

of energy can help to maximise exercise and muscle performance. The nutrient intake required by an athlete is determined by the exercise load, the athlete's specific needs, training objectives, body composition, health and the growth of young athletes.² A balanced nutritional diet in accordance with the exercise requirements is beneficial for softball players. The energy and carbohydrate intake of players should be adjusted with the daily exercise load.

Sources of nutrient intake during softball exercise are recommended to come from highly nutritious foods such as cereals, fruits, vegetables, low-fat dairy products, lean meats and poultry, fish, nuts, seeds, nuts and so on. The consumption of food with a low nutritional value such as soft drinks, snacks, cakes, biscuits, and fried foods should be restricted or limited. Meal timing is the key to success. Portion control and inter-meal intervals can help to improve nutrient absorption and regulate appetite.

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METHOD

Our study employed an analytic observational research approach using a cross-sectional design. The population in this study was made up of softball players from the State University of Surabaya. The research sample included 20 active softball players. We applied simple random sampling to recruit the participants.

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The data was analysed using both descriptive and inferential statistics. The Spearman Rank Correlation Test was used to assess the relationship between all of the independent variables and nutritional status. The statistical analysis was done using the SPSS program version 22.

RESULTS

The consumption pattern can be seen using the type of food and eating frequency questionnaire, as shown Table 1. More than half of the respondents (55%) consumed staple food (rice) twice a day. Protein-based foods were meat, poultry or eggs or soya beans in the form of tempeh and tofu consumed twice a day by most

of the respondents (60% and 50% respectively). Most of the respondents only ate vegetables once a day (45%). Most of the respondents consumed fruit twice a week (50%) and milk three times a week (60%).

Table 1: Type of food and eating frequency

n = 20

Type of food	Eating frequency	n (%)
Grains (rice)	2 times a day	11 (55)
	3 times a day	9 (45)
Meat, poultry, eggs	1 time a day	7 (35)
	2 times a day	12 (60)
	3 times a day	1 (5)
Legumes/beans	1 time a day	2 (10)
	2 times a day	10 (50)
	3 times a day	8 (40)
Vegetables	1 time a day	9 (45)
	2 times a day	5 (25)
	3 times a day	6 (30)
Fruits	1 time a day	3 (15)
	2 times a week	10 (50)
	3 times a week	7 (35)
Milk	1 time per day	4 (20)
	3 times a week	12 (60)
	never	4 (20)

Based on the information of the type of food and eating frequency, the researchers calculated the estimated energy intake. Table 2 shows that the average food consumption of the respondents was 2892.25 ± 323.30 kcal with a meal frequency of 1 – 2 times a day. Most respondents rarely had a vegetarian diet (50%) and one focused on fast food (90%), but they often consumed caffeine or soft drinks (50%). Most of them had no dietary restrictions (90%) and had not had any infectious diseases within the last 3 months (65%). The majority of the respondents had good energy adequacy (65%), moderate physical activity (55%), and normal nutritional status (85%).

Table 2: Variables of the respondent’s characteristics

Variables		n (%)	Mean ± SD
Energy intake (food consumption)	2500–2999 kcal	14 (70.0)	2892.25 kcal ± 323.30
	3000–3499 kcal	5 (25.0)	
	3500–4000 kcal	1 (5.0)	
Eating frequency	1-2 times a day	11 (55.0)	
	3 times a day	7 (35.0)	
	>3 times a day	2 (10.0)	

Conted...

Vegetarian diet	Never	7 (35.0)	
	Rarely	10 (50.0)	
	Frequent	3 (15.0)	
Caffeine/ soft drink consumption	Never	1 (5.0)	
	Rarely	8 (40.0)	
	Frequent	10 (50.0)	
Fast food consumption	Rarely	18 (90.0)	
	Frequent	2 (10.0)	
Food restriction	No	18 (90.0)	
	Yes	2 (10.0)	
Infectious diseases	Never	13 (65.0)	
	Rarely	3 (15.0)	
	Frequent	4 (20.0)	
Knowledge of nutrition	Good	12 (60.0)	
	Poor	8 (40.0)	
Energy adequacy	Good	13 (65.0)	
	Poor	7 (35.0)	
Physical activity	low (< 600 MET- minutes a day)	1 (5.0)	
	Moderate (600 - <1500 MET- minutes a day)	11 (55.0)	
	High (1500 - <3000 MET- minutes a day)	8 (40.0)	
Nutritional status	Underweight (BMI: <18.5)	2 (10.0)	
	Normal (BMI: 18.5 - <24.9)	17 (85.0)	
	Overweight (BMI: 25 - <27)	0	
	Obese (BMI ≥27.0)	1 (5.0)	

Remark: MET : Metabolic equivalents; BMI : Body Mass Index

Table 3 shows the relationship between the explanatory variables and energy adequacy. The significant relationship was shown by the p-value <0.05. Each variable of energy intake, eating frequency, and knowledge of nutrition showed a significant positive correlation coefficient with energy adequacy. Conversely, physical activity had a significant negative

negative correlation coefficient to energy adequacy. A higher level of physical activity will reduce the level of energy adequacy.

Table 3: The relationship between the explanatory variables and energy adequacy

Variables	Correlation Coefficient (r)	p-value
Energy intake	0.619	0.001
Eating frequency	0.736	0.000
Vegetarian dietary	-0.100	0.676
Caffeine/soft drink consumption	0.131	0.582
Fastfood consumption	0.000	1.000
Food restriction	-0.245	0.299
Knowledge of nutrition	0.599	0.005
Physical activity	-0.536	0.015

Table 4 shows that there was a significant negative correlation (p value <0.05) between infectious diseases and energy sufficiency with nutritional status. Getting an infectious disease will lower the participant's nutritional status. The energy adequacy had a positive significant correlation coefficient with the nutritional status. Having better energy adequacy will improve their nutritional status.

Table 4: The relationship between energy adequacy, infectious disease and nutritional status

Variables	Correlation Coefficient (r)	Sig.
Infectious disease	-0.568	0.009
Energy adequacy	0.691	0.001

DISCUSSION

In our study, a higher energy intake, more sufficient eating frequency, and a higher knowledge of nutrition significantly increases the level of energy adequacy. Conversely, a higher physical activity level will lower the level of energy adequacy. This finding signifies the importance of the adequate consumption of nutritious food for softball players. To achieve optimal physical and mental performance, athletes are recommended to consume food with sufficient energy to fulfill their nutritional needs.^{4,5}

Food consumption pattern reflects the quantity and type of food that is commonly consumed in a certain

frequency and at particular time intervals.⁶ It relates to the eating habits learned in childhood and tends to remain in adulthood. Selecting foods that are rich in micro nutrients will reduce the risk of nutritional deficiencies that affect health.⁷ The energy required by athletes during exercise can be met through various sources of energy that can be stored in the body from burning carbohydrates and fats with a 5% contribution from protein breakdown.⁸ Carbohydrates can be stored in the muscles and liver as glycogen, which can be used as a source of fuel for the brain and muscles during physical activity.⁹ The right selection of food with fibre, various vitamins and minerals including vitamin B, iron, calcium and folate can help to ensure that the body has enough energy to move and recover from injuries.⁹

Knowledge of nutrition is associated with the consumption of nutritious foods. A previous study reported that good nutritional knowledge was significantly associated with a consumption of a low-fat diet.¹⁰ Another study found that higher nutritional knowledge was strongly associated with reading nutritional information on food products.¹¹ However, parental knowledge about milk products did not predict the amount of milk consumed.¹¹ Nutritional education for school children influenced changes in their dietary behavior after more than 2 years.¹²

Physical activity and exercise contributed to the total daily energy expenditure approximately between 25% and 50%.¹³ Active transportation (walking and cycling) is inversely associated with overweight or obesity.¹⁴ Continuous physical exercise require athletes to maintain a balance between food intake, energy expenditure and additional energy from high physical activity.¹⁵ Specific aspects such as the type of sport, special skills or player position, training schedules and competition calendars, categories and special objectives, which differ from the general population, must be considered when determining the daily energy expenditure.¹⁵

In the second relationship analysis between infectious disease, energy adequacy and nutritional status, both showed a negative and positive relationship respectively. Malnutrition, as well as overnutrition, may affect the immune response to infection.¹⁶ On the other hand, infectious diseases also affect nutritional status, including anorexia, gastrointestinal disease, and other chronic or parasitic infections leading to anemia.¹⁷

Food intake will affect the performance of athletes, where athletes with a poor nutritional status cannot be

optimal in their performance.¹⁸ In relation to training, energy adequacy should balance with the increased energy expenditure in order to maintain the athlete's recommended nutritional status.¹⁹ Other physiological conditions that determine the athlete's performance including heart rate, blood pressure, somatotype and hydration status should be taken into account.²⁰⁻²²

Other variables studied in the present research including vegetarianism, caffeine/soft drink consumption, fast food consumption, and food restrictions had no correlation with energy adequacy. However, low vegetable consumption but the high consumption of fast food and caffeine or soft drinks among softball players in the present study should be highlighted. Soft drinks can stimulate the appetite or suppress satiety because of the high glycemic index.²³ A previous study in the United States found a positive relationship between the consumption of soft drinks and energy intake.²⁴ Similarly, fast food has been rapidly accepted, especially among students and young people, due to the convenience, good taste, and quick preparation as well as massive advertisements as reported in studies conducted in India and Australia.^{25,26} Low food intake, an unbalanced household food distribution, and recurrent infections are among the main causes of malnutrition, however, food restriction and poor understanding about food significantly contribute to malnutrition.^{27,28}

CONCLUSION

Softball players are required to achieve optimum performance during both training and competition. A higher energy intake, more sufficient eating frequency, and a higher knowledge of nutrition are significantly correlated with an increased level of energy adequacy. Conversely, a higher level of physical activity will lower the level of energy adequacy. Moreover, suffering from infectious disease as well as having poor energy adequacy is significantly correlated with low nutritional status among softball players. Therefore, managing their consumption patterns and energy adequacy is crucial for softball players.

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Compliance with Smoke-Free Legislation and Associated Factors: A Serial Survey in Bali, Indonesia

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ABSTRACT

This study aims to describe the compliance to the smoke-free legislation and to identify the associated factors. A cross-sectional study was conducted to assess the compliance at all smoke-free venues. A number of 5,500 smoke-free venues were involved. The data was collected on a six monthly basis through observation and interviews. The study observed 6,670 buildings. The compliance was 11.8% in the second semester of 2013 (1st) as the baseline, which increased to 62.0% in 2015 (5th). Meanwhile, the most common violations of smoke-free legislation were found to be cigarette butts, the provision of ashtrays and smoking. Factors that were associated with compliance were awareness, knowledge and support of the legislation and the presence of internal monitoring. The compliance with Bali's smoke-free legislation remains suboptimal, despite showing increasing trends over time. Hence, continuous education and supervision should be conducted for venue managers to increase compliance.

Keywords: *smoke-free legislation, smoke-free venue, compliance, Bali Indonesia*

INTRODUCTION

The tobacco epidemic and its products are one of the biggest challenges to public health in the world. Indonesia is the fourth highest country for the population of smokers in the world¹. The Basic Health Research Data in Indonesia (*Riskesdas*) in 2010 showed that the prevalence of smokers aged ≥ 15 years was 34.7% and this increased significantly in 2013 to 39.5%². According to the WHO's official report, it is estimated that the prevalence of smokers in Indonesia will increase again to 42.7% by 2020, where the prevalence of men is estimated to reach 82.5% and women 3.0%³. Also, the

prevalence of smokers is also high in Bali, which was 24.9% in 2007, which increased to 31.0% in 2010, and slightly decreased to 28% in 2013².

The WHO reported that cigarettes kill more than 7 million people per-year in the world, of which 6 million were active smokers and approximately 890,000 were non-smokers but exposed to second-hand smoke. It shows that the smoke not only endanger smokers, but also non-smokers³. Indonesia is the only country in Asia that has not ratified the WHO's FCTC. Nevertheless, tobacco control efforts have been undertaken and the establishment of smoke-free venues in 2011 was one of the important regulation in Indonesia. The legislation is important to reduce the harm from smoking among non-smokers and to provide healthy air to the community. There are seven venues which ruled as smoke-free: health facilities, schools, places of worship, children's playgrounds, work places, public places and public transportation⁴.

Since 2011, Bali also implemented smoke-free legislation, which was the first smoke-free legislation at the provincial level in Indonesia. After 3 years of

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implementation, the legislation has never been evaluated, particularly regarding compliance. Accordingly, this study aimed to describe the compliance to the Bali provincial smoke-free legislation and to identify the associated factors.

METHOD

A cross-sectional study was conducted to assess all smoke-free legislation criterias across five periods, from July 2013 to August 2015. The study was located in Bali, Indonesia, which has more than 14,700 smoke-free venues spread across the nine districts of Badung, Gianyar, Klungkung, Bangli, Karangasem, Tabanan, Jembrana, Buleleng, and Denpasar.

The sample size was determined based on the cluster recommendation ⁶. A total of 5,500 smoke-free venues (1,100 in each period) were included. The sample from each venue was determined by there being 150 schools, 100 health facilities, 400 public places, 100 children’s playground, 150 places of worship, 150 work places, and 50 public transportation vehicles and using systematic random sampling.

The data was collected using a form containing eight indicators: observed smoking (main indicator), the provision of designated smoking venues, the provision of ashtrays, the availability of no-smoking signs, observed cigarette butts, the observed smell of tobacco smoke, observed cigarette selling, and tobacco advertisements, promotions and sponsorships (secondary indicators) ⁶. Smoke-free venues were considered to be compliant if they met the eight compliance indicators, except for public places which were permitted to sell cigarettes and promote them through advertisements. Interviews were conducted with all venue managers. The data was collected by 44 trained enumerators, and was inputted using Epi-Data 3.1, analysed descriptively using STATA-SE 12.1, and tested using the Chi-square test.

RESULTS

Compliance with Smoke-free Legislation in the Provinces and Districts: The study observed 6,670 buildings from within 5,500 non-smoking venues in Bali over five periods. Generally, the surveys indicated an increasing trend of compliance over time, but not all having yet reached the target (80%). For the first period of the survey, compliance remained (11.8%).

However, in the next periods, compliance showed an increasing trend (2nd=17.2%, 3rd=25.9%, 4th=37.8%, and 5th=62.0%). Districts also showed a positive trend in compliance, with the highest being Tabanan (78.3%). There were two districts that showed low compliance; Badung (44.8%) and Gianyar (52.8%). Both districts have more public places such as hotels, restaurants and other public places (Figure 1).

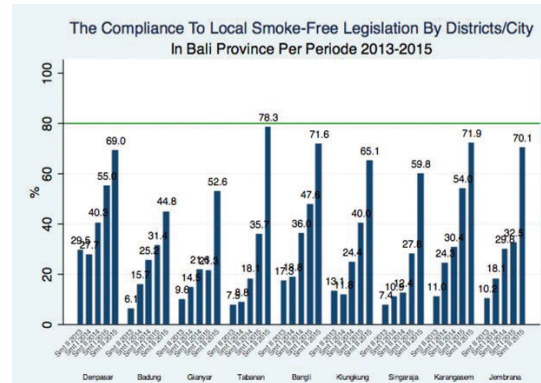


Figure 1: The compliance with smoke-free legislation in Bali by district

Compliance with Smoke-Free Legislation by Venue Type:

Figure 2 shows that the type of venue that has the highest increasing trend of compliance were children playgrounds (6.5%-90%), followed by health facilities (54.2%-88.8%), and education places or schools (12.4%-83.2%). Increased compliance was also shown in public places, although it was not as high as other venues. For example, compliance in restaurants increased from 0.7% in the first survey to 15.6% in the fifth survey. Hotels also showed improved compliance from 0.6% in the first survey to 38.4% in the fifth survey. Traditional markets showed compliance in the fifth survey at 32.3%, while the modern market had the highest compliance among the public places (10.3%-71.7%).

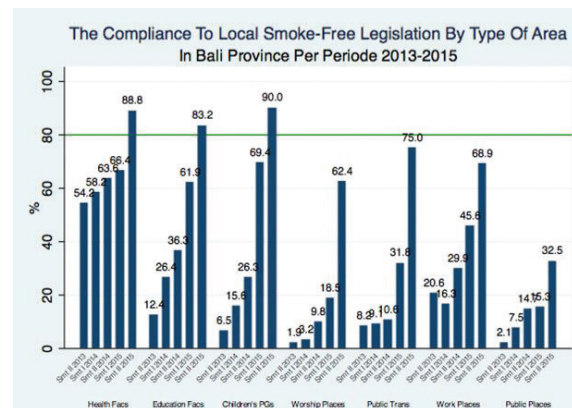


Figure 2: The compliance with smoke-free legislation in Bali by venue

No-Smoking Sign Coverage: In this study, we found that no-smoking sign coverage increased over the five periods of the survey (from 21.2 % to 77.8% respectively). However, compliance had not yet reached the target (100%).

Violations on the Implementation of Smoke-Free Legislation: The violations that were assessed in this study were also based on 8 indicators. The most common 3 violations were the cigarette butts found indoors, the provision of ashtrays and observed smoking indoors. Moreover, no decreasing trend in the violations was found in the five periods of the survey (Figure 3).

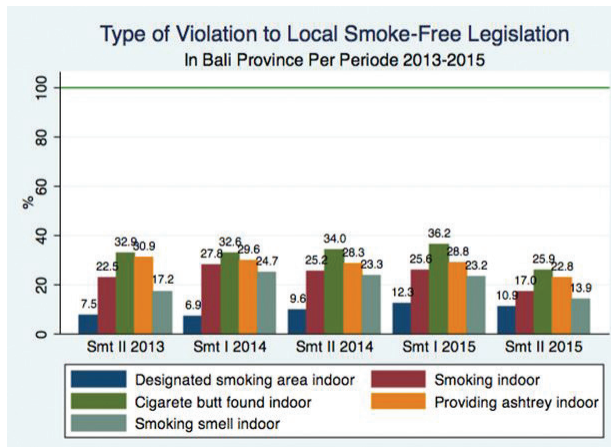


Figure 3: Type of Violation and the Smoke-Free Legislation in the Bali Provinces

Factors Associated with Compliance: The results showed that the factors associated with compliance were awareness regarding the presence of the legislation (PR=3.0), knowledge (PR=3.0), support of the legislation (PR=3.0) and the presence of internal monitoring (PR=2.1) (Table 1).

Table 1: Factors associated with the compliance to Bali’s smoke-free legislation

Factor	Comply		Prevalence Ratio (PR)	95% CI
	No	Yes		
Socialised				
No	2,093 (86.2)	334 (13.8)	ref	
Yes	2,326 (58.9)	1,625 (41.1)	3.0*	2.7-3.3
Knowledge				
Less	3,275 (82.3)	703 (17.7)	ref	
Good	1,142 (47.7)	1,254 (52.3)	3.0*	2.7-3.2
Support				
No	637 (89.1)	78 (10.9)		
Yes	3,770 (67.7)	1,876 (32.3)	3.0*	2.5-3.8

Conted...

Internal monitoring				
No	1,961 (74.8)	662 (25.2)		
Yes	845 (45.8)	1,001 (54.2)	2.1*	2.0-2.3

*p<0.01

DISCUSSION

The results showed that after three years, the overall compliance in Bali was suboptimal. Bali province is a famous tourist destination. Thousands of public places were built to support tourism. Meanwhile, public places are a very challenging venue in terms of policy implementation. Thus, the study was concerned with public places and workplaces ⁷ in which the low compliance was not only taking place in developing countries ⁸ opinions and compliance related to Uganda’s comprehensive smoke-free law among hospitality venues in Kampala Uganda. DESIGN This multi-method study presents cross-sectional findings of the extent of compliance in the early phase of Uganda’s comprehensive smoke-free law (2 months postimplementation; pre-enforcement, but also in developed countries ⁹.

The type of venues that had better compliance were health facilities, schools and children’s playground. The factors associated with compliance were including were strong commitment from the manager, the presence of an internal monitoring system, and better knowledge of the employees regarding smoking harm as well as concerns over patient safety and disruptions to care ¹⁰.

Compliance in public transportation, workplaces and places of worship showed a significant improvement despite still being below target (80%). It has proven that the awareness of community regarding the legislation has started to increase. Waddell et al emphasised the importance of contextual information for community education efforts on smoke-free legislation ¹¹. It is also necessary to change the individual perception regarding the legislation and the harm of second-hand smoke among community, which can affect the compliance and people’s health status ¹². In some schools, many teachers and administration staff members were found to smoke. This is ironic because they are a role model for the students, even though one study showed that the majority of students disagreed with the teachers’ smoking in the classroom and in their offices ¹³.

The venue that had compliance that was as low as public places was places of worship. In Bali, the places of worship were mosques, churches, monasteries, and pagodas. Temples in Bali are a semi-open venue, and many violations occurred, particularly observations of smoking and cigarette butts. Involving religious leaders and local wisdom could be an appropriate strategy in a social religious community like Indonesia, particularly in Bali ¹⁴.

One of the most important indicators in the policy is the availability of no-smoking sign. A study showed that smoke-free compliance in public places was suboptimal due to the absence of no-smoking signage ¹⁵ smoking aids, cigarette butts/bidi ends and smoking smell. Moreover, no-smoking signs being displayed had an effect on curbing smoking behaviour in public places ¹⁶. However, our study showed that the coverage of the signs remains below the target (100%). The absence of no-smoking signs could make visitors not aware of and thus violates the legislation, and indicates the absence of an internal monitoring system. Thus, installing no-smoking signs, removing ashtrays, and sweeping away cigarette butts is important to inform society of the descriptive norm that smoking is not a normal behaviour in the community ¹⁷. Other studies have emphasised that enforcement agencies should focus on the comprehensive removal of ashtray equivalents that could act as cues for smoking within a venue ¹⁸.

The better level of compliance in Denpasar, the capital of Bali, was because of the majority venue type being health facilities and government offices. It indicates that the performance of the tobacco control program in Denpasar was better than in other districts. Moreover, the communities in the urban venues had a better education level, were exposed to updated information, and were relatively more controlled. It corresponds with a study stating that the higher potential exposure to policy, the better the compliance level, because exposure to policy is one of the moderators to compliance ¹⁹. However, other studies showed that rural residents were more likely than those in urban settings to support local smoke-free legislation ²⁰.

Based on the interview, the managers exposed to smoke-free legislation had better knowledge, showed more responsibility and supported the legislation's implementation through an internal monitoring system. The system became the significant factor in increasing

compliance. Thus, it is necessary to strengthen the enforcement infrastructure and efforts as well as investing in minimal but essential enforcement resources ²¹. This finding should be followed by innovative monitoring and an implementation program for each type of venue. Another study also emphasised that the education level of the managers was an important determinant to ensure compliance with the smoke-free legislation ²².

Some of the managers, particularly from hospitality venues, were also worried regarding the economic impact of the smoke-free implementation. It was reasonable despite several studies that showed that banning smoking in the business sector has had no significant negative economic impact ²³. However, a study in the US stated that despite clear public health arguments and strong public support, the passing of smoke-free laws had stagnated and exemptions were being used to weaken the existing laws. Hence, the capability to make both a health and business case in support of smoke-free air laws may also bolster the case for expansion ²⁴.

CONCLUSIONS

The compliance with the local smoke-free legislation in Bali remains suboptimal, despite increasing over time. The suboptimal compliance is associated with education coverage, knowledge and the support of managers as well as their responsibility to conduct internal monitoring. The continuous and appropriate approach of education, supervision and mentoring should be done by and for managers and the community. Each district is recommended to establish an effective tobacco control team, which could educate and provide assistance regarding the implementation of smoke-free legislation in its region.

Conflict of Interest: None.

Ethical Clearance: The study achieved ethical clearance from the Ethical Committee of the Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia.

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The association of Pre-Pregnancy Body Mass Index (BMI) and Increased Maternal Weight in the Third Trimester of Pregnancy with Foetal Weight Estimation

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ABSTRACT

Poor nutritional status in pregnancy affects foetal growth, which can lead to low birth weight and subsequently have an impact on intergenerational malnutrition. The purpose of our study was to assess the relationship between pre-pregnancy body mass index (BMI) and increased maternal weight in the third trimester of pregnancy with foetal weight estimation. We employed an analytical observation study with a cross-sectional design. We used a total sample of all third trimester pregnant women in Tanggulangin Community Health Centre (CHC) in Sidoarjo, East Java, with a total of 349 women being recruited. The data was secondary, obtained from the maternal and child health status book of the study subjects and medical records. The data was analysed using the Spearman correlation test. Most women with normal pre-pregnancy BMI were multiparous. Pre-pregnancy BMI was significantly correlated with the foetal weight estimation. Low pre-pregnancy BMI increases the risk of low foetal weight. However, our study did not find a significant correlation between maternal weight gain during the third trimester and foetal weight estimation. Most of our study subjects had maternal weight gain of approximately 0.3 – 0.5 kg/week. Improving the nutritional status of women before and during pregnancy is crucial to achieve the recommended foetal weight.

Keywords: *body mass index, third trimester of pregnancy, maternal weight gain, fetal weight*

INTRODUCTION

Low birth weight (LBW) refers to the baby's weight at birth when it is below 2,500 grams.¹ LBW babies have a higher risk of neonatal mortality and morbidity including the risk of non-communicable diseases when they are older.¹ In 2013, approximately 22 million neonates or 16% of the total babies born globally had a low birth weight.² South Asia has the highest prevalence of LBW; an estimated 28% of the babies in the region.¹

The prevalence of LBW in Indonesia was estimated to be 10.2% in 2013, a decrease from 11.11% in 2010.³ Lack of nutrition before and during pregnancy may affect the incidence rate of LBW.² In line with the LBW incidence rate, the prevalence of Indonesian pregnant women with chronic energy deficiency (CED) was estimated to be 15% in 2013.³

Nutrition is important for pregnant women, not only to maintain their health but also to support foetal growth.⁴ The World Health Organisation (WHO) strongly recommends for pregnant women to take iron tablet, folic acid and calcium supplements to prevent LBW, preterm birth, puerperal sepsis and anaemia related to pregnancy.¹ A recent multi-country study found that some significant determinants of the incidence rate of LBW in developing countries included older maternal age, a lack of antenatal care (ANC), a lack of education, low socioeconomic status, and low body mass index (BMI).⁵ A previous study also reported that a low

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maternal weight marked by a BMI ≤ 19.8 kg/m² had a correlated increased risk of LBW by 1.8 times (95%CI= 1.1-2.9).⁶ This present study, therefore, aimed to examine the relationship between BMI, the maternal weight in the third trimester of pregnancy, and the estimated birth weight among women of the study setting.

METHOD

This study used an observational analytic research design with a cross-sectional approach. The sample population in this study were all third trimester pregnant women who attended Tanggulangin Community Health Centre (CHC) between March 2016 and April 2017. The selection of this setting was based on the 2015 health report of the Sidoarjo District Health Office, indicating that the LBW prevalence was 3.8%, the second highest in the district.⁷ As we applied total sampling, women who had a normal pregnancy and who had a complete record in the Maternal and Child Health status book and medical database were included in this study. In total, our study included 349 pregnant women. To collect the data, we used secondary data obtained from the MCH handbook and the medical records at the Tanggulangin CHC. The data was analysed using the Spearman Correlation test with the help of SPSS version 22.

RESULTS

As displayed in Table 1, 138 women were in their first pregnancy (primiparous), while 211 women were multiparous. The majority of primiparous women were aged between 21-25 years old (63.0%), while most of the multiparous women were aged between 26-30 years old (38.9%). Most of the primiparous and multiparous women were employed (67.4% and 51.2%, respectively), and had a high level of education (78.3 % and 73.5%, respectively). More than half of the primiparous and multiparous women also had normal pre-pregnancy BMI and had a weekly weight increase that was between 0.3 – 0.5 kg. The estimated foetal weight among the respondents was mostly between 2,500 – 3,500 grams (84.1% and 86.3% for primiparous and multiparous respectively).

Table 1: Characteristics of the respondents based on parity

Variables	Primiparous		Multiparous	
	n	%	n	%
Age (years)				
16-20	27	19.6	1	0.5
21-25	87	63.0	36	17.1
26-30	20	14.5	82	38.9
31-35	2	1.4	69	32.7
36-40	2	1.4	19	9.0
41-45	0	-	4	1.9
Employment				
Unemployed	45	32.6	103	48.8
Employed	93	67.4	108	51.2
Education				
Low	30	21.7	56	26.5
High	108	78.3	155	73.5
Pre-pregnancy BMI				
Underweight	47	34.1	38	18.0
Normal	75	54.3	117	55.5
Overweight	11	8.0	42	19.9
Obesity	5	3.6	14	6.6
Increased maternal weight (kg/week)				
0.1–0.29	15	10.9	49	23.2
0.3–0.5	81	58.7	124	58.8
0.6–1.0 kg	42	30.4	38	18.0
Estimated foetal weight (grams)				
2,200–2,400	22	15.9	29	13.7
2,500–3,500	116	84.1	182	86.3
Total	138		211	

Table 2 presents the comparison of the respondent’s characteristics based pre-pregnancy BMI, their increased maternal weight and the estimated foetal weight among the age group. Most of the respondents in all age groups had a normal pre-pregnancy BMI. Except for the age group of 16-20 years old, all of the age groups had a weekly maternal weight increase between 0.3 – 0.5 kg. All of the age groups also had an estimated foetal weight between 2,500- 3,000 grams.

Table 2: Pre-pregnancy BMI, increased maternal weight, and the estimated foetal weight based on age group

Variables	Age group (years) n (%)					
	16-20	21-25	26-30	31-35	36-40	41-45
Pre-pregnancy BMI						
Underweight	6 (21.4)	42 (34.1)	23 (22.5)	11 (15.5)	2 (9.5)	1 (25.0)
Normal	18 (64.3)	65 (52.8)	59 (57.8)	36 (50.7)	13 (61.9)	1 (0.0)

Conted...

Overweight	3 (10.7)	9 (7.3)	18 (17.6)	18 (25.4)	5 (23.8)	0 (0.0)
Obesity	1 (3.6)	7 (5.7)	2 (2.0)	6 (8.5)	1 (4.8)	2 (50.0)
Increased maternal weight (kg/week)						
0.1–0.29	6 (21.4)	14 (11.4)	16 (15.7)	20 (28.2)	7 (33.3)	1 (25.0)
0.3–0.5	9 (32.1)	58 (47.2)	57 (55.9)	43 (60.6)	11 (52.4)	2 (50.0)
0.6–1.0 kg	13 (46.4)	51 (41.5)	29 (28.4)	8 (11.3)	3 (14.3)	1 (25.0)
Estimated foetal weight (grams)						
2,200–2,400	8 (28.6)	13 (10.6)	16 (15.7)	10 (14.1)	3 (14.3)	1 (25.0)
2,500–3,500	20 (71.4)	110 (89.4)	86 (84.3)	61 (85.9)	18 (85.7)	3 (75.0)
Total	28 (8.0)	123 (35.2)	102 (29.2)	71 (20.3)	21 (6.0)	4 (1.1)

In Table 3, pre-pregnancy BMI and increased maternal weight were compared among the groups of women with different estimated foetal weight. Most of the women with LBW (estimated foetal weight between 2200–2400 grams) were underweight (54.9%), while most of the women with a normal estimated foetal weight also had normal pre-pregnancy BMI (57.4%). Most of the women in both estimated LBW and normal foetal weight groups had a weekly maternal weight increase between 0.3–0.5 kg (64.7% and 49.3%, respectively).

Table 3: Pre-pregnancy BMI, increased maternal weight and estimated foetal weight

Variables	Estimated foetal weight			
	2,200-2,400 grams		2,500-3,500 grams	
	n	%	n	%
Pre-pregnancy BMI				
Underweight	28	54.9	57	19.1
Normal	21	41.2	171	57.4
Overweight	2	3.9	51	17.1
Obesity	0	0.0	19	6.4
Increased maternal weight (kg/week)				
0.1–0.29	10	19.6	54	18.1
0.3–0.5	33	64.7	147	49.3
0.6–1.0 kg	8	15.7	97	32.6
	51		298	

We employed the Spearman Correlation test to analyse the correlation between pre-pregnancy BMI and estimated foetal weight as well as the correlation between increased maternal weight and estimated foetal weight. The results showed that the correlation coefficient of pre-

pregnancy BMI and estimated foetal weight was 0.294 (p-value = 0.001). The correlation coefficient value between weekly increased maternal weight in the third trimester and estimated foetal weight was 0.63 (p-value = 0.1). Pre-pregnancy BMI is significantly associated with estimated foetal weight, while increased maternal weight had no association with estimated foetal weight.

DISCUSSION

The results of our study showed that most of the respondents were aged between 21-30 years old, had a high level of education, and were employed. Most of the pregnant women with normal pre-pregnancy BMI were aged between 21-30 years old. Having normal pre-pregnancy BMI in this age range would be more likely to produce positive maternal and neonatal outcomes.⁸ Giving birth below 20 years old or older than 35 years old increases the risk of adverse pregnancy outcomes.⁸ Adolescence pregnancy would increase the risk of maternal and neonatal mortality due to having unstable emotions and a lack of nutrition, while an advanced maternal age of older than 35 years is associated with lower bodily resistance to various communicable and non-communicable diseases.⁹

The results of the present study indicate that most of the multiparous respondents (60.9%) had normal pre-pregnancy BMI. Having a normal BMI is very good for women who are planning for pregnancy.^{10,11} A previous study in Japan reported the increased prevalence of chronic hypertension and hypertension related to pregnancy among women with a BMI that indicated a status of being overweight or obese.¹¹ Women with a higher pre-pregnancy BMI are associated with the onset of pregnancy-induced hypertension.¹¹ Malnourished

pregnant women encounter the risk of LBW and low breastmilk production.¹² In our study, approximately 5.4% of the study subjects were obese before getting pregnant. Obese women in their second pregnancy have a higher risk of preeclampsia, caesarean delivery, and neonatal mortality.¹³

The results of this study indicate that about 65% of multiparous respondents experienced an increase in body weight during the third trimester between 0.3-0.5 kg/week. During the second and third trimesters of pregnancy, normally a woman gains weight by approximately 1 kg/week.¹⁴ Throughout pregnancy, a woman is expected to increase their weight up to 12.5 kg, depending on their pre-pregnancy weight and the type of pregnancy (single or multiple pregnancy).¹⁵ A pregnant woman requires additional calories; 180 kcal in the first trimester, and 300 kcal in the second trimester and third trimester.¹⁶

The results of this study indicated that about 61.1% of the multiparous respondents had an estimated foetal weight of 2500-3500 grams, so normal birth weight can be expected. Similarly, another Indonesian study reported that about 94.8% of pregnant women in their study had an estimated foetal weight of 2500-4000 grams.¹⁷ Foetal weight can be estimated using clinical methods, which is useful for low resource settings.¹⁸ Calculations using the clinical method have been widely used due to simplicity, low cost, and being user friendly. However, it is more suitable for normal pregnancy. To detect abnormalities and the well-being of the foetus, an ultrasound would be required.¹⁸

The Spearman Correlation test yielded a significant association between pre-pregnancy BMI and foetal weight estimation. According to Diouf (2011), pre-gestational BMI is helpful when estimating foetal weight.¹⁹ Women who have a low pre-gestational BMI are more likely to have an incidence of preterm birth by 20% in their first pregnancy and 40% in the second pregnancy.¹³ Pre-pregnancy BMI contributes to the shape of the independent relationship between maternal weight gain and preterm birth.²⁰

Our study did not find a significant correlation between maternal weight gain during the third trimester and foetal weight estimation. However, approximately 81.9% of the study subjects were expected to have normal a foetal weight estimation. Some possible explanations related to this finding were homogeneity or there being less variety in the data. In addition, there

are other external factors that may have influenced the results, such as maternal stress conditions, maternal work, maternal education, maternal age, ANC history, and socioeconomic level.²¹ Low maternal weight gain, especially among underweight women, increased the risk of low birth weight.²¹ Pre-gestational nutritional status and maternal weight gain are closely related to foetal growth and development, and birth weight.²²

Monitoring the nutritional status of pregnant women can be done by regularly measuring the weight gain during pregnancy. Maternal weight gain is used as an indicator to predict maternal and neonatal health outcomes.²³ Women with low maternal weight gain are advised to improve their nutritional intake to achieve a normal weight. Conversely, pregnant women with excessive body weight are recommended to have a balanced diet by reducing their intake of calorific foods and high fat.²¹

CONCLUSION

In our study, most of women were multiparous (n=211). From the characteristics of the study subjects, most of the primiparous women were aged between 21-25 years, while the multiparous women were aged between 26-30 years old. Most of the multiparous women were unemployed (51.2%) and had a high level of education (73.5%). Normal pre-pregnancy BMI was found mostly among the multiparous women (55.5%). Most of the multiparous women had gained weight during the third trimester ranging from 0.3 to 0.5 kg per week and were expected to have a normal foetal weight (2,500-3,500 grams).

Pre-pregnancy BMI showed a significant correlation with the foetal weight estimation, while no correlation was found between increased maternal weight and the foetal weight estimation. Women with normal pre-pregnancy BMI have more chance to have a normal foetal weight than women with lower or higher pre-pregnancy BMI. Therefore, nutritional supplements are highly recommended, not only during the pregnancy period but also during the pregnancy planning stage.

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The Effectiveness of Bay Leaf Extract (*Syzygium Polyanthum*) in Inhibiting the Growth of *Candida Albicans*

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ABSTRACT

Introduction: Fluor albus is derived from secretion of a woman's vagina and might be undergone by all women throughout the life cycle. Color and odor changes occur because of pathogenic microorganisms infecting it. The most common pathogenic microorganisms in fluor albus are *Candida albicans*. Bay leaves are easy to obtain and have been reported to contain effective antimold activities to inhibit the growth of *Candida albicans*. This research is aimed to know the effectiveness of bay leaf extract on inhibition of the growth of *Candida albicans* and to know which extract is effective in inhibiting *Candida albicans*.

Method: This research is in vitro experimental research with randomised group design. In this research there were eight kinds of extracts as treatment with three replications. Data were analyzed using ANOVA.

Results: The results showed that extraction with soaking in water for 24 hours had the highest inhibition on *Candida albicans* (12 no), and the young bay leaves extract dissolved by ethanol had the highest antioxidant capacity 11.273.41mg/L GAEdaAC).

Conclusions: Bay leaves have potency as alternative resources to inhibit the growth of microorganism in fluor albus occurrence. It is suggested to test the effectiveness of young bay leaves extracted with ethanol on *Candida albicans* on women with fluor albus.

Keywords: *Bay leaves, Candida albicans.*

INTRODUCTION

Fluor albus, or often referred to as vaginal discharge, is vaginal secretion in women. Leucorrhoea in women is physiological due to an increase in estrogen and progesterone hormones. Leucorrhoea is a thin and white mucus released through the vagina. This vaginal discharge usually comes out more and thicker during before and after menstruation, and when sexually aroused. However, if it is excessive and lacking in cleaning, it causes the area to become moist so that it tends to be attacked by bacteria or fungi. Humid and wet areas tend to be a medium for breeding pathogenic microorganisms.

Nearly 50% of the entire female population is affected by pathological vaginal discharge¹. The results of research conducted by Lingga (2011), stated that 75% of women in the world were affected by vaginal discharge and 45% of them had experienced it twice or more and 75% of Indonesian women experienced a once-in-a-lifetime vaginal discharge².

Leucorrhoea is also the most common complaint expressed by women, where vaginal discharge may be a sign of abnormalities in the female reproductive organs. Leucorrhoea can be divided into two types, namely physiological and pathological. Physiological leucorrhoea is a natural vaginal discharge, which occurs before and after menstruation and when there is an increase in sexual stimulation. Pathological leucorrhoea is a vaginal discharge that occurs continuously accompanied by the presence of odor and discoloration in the liquid.

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Color changes and odors smelled are due to the presence of pathogenic microorganisms (bacteria, fungi and viruses) that infect the vaginal discharge. The fungus that is the most common pathogenic microorganism in vaginal discharge is *Candida albicans*. *Candida albicans* is a type of fungus that grows in two forms: stem cells (blastospores) and pseudohyphae. This false hyphae that will continue to grow and multiply so that it will interfere with the organs on which it grows. Pseudohyphae live in groups or colonies which will cause unpleasant odors and give color to leucorrhoea and cause pathogenic or pathological leucorrhoea.

Pathological leucorrhoea will disturb the comfort of women. Itchiness that is felt tends to cause women to be anxious and scratching, which will have an impact on injury or blisters, which results in further infection. This situation results in a woman seeking help in treatment. The usual treatment is antifungals with the class of micostatin. But some practitioners also offer a variety of products to overcome this. Among them are many who use traditional medicine wherein the ingredients are all from nature, such as from growing plants. One of the most convenient and very easy to obtain is bay leaf.

Bay leaf (*Syzygium polyanthum*) is a leaf that is very easy to find by the community and commonly used as a cooking spice. Bay leaves have been shown to have antifungal properties. The content of chemical compounds contained in bay leaves include: flavonoids, tannins, essential oils, citral and eugenol³. Bay leaves are reported to contain antifungals which are very effective for inhibiting the growth of *Candida albicans*.

The formulation of the problem is: Is Bay Leaf Extract effective in inhibiting the growth of *Candida albicans*? The aim was to determine the effectiveness of bay leaf extract in inhibiting the growth of *Candida albicans* by testing the growth inhibition of *Candida albicans* by extracting water solvent, decoction, 95% ethanol and hexane and testing the ability to counteract free radicals with DPPH (2,2-diphenyl-1-picrylhydrazyl). The benefits obtained are in providing scientific information about the advantages of bay leaves in inhibiting the growth of *Candida albicans* fungi and providing information to the public to be able to utilize bay leaves, which are easily accessible, as an antifungal

in inhibiting the growth of *Candida albicans* fungi as a cause of infection in vaginal discharge (Fluor Albus).

METHOD

This research is an experimental laboratories study in vitro with a randomized block design⁴. with eight experimental treatments, namely young bay leaf extract with 24-hours of water immersion (ESAM); young bay leaf extract with boiling for 1 hour (ESRM); young bay leaf extraction with ethanol solvent (ESEM); young bay leaf extraction with hexane solvent (ESHM); old bay leaf extract with 24-hours soaking in water (ESAT); extracting old bay leaves with boiling for 1 hour (ESRT); old bay leaf extract with ethanol solvent (ESET); and old bay leaf extract with hexane solvent (ESHT).

Phase I of the research was conducted at the Food Technology Laboratory of Udayana University Denpasar and the Health Laboratory (Labkes) of Denpasar City. The implementation of this laboratory research was for three months from July to October 2017. The number of samples was determined by the Federer formula: $(t-1)(n-1) \geq 15$, $N = 3$ times replication. So, the number of samples was $8 \times 3 = 24$.

RESULTS AND DISCUSSION

a. Bay Leaf Extract: The making of the bay extract was started by sorting out by separating the old leaves and young leaves and the damaged leaves (dry, discolored or pockmarked). Damaged leaves will be discarded and not used and these are shown in the picture below. Old leaves will look darker and young leaves will look brighter. After being sorted, then washing is done and they are then dried with the aim of removing the water content in the bay leaf.

This drying process was undertaken to make it easier to carry out extraction because the water will interfere with the solvent in dissolving the active compound in the bay leaf; therefore, the water must be evaporated first by drying. After drying, it was then taken to the Udayana University Food Technology laboratory for extraction. The making of bay leaf extract in this study used several solvents including water, ethanol and hexan. The name of the sample along with the type of solvent can be seen in the table below.

Table 1: Name of the sample, type of solvent and solvent properties

No.	Sample name	Solvent	Solvent properties	Sample making method
1	ESAM	Water	Polar	Soak in water for 24 hours and extract.
2	ESRM	Water	Polar	Boil with water for 1 hour and extract.
3	ESEM	Ethanol	Polar	Extract with the addition of ethanol.
4	ESHM	Hexan	Non-polar	Extract with hexane addition.
5	ESAT	Water	Polar	Soak it in water for 24 hours and extract.
6	ESRT	Water	Polar	Boil with water for 1 hour and extract.
7	ESET	Ethanol	Polar	Extract with the addition of Ethanol.
8	ESHT	Hexan	Non-polar	Extract with Hexan addition.

Laboratory Test Results

a. Inhibition of bay leaf extract against

Candida albicans: This study showed that young bay leaf extract with 24-hour immersion treatment (ESAM) had the highest level of inhibition against *Candida albicans* (12mm). Other treatments did not show inhibition of the fungus. The inhibitory power of bay leaf extract against *Candida albicans* fungi can be seen in the table below.

Table 2: Inhibition of bay leaf extract against *Candida albicans*

No.	Sample name	Average inhibitory power (mm) *
1.	ESAM	12
2.	ESRM	0
3.	ESEM	0
4.	ESHM	0
5.	ESAT	0
6.	ESRT	0
7.	ESET	0
8.	ESHT	0
9.	Control	12

Description *): an average of three replications using Sabouroud media dextrose agar.

From the table above, the results can be concluded so that statistical tests are not carried out.

b. Antioxidant capacity: This study showed that young bay leaf extract using ethanol solvent (ESEM) had the highest antioxidant capacity

(11,273.41mg / L GAEAC) followed by old bay leaf extract with ethanol solvent (ESET) of 11,080.33mg / L GAEAC. Young and old bay leaf extracts which were soaked for 24 hours (ESAM and ESAT) had the lowest antioxidant capacity (70.94 and 291.22mg / L GAEAC, respectively). The average antioxidant capacity can be seen in Figure 1.

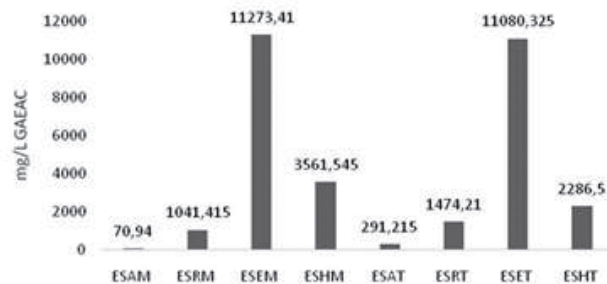


Figure 1: Antioxidant capacity of bay leaves

Description: GAEAC = Gallic acid equivalent antioxidant capacity

DISCUSSION

Bay leaves (*Syzygium polyanthum*) are rich in tannins, flavonoids and essential oils (0.05%) which consist of eugenol and cytral. The chemical components of the bay leaf have a functional role, including antimicrobial, anti-inflammatory, anti-fungal and analgesic compounds⁵.

Extraction of bay leaves aims to separate the active compounds from their original ingredients so that they have maximum functional activity. The extraction process uses a solvent to dissolve the active compound in the material according to the characteristics of the active compound to be separated. Polar solvents (such as water and ethanol) can separate active compounds in materials that are hydrophilic, while non-polar solvents (such as

hexane) are only able to dissolve active compounds that are hydrophobic. Shriner et al. (1980) state that polar solvents will dissolve polar solutes and non-polar solvents dissolve non-polar solutes or a so-called “like dissolve like” process⁶.

Candida albicans is known as a facultative anaerobic organism (it can live without the need for oxygen). The fungus lives in a fairly large range of pH 4.5 to 6.5, with optimal growth temperatures of 28-37°C. *Candida albicans* fungi can be inhibited by the addition of young bay leaf extract soaked for 24 hours (ESAM). From Table 1 above, ESAM samples (young bay leaf extract soaked with water for 24 hours) showed high inhibitory power against *Candida albicans* by 12mm as well as control inhibitory power (micostatin). Other samples showed no inhibitory power against *Candida albicans*.

This result is very interesting because the simple extraction method is by soaking in water for 24 hours, by which the young bay leaf extract can provide an inhibitory effect on *Candida albicans*. It is suspected that antimicrobial compounds, especially antifungal (*Candida albicans*), have polar (hydrophilic) properties that are easily soluble in water, and are found in young bay leaves. This is in line with research conducted by Hendradjatin (2009) who found soaked bay leaves (infusion of bay leaves) have an inhibitory effect on *V. cholerae* (minimum concentration of 3.12%), and pathogenic *E. coli* (minimum concentration of 12.5%).

Control inhibitory power (micostatin) against *Candida albicans* fungi is also high. Mikostatin is often used to reduce fungal growth. Koneman et al. (1988) revealed that the presence of the inhibition zone showed evidence that these microorganisms were susceptible to the influence of these types of antibiotics⁸. The greater the inhibition zone, the greater the effectiveness of these antibiotics in the treatment of these microorganisms.

The antioxidant capacity of an ingredient is the ability of compounds in these ingredients to reduce free radicals. The ability of these antioxidant compounds is much influenced by the presence of hydroxyl compounds found in these materials, such as phenolic compounds. These components can inhibit oxidation reactions and are able to capture free radicals⁹.

Extraction using ethanol on young and old bay leaves is able to dissolve the antioxidant compounds in bay leaves more optimally than using non-polar hexane

solvents. This shows that most of the antioxidants in bay leaves have high polarity (hydrophilic). The ability of ethanol to dissolve antioxidant compounds in bay leaves is also more optimal than by dissolving with water or boiling. Dissolving antioxidant compounds in bay leaves with water for 24 hours produces very little antioxidant capacity, as well as boiling.

Interestingly, this study shows that the high antioxidant capacity of bay leaf extract samples was not directly proportional to its ability to inhibit *Candida albicans*. ESEM and ESET samples with the highest antioxidant capacity did not have inhibitory power against *Candida albicans*. In contrast, ESAM samples having the lowest antioxidant capacity, actually have inhibitory power against *Candida albicans*.

CONCLUSIONS

Extraction with 24-hour immersion (ESAM) had the highest level of inhibition against *Candida albicans* (12mm). Young bay leaf extract using ethanol (ESEM) solvent had the highest antioxidant capacity (11,273.41mg / L GAEAC). Future studies can continue this research in subsequent clinical trials to see the effectiveness of selected extracts on *Candida albicans* found in women with pathological female vaginal discharge.

Ethical Clearance: Not required.

Source of Funding: This study is self-funded research project.

Conflict of Interest: None.

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The Presenting Symptoms as a Predictor of the Hospital Arrival Time Intervals of Patients with Acute Coronary Syndrome

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ABSTRACT

The hospital arrival time intervals of Acute Coronary Syndrome (ACS) patients is calculated from the onset of pain to arriving at the hospital. Various factors may affect the hospital arrival time interval including the presentation of symptoms. The purpose of this study was to analyse the relationship between the variables of presenting symptoms and the hospital arrival time intervals among ACS patients at Karsa Husada Batu Hospital and Dr. Soepraoen hospital in Malang, East Java, Indonesia. The research method employed was an analytical observation with a cross-sectional approach. Using a purposive sampling technique, a total sample of 26 ACS patients were recruited. The study was conducted between February and May 2018 (3 months). The significance of the association was set up as having a p-value of less than 0.05. From the data analysis, we found that the presenting symptom variables of provocation, radiation, severity, accompanying symptoms and time were significantly associated with the hospital arrival time interval. Quality and location were not significantly associated with the hospital arrival time interval. ACS patients who experienced pain symptoms with triggers, felt the pain spreading, had a higher level of severity, had accompanying symptoms, and felt continuous pain might have a shorter hospital arrival time interval than their counterparts. Presenting symptoms is a crucial factor to reduce the hospital arrival time interval. Therefore, patients and their families should recognise all aspects of the ACS symptoms.

Keywords: *Acute coronary syndrome, presenting symptoms, hospital arrival time interval*

INTRODUCTION

Acute coronary syndrome (ACS) is an incident in the coronary arteries caused by thrombosis due to unstable atherosclerotic rupture. It includes ST-segment elevation myocardial infarction (STEMI), non-ST-segment elevation myocardial infarction (NSTEMI) and unstable angina (UA). ACS, along with coronary artery disease (CAD), accounted for approximately seven million deaths per year between 1990 and 2010 in the

Asia-Pacific, with more than half of the deaths taking place in less developed countries.¹ In the United States, coronary heart disease (CHD) is the major cause of cardiovascular disease (45.1%) which accounts for one in seven deaths annually or more than 360,000 deaths per year.² By the end of 21st century, the CHD prevalence is estimated to increase by 120% among women and by 137% among men in developing countries.² Among hospitalised patients in Indonesia, cardiovascular disease accounted for the highest proportion of deaths from non-communicable diseases (9.5%) in 2010.³

ACS patients require immediate treatment to avoid further damage to the tissue. However, many patients arrive too late at the hospital or delayed to seek treatment.⁴ Previous studies showed that pre-hospital delays are common around the world. Pre-hospital delays range from approximately under 2 hours in Spain, 2 hours and 10 minutes in China, 2.2 hours in the US, 6 hours in India, and 7.8 hours in Jordan.⁵⁻⁹ The hospital

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arrival time interval is calculated from the onset of pain until the patient's arrival at the hospital.

Presenting symptoms are one of influential factors related to the pre-hospital delay of ACS patients. Public awareness related to the severity and urgency of the presenting symptoms of ACS is generally low.⁸ Nurses and paramedics reported that patients usually confuse the presenting symptoms with digestive disorders or gastrointestinal problems. Additionally, cardiologists viewed that the pre-hospital delay was usually because of the patients' misinterpretation about the presenting symptoms of ACS, thus only getting the medical examination after the symptoms worsened.⁸ Another study found that patients with a history of severe pain and a history of other diseases were more likely to have a shorter pre-hospital delay.¹⁰ Therefore, our study aimed to explore the relationship between the presenting symptoms and the hospital arrival time of the ACS patients who were hospitalised in two different hospitals in Malang, Indonesia.

METHOD

We applied an analytical observation design with a cross-sectional approach. The sampling technique employed was non-probability sampling in which the study subjects were purposively selected and recruited. The study population was ACS patients who were admitted to the emergency department and hospitalised in Karsa Husada Batu General Hospital and Dr. Soepraoen district hospital in Malang, Indonesia. The data collection was conducted for 3 months starting between February and May 2018. Our study recruited 26 ACS patients. We utilised primary and secondary data for the purpose of this study. The primary data was obtained from structured interviews with the respondents, while the secondary data was generated from medical records. The data was analysed statistically using the Fisher test, except for the presenting symptom variables of quality and severity which were examined using the Chi-square test and the Spearman test respectively. All statistical tests used SPSS 23.0 for the Windows Evaluation Version program. The significance level was set up at 95% (p-value < 0.05).

RESULTS

Table 1 describes the characteristics of the respondents. Most of the respondents were older than 55 (53.8%), male (69.2%) and married (84.6%). More than half of the

respondents had completed their education at elementary or junior school level and worked in the private sector or were self-employed. The majority of respondents were diagnosed with non-ST-segment elevation myocardial infarction (NSTEMI) (84.6%). Health insurance was the major type of hospital payment used by the respondents (73.1%). Most of the patients were on their first attack (73.1%) and were admitted directly to the emergency department without a medical referral (73.1%). At the time of attack, most of the respondents were at home (92.3%) and with their family (84.6%).

Table 1: Characteristics of the study subjects (n= 26)

Variables	n	%
Age		
<55 years	12	46.2
>55 years	14	53.8
Gender		
Female	8	30.8
Male	18	69.2
Education		
No education	2	7.7
Primary/junior school	14	53.8
High school	6	23.1
Junior college	2	7.7
Higher education	2	7.7
Medical diagnosis		
STEMI	4	15.4
NSTEMI	22	84.6
Payment of hospital		
Self-pay	7	26.9
Health insurance	19	73.1
Occupation		
Unemployed	6	23.1
Government employee	7	26.9
Private/self-employed	13	50.0
Marital status		
Married	22	84.6
Single/divorced/widow	4	15.4
Number of attack		
First	19	73.1
Second	5	19.2
Third or more	2	7.7
Referral		
Yes	7	26.9
No	19	73.1

Conted...

Situation		
Alone	3	11.5
With family	22	84.6
With community	1	3.8
Place of attack		
At home	24	92.3
At prayer room	1	3.8
On a travel	1	3.8

Table 2 presents the distribution of the respondents based on the presenting symptoms. The majority of the respondents reported that the symptoms were without any triggers (53.9%) by feeling a heavy pressure (50.0%) that was substernal (53.8%). The majority of respondents experienced non-spreading symptoms (53.8%) with a severity level between 7 to 10 (57.7%). Most of them reported having no accompanying symptoms (57.7%) with the present symptoms being intermittent (on-off) (53.8%).

Table 2: Distribution based on the presenting symptoms (n=26)

Variables of the Presenting symptoms	n	%
Provocation		
With triggers	12	53.9
Without triggers	14	46.1
Quality		
Burning	9	34.6
Heavy pressure	13	50.0
Sharp/stabbing	4	15.4
Location		
Substernal	14	53.8
Left chest	12	46.2
Radiation		
Non-spreading	14	53.8
Spreading	12	46.2
Severity		
Scale of 1,2,3	0	0
Scale of 4,5,6	11	42.3
Scale of 7,8,9,10	15	57.7
Accompanying symptoms		
No	11	42.3
Yes	15	57.7
Time		
Continuous	12	46.2
Intermittent	14	53.8

From Table 3, most of the respondents (n=19) had a hospital arrival time of more than 120 minutes. This means that they came to hospital over 2 hours after the feeling of pain began. However, from the raw dataset, it was found that the average time interval was 7.6 hours (not shown in the table). Among the variables of the presenting symptoms, five variables including provocation, radiation, severity, accompanying symptoms, and time showed a significant association with hospital arrival time.

Table 3: The summary of the relationship between the presenting symptoms and the hospital arrival time of the ACS patients

Variables of presenting symptoms	Hospital arrival time		p-value
	<120 minutes n (%)	>120 minutes n (%)	
Provocation			
With triggers	0 (0.0)	12 (63.2)	0.005
Without triggers	7 (100.0)	7 (36.8)	
Quality			
Burning	2 (28.6)	7 (36.8)	0.902
Heavy pressure	4 (57.1)	9 (47.4)	
Sharp/stabbing	1 (14.3)	3 (15.8)	
Location			
Substernal	5 (71.4)	9 (47.4)	0.261
Left chest	2 (28.6)	10 (52.6)	
Radiation			
Non-spreading	6 (85.7)	6 (31.6)	0.021
Spreading	1 (14.3)	13 (68.4)	
Severity			
Scale of 1,2,3	0 (0.0)	0 (0.0)	0.006
Scale of 4,5,6	1 (14.3)	10 (52.6)	
Scale of 7,8,9,10	6 (85.7)	9 (47.4)	
Accompanying symptoms			
No	7 (100.0)	8 (42.1)	0.010
Yes	0 (0.0)	11 (57.9)	
Time			
Continuous	6 (85.7)	6 (31.6)	0.021
Intermittent	1 (14.3)	13 (68.4)	

DISCUSSION

From the sociodemographic characteristics of the present study, most of the ACS patients were male,

aged older than 55 years old, educated up to primary school/junior school level, were currently married, and were employed. For the presenting symptoms of ACS, most of the respondents complained about feeling a heavy pressure that occurred substernal but that did not spread to other areas of the body. While most of the respondents reported arriving at the hospital 2 hours after the presentation of symptoms, the average hospital arrival time was 7.6 hours. This high average hospital arrival time is quite alarming for the patient safety. An arrival time of more than 4 hours after the onset of the symptoms delays thrombolytic therapy, which reduces the opportunity for reperfusion.⁴ A study in Ireland reported that the average hospital arrival time of ACS patients was 4.06 hours, ranging from 2.7 hours for STEMI patients, 4.51 hours for N-STEMI patients, and 5.5 hours for AU patients.¹¹

Our study results found that the variables of provocation, radiation, severity, accompanying symptoms, and time were significantly associated with the hospital arrival time. Other variables of location (location of pain) and quality did not show a significant association with hospital arrival time. The variable of provocation reported that most of the respondents (n=14) experienced pain symptoms without a trigger. When the arteries constrict due to atherosclerosis, the heart may still get enough oxygen to pump blood when at rest. On the other hand, exercise increases the work of the heart and the narrowed arteries may not be able to supply enough oxygen to the heart. A person with a narrowed coronary artery may experience unstable angina while exercising or working hard.¹²

Most of the study respondents (n=14) also reported the pain not spreading to other areas around the chest such as the neck, back, arms, and upper arms. Three out of four patients diagnosed with STEMI experienced a spreading of the pain. Ischemic chest pain is classically described as spreading from the chest to one or both arms. A person with the presenting symptom of pain spreading from the chest to the shoulder or both arms is more likely to have ACS by 4 times.¹¹ However, no association was found between the spread of chest pain with hospital arrival time interval.¹¹

In our study, almost half of the respondents experienced pain symptoms on a scale of 7, 8, 9 or 10. A study by O'Donnell et al. found that the faster onset of ACS (marked by the presence of chest pain, symptoms that appear suddenly, persistent symptoms, and symptoms of severe pain) had a shorter hospital

arrival time interval of less than 2 hours.¹⁴ Patients with fast onset ACS are more likely to immediately seek help from the hospital than patients with slow onset ACS.¹⁴ Another study also reported that 20% of ACS patients immediately went to hospital after experiencing an increased level of pain.¹⁰

The presence of accompanying symptoms is associated with the hospital arrival time interval. This finding supports the results of a previous study, stating that ACS patients with accompanying symptoms of chest pain and diaphoresis were more likely to arrive at the hospital faster than those without accompanying symptoms.¹⁵ The sicker patients may seek treatment more quickly than lesser pained patients.

In our study, most of the respondents reported intermittent pain symptoms (n=14). Continuous pain is associated with a shorter hospital arrival time interval. This result confirmed the previous finding that continuous symptoms are significantly associated with shorter delay times related to hospital arrival in all groups (STEMI, NSTEMI, and AU).¹¹ In an ACS patient with typical angina, a feeling of tension is present in the retrosternal area, spreading to the neck, jaw, inter-scapular area, left arm, shoulder or epigastrium.¹⁶ In contrast, non-cardiac chest pain tends to be in the middle or lower abdominal area, in the chest area especially in the left ventricular apex or costochondral meeting and then spreading to the lower extremities.¹⁶

CONCLUSIONS

In this present study, more respondents arrived at the hospital after 120 minutes of presenting symptoms. The average hospital arrival time interval was 7.6 hours after the patients started to feel pain. The presence of triggers, the spreading of pain, the high level of severity, and the accompanying symptoms as well as continuous pain were associated with a shorter hospital arrival time interval. To reduce the hospital arrival time interval, patients and their families should be educated about the presenting symptoms. However, factors other than the presenting symptoms that may affect the hospital arrival time interval should be considered in future studies.

Ethical Clearance: Ethical approval was granted by the School of Public Health in Airlangga University, Surabaya.

Source of Funding: Self-funding.

Conflict of Interest: Nil.

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Factors Influencing the Husband's Participation in Pregnancy Care in Surabaya City, Indonesia

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ABSTRACT

Pregnancy is an event starting from conception and ending with the onset of labour. To promote the maternal outcome of healthy mothers and babies, husbands are encouraged to increase their participation in pregnancy care. This study aimed to analyse the determinants of the husband's participation in pregnancy care. This study employed an observational analytic research methodology with a cross-sectional design. The study sample size was 20 pregnant women attending Mulyorejo public health centre in Surabaya city, Indonesia. The sample was selected using the random sampling technique. The respondents were the husbands of the recruited pregnant women. The data was collected using a self-reported questionnaire. The statistical test used was multiple logistic regression analysis. The results of the data analysis showed that the knowledge of pregnancy care and level of education were significantly associated with the husband's participation in pregnancy care (OR= 0.014 and OR=0.033, respectively). The variables of level of income and parity had no significant relationship with the husband's participation in pregnancy care. Motivating husbands to increase their support of pregnancy care is crucial to improving the positive maternal and neonatal health status.

Keywords: husband's participation, pregnancy care, antenatal care

INTRODUCTION

By 2012, the Maternal Mortality Rate (MMR) in Indonesia was still high at 359 per 100,000 live births. It decreased to 305 per 100,000 live births in 2015.¹ Meanwhile, the rate of attending the minimum four antenatal care (ANC) visits has decreased from 87.48% in 2013 to 85.35% in 2016.¹ The 2012 Indonesian Demographic and Health Survey (IDHS) reported that approximately 79% of men accompany their pregnant spouses to ANC.² This report also presented that about 68% of pregnant women selected health facilities as their place of delivery.²

To improve maternal and child health status, the Indonesia Ministry of Health (MoH) strongly

recommends a minimum of four ANC check-ups by health professionals.³ During ANC, the health professional measures the body weight and height, blood pressure and mid-upper arm circumference, and fundal height. Pregnant women receive tetanus toxoid immunisation, iron tablet, and health counselling.³ Health professionals provide health education especially related to pregnancy care, danger signs in pregnancy, childbirth preparedness, early breastfeeding initiatives and exclusive breastfeeding, neonatal care, and family planning advice.³ Pregnancy care is intended to help the mother maintain her health and the health of her foetus through promoting self-care behaviour such as bathing, cutting of the nails, cleaning their intimate organs, breast care, brushing their teeth, having the recommended prenatal care, adopting nutrition management, regularly doing pregnancy exercises and adequate rest.^{3,4}

Husbands are advised to accompany their wives during ANC.³ The husband is expected to recognise any signs of pregnancy complications and to actively arrange transport and the place for delivery.⁵ Knowing the danger signs in pregnancy is crucial to obtain immediate treatment and to prevent severe morbidity and mortality.^{6,7} Some studies highlighted the reasons

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of maternal death including delays in managing complications during labour due to delays of the husbands in making the decision to seek medical help in a health facility.^{8,9} A lack of communication between the husband and wife also affects the pregnancy outcome.¹⁰ A previous study on *Suami Siaga* or Alert Husband in Indonesia found that husbands who were engaged in discussions to arrange transport, a place of delivery, blood transfusion, and delivery cost were more likely to accompany their wives to ANC and tended to have their wives give birth in a health facility.¹¹

Surabaya is one of the biggest cities in Indonesia, with a population of approximately 2.9 million in 2015.¹² Surabaya has successfully decreased the maternal mortality rate from 119.15 per 100,000 live births in 2013 to 85.72 per 100,000 live births in 2016.¹³ In addition, approximately 96.6% of pregnant mothers had an ANC visit at least once.¹³ This success was partly contributed to by the Surabaya 1000 First Days of Life program, which aimed to educate engaged or newly married couples about reproductive health.¹³ Considering the significant role of the husband in promoting maternal health, the purpose of this study was to examine the determinants of the husband’s participation in pregnancy care in Surabaya city.

METHOD

We employed an observational analytic research study using a cross-sectional design. The study took place in the Mulyorejo sub-district of Surabaya City, East Java between October and November 2017. The sample population was 39 pregnant women attending Mulyorejo public health centre during the study period. Using a random sampling technique, we recruited 20 respondents to participate in the study.

The data collection was conducted using a self-reported questionnaire targeting the husbands of the pregnant women participating in the study. The independent variables included knowledge of pregnancy care, level of education, level of income, and parity. The dependent variable was the husband’s participation in pregnancy care (0=less participate, 1=fully participate). The data was statistically analysed using multiple logistic regression.

RESULTS

As shown in Table 1, most of the husbands fully participated in pregnancy care (65%). Most of them

also had good knowledge of pregnancy care (65%). The majority of husbands had a high level of education or had at least graduated from senior high school (70%) and had a high level of income. Most of them had 1 – 2 children (60%).

Table 1: Characteristics of the husbands

Variable	n	(%)
Husband’s participation		
Full participation	13	(65)
Lesser participation	7	(35)
Knowledge of pregnancy care		
Good	13	(65)
Poor	7	(35)
Level of education		
High education	14	(70)
Low education	6	(30)
Level of income		
High	15	(75)
Low	5	(25)
Parity		
1-2	12	(60)
3-4	8	(40)

Table 2 displays the relationship between the independent variables and the husband’s participation in pregnancy care. Knowledge of pregnancy care and level of education had an inverse association with the husband’s participation in pregnancy care. Husbands with a higher knowledge of pregnancy care were 71 times less likely to participate in pregnancy care (OR=0.014) than husbands with less knowledge of pregnancy care. Husbands with a high level of education were 30 times less likely to participate in pregnancy care (OR=0.033) than those with a low level of education. The other variables of level of income and parity had no significant association with the husband’s participation in pregnancy care.

Table 2: Multiple logistic regression of the husband’s participation in pregnancy care

Variables	Husband’s participation		p-value	OR
	Less participation n (%)	Full participation n (%)		
Knowledge of pregnancy care				
Low	1 (8.0)	12 (92.0)	0.004	0.014
High	6 (86.0)	1 (14.0)		

Conted...

Level of education				
Low	5 (83.0)	1 (17.0)	0.011	0.033
High	2 (14.0)	12 (86.0)		
Level of income				
Low	3 (60.0)	2 (40.0)	0.191	
High	4 (27.0)	11 (73.0)		
Parity				
1-2	3 (25.0)	9 (75.0)	0.258	
3-4	4 (50.0)	4 (50.0)		

DISCUSSION

Knowledge of pregnancy care: The results of the logistic regression analysis showed that knowledge of pregnancy care was significantly associated with participation in pregnancy care. However, the higher the knowledge, the less they participated in pregnancy care (OR=0.014). Participation in pregnancy care was measured by the husband’s active support of their wife in maintaining a healthy life style throughout pregnancy, such as taking vitamin A and iron tablets, controlling their sugar and salt intake, eating nutritious food, and accompanying their wives to ANC visits. According to Baston and Jennifer (2012), pregnant women should gain weight, least 11-15 kg throughout pregnancy, eat healthy food, and consume supplementary food such as vitamin A, D, folic acid, and iron tablets.⁵ Pregnant women are restricted when consuming salt, no more than 6 grams a day, > 300 mg of caffeine per day, and no smoking or being exposed to smoke.⁵

Husbands may think that their wives also have good knowledge about pregnancy care, and therefore they expect their wives to know what to do without their involvement. A previous study in Kenya reported that the men’s reluctance to participate in prenatal care was due to the perception about the exclusive female role in pregnancy support.¹⁴ Another previous study in Indonesia reported that the husbands were busy at work, which limited their participation in prenatal care.¹⁵ On the other hand, the husband’s advice for their pregnant wives on not working too much had been considered sufficient participation in pregnancy care.¹⁵

The husband’s participation in pregnancy care may positively influence maternal health. The wives would be emotionally supported and motivated to maintain

their health by undertaking activities that are beneficial for pregnancy.¹⁶ The husband is the closest relative to the wife, and therefore has an important role in helping their wife to manage a healthy pregnancy.¹⁷

Based on this result, to promote the husband’s participation, despite the importance of knowledge in pregnancy care, improving the husband’s motivation to participate in prenatal care should be encouraged. Acquiring knowledge may lead to behaviour change, therefore motivating the husbands to take part in pregnancy care should be promoted.¹⁸

Level of education: Education is a strong predictor of ANC utilisation as reported in many studies.^{11,19,20} In this present study, level of education was significantly associated with the husband’s participation in pregnancy care. A study in Egypt found that the woman’s level of education was significantly associated with an awareness of the danger signs of pregnancy.¹⁹ The higher level of the husband’s education was associated with the provision of financial support to allow them to attend prenatal care as reported by a study in Myanmar (OR= 6.08; 95% CI: 1.48–25.97).²¹

Using the datasets from a nationwide survey, a previous Indonesia study found that a higher level of women’s education increased the chance of delivery in a health facility by 2.6 times (95% CI: 1.4–4.6), however, no significant association was found between the husband’s education level and their presence at ANC.¹¹ However, the results of our study showed that the high level of education reduced the chance of the husbands to participate in pregnancy care. Husbands with a high level of education were those who had completed at least the secondary level of education. This finding suggests that there might be other more influential factors such as culture and belief that affect the willingness of the husband to participate pregnancy care.²² Future studies are recommended to include the aforementioned factors when assessing the husband’s participation in maternal health care.

Other non-significant variables; income level and parity: Previous studies in Indonesia and elsewhere highlighted the significant relationship between level of income and parity with the involvement of the husband being involved in maternal health.^{11,20} Having a higher level of income increased the probability of the likelihood of the husbands participating in ANC

visits. Facility-based delivery decreased along with the increase of parity.¹¹ A study conducted in a sub-district of Sumatra, Indonesia, described the mother's resistance to having an ANC check-up because of being ashamed for having more than three children, being afraid of being scolded by the midwives, and feeling confident from their previous pregnancy.¹⁵ However, the results of our study found there to be an insignificant relationship between the factors of level of income and parity, and the husband's participation in pregnancy care. The small sample recruited in this study may affect this result.

Having more children means that the husbands have more responsibility when it comes to taking care of their families. The husbands may experience stress due to financial problems and were worry about the future and their abilities as the household leader which may affect their relationships with their wives and other family members.²³

In a patriarchal community, a husband as the household leader has the obligation to meet the family's needs, including taking care of his pregnant wife. Despite the insignificant factor of income related to the husband's participation in pregnancy care, the financial aspect is important to ensure the women's access to maternal healthcare. Adequate access to maternal health care is important to achieve positive maternal and neonatal outcomes.²⁴ To support their wives, husbands are expected to ensure that their wives having sufficient nutritional intake and other supplementary food for pregnancy, and have enough exercise and rest. The husbands should also provide their pregnant wives with comfortable clothes and shoes that enable smooth blood circulation.²⁵ Maternal complication may occur from mild to severe.²⁶ Some common complaints of pregnant women include headache, nausea and vomiting, urination, diarrhoea, and stiffness in the hands and feet (swelling and leg cramps). Therefore, the husband's support is important to help the wives feel comfortable and stay healthy.

CONCLUSION

The husband's knowledge of pregnancy care and level of education are significant factors involved in influencing the husband's participation in pregnancy care, as described from the results of our study. However, both level of income and parity were found to have no significant relationship with the husband's participation

in pregnancy care. A good understanding of pregnancy care, however, does not always motivate the husbands to participate. Similarly, a high level of education does not always promote the husband's increased participation in pregnancy care. Other factors of culture and belief may have an important roles in encouraging the husbands to be more attentive to their wives needs during pregnancy.

Health professionals in this area and other similar settings should promote health education and counselling about prenatal care by involving the husbands. Husbands who accompany their wives to a health facility for ANC should be invited to be with their wives during any health examinations. By doing so, the husbands will understand the health status of their pregnant wives and will have the opportunity to discuss with the health professionals about planning the delivery and family planning after childbirth. We recommend for future studies to include the factors of culture, belief, and access to health professionals in examining the husband's factors in association with their participation in pregnancy care.

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