An Ontological Framework to Preserve Malay Indigenous Health Knowledge

Haryani Haron¹, M. Hamiz¹

¹Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA, 40450 Shah Alam, Selangor, Malaysia

In the society, science and technology are intimately linked to the studies and expansion in the general progression of the society. However, the Indigenous Knowledge (IK) which holds the same weight-age as the development of the society with science seems to be forgotten. IK is a knowledge that being used by the people in certain environments in making their living such as health, spiritual and agriculture. It is important because if the knowledge is not being preserved, the extinction will be faced with this valuable knowledge. Ontology intends to capture consensual knowledge in a nonspecific way which in can be reused and shared among the software applications and by the group of people. There is no specific way to preserve the knowledge itself but an appropriate search and retrieval mechanism such as an ontological model is important and needed to describe the concept of the Indigenous Knowledge which is scattered and unorganized. The scope of the Indigenous Knowledge in this paper is within on the Malay culture in Malaysia. The focus is on the Malay confinement dietary. This research targeted towards a better insight of the Indigenous Health Knowledge in Malay culture and society which focus on the Malay postpartum dietary. The ontological framework is divided into four main classes which is the food pyramid levels, allowed and not allowed food, nutrients lack, and preventive and permissive reasons. The classes will be linked to each other to see which foods are allowed or disallowed based on their permissive and preventive reasons. Besides that, the allowed food also will be relates to the food pyramid levels and the nutrients lack in the mother”s body in the postpartum period. By preserving this kind of knowledge, it is not only able to value but preserve their knowledge for future generation use.

Keywords: indigenous; knowledge; preservation; ontology; framework

1. INTRODUCTION

In this modern world, science and technology are really associated with human”s life. In the society, science and technology are closely linked feature for the studies and development in the general advancement of the society [1]. Since its rapid development, most of the new scientific knowledge had been developed day by day. Although modern science could be considered as one of the most important now, but [2] argue about it and stated that modern science cannot meet the hassles of the developing world without tie together with Indigenous Knowledge (IK). However, people tend to forget about IK and according to [3, 4], IK needs to be supported and promoted because it is a very sensitive issue that related to cultural and ethnicity of corresponding stakeholders.

There are lots of IK areas that can be captured to be made as a model such as agriculture and horticulture, astronomy, health, and many more [5]. IK needs to be captured and preserve as it can revitalise endangered of extinction culture, prolong and increase the community-based contribution of planning and development [6]. Through Information Technology (IT), the extinction of IK could preserve as there are lots of IT tools that can be used to capture, manage and disseminate the knowledge. Besides that, the lack of information about IK on the web [7] could be one of the alternatives in order to build an ontology model to preserve certain areas of IK.

The scope of the Indigenous Knowledge in this research is within on the Malay culture in Malaysia. The focus is on the Malay confinement dietary. There is a lot of important knowledge that can be captured from the traditional Malay midwife on what the mothers can eat under the confinement period as there are very strict rules being implemented from the greatest previous generation until now.

In real-world application, information is often fuzzy or confusing [8]. Hence, Yazici and George [9] came out
with numerous proposals to widen database model that maintains the ambiguity and vagueness of real-world application. The proposal then will be extended to ontological model which if been realized, will contribute much to certain area of research. Philosophically, ontology can be defined as the study that concerned with the existence of itself [10]. However in the IT context, it can be described as an explicit specification of conceptualization [11]. In short, ontology intends to capture consensual knowledge in a nonspecific way which in can be reused and shared among the software applications and by the group of people [12].

2. INDIGENOUS KNOWLEDGE

IK is tacit and the importance of capturing it had been highlighted by many literatures [13a, 14a]. It had been defined by as the knowledge that being used by the local people in certain environments in making their living. This statement agrees with Davis [15] and Ngulube [16] which stated that IK generally means as a traditional practices and culture which involve the beliefs, rituals and expressions of cultural values.

Previously, the IK were more emphasized on the technical IK. IK nowadays can be considered as cultural knowledge including the political, social, economic and spiritual aspects of life [17]. For instance, spiritual beliefs about certain nature may influence on how the resources being managed and how willing the people to adopt new resource management strategies [18].

There are lots of threats, limitations and issues that make the IK being hard to be retrieved and protected. According to Western Australian Law Reform Commission [19], the deficiency of protection on a nationwide level by all means of government becomes one of the major factors. Besides that, the influence of modern technology and education also becomes one of the threats to IK [16]. Moreover, the collection of IK information needs more of labour resources and time consuming which is really costly [20]. Besides that, since IK practices are not recorded previously and just being transmitted by mouth to mouth from generation to the next generation orally, the knowledge itself could be easily faded away [21].

In this paper, IK is focusing on the health category which falls into Malay confinement dietary. However, the data of the previous research on Malay confinement dietary are not available on exact maternal daily intakes for the assessment of energy intake and expenditure [22]. Hence, a proper storage and management is very important in order to make the information is available and accessible. If IK are not recorded and preserved, the probability of the knowledge lost and remain inaccessible is very high as IK is very important in any specific area of development and gives benefit to the society.

3. KNOWLEDGE MODELLING & ONTOLOGY

The means of the Knowledge Representation (KR) is to make the knowledge explicit [15]. There is an issue that always arises in KR which questioned on how to represent the knowledge. However, KR actually can be made to be independent of the fundamental knowledge model such as the semantic network [23, 24]. The ontology is an example of knowledge modelling which represent the knowledge in a manner which a computer can facilitate [25].

The role of ontology in Knowledge Management (KM) processes aids in knowledge creation, storage, retrieval, transfer, and application together with performance improvement [26, 27]. The importance to develop an ontological model is to share a common understanding and sensible structures of information, to make domain hypothesis explicit, to provide categorization structure, to enable reuse of domain knowledge and much more.

Developing ontology is similar to the essential set of data and their organization for other programs to use. A declarative approach to ontology is needed for the knowledge preservation because ontology is a method where the domain is represented in structured and may provide the benefits to those who implemented it [28].

4. POSTPARTUM KNOWLEDGE COLLECTION

Pregnancy and childbirth are practiced within a socio-cultural circumstance and the temperament of the experience, particularly for the mother, is shaped by the viewpoints and practices of her own culture [29, 30]. The term „traditional birthing practices“ is generally defined as all philosophy, behaviours, ceremony demonstrated during antenatal, labour and birth, and postnatal periods, which are commonly constructed and produced by the sensitivity and customs of that particular culture [31, 32].

The period of postpartum is considered as a very special phase experience for the women and her newborn. For women who experiencing childbirth for a very first time, probably the experience is marked as the most noteworthy and life-changing event that they have yet live [33]. It is noticeable by tough emotions, obvious physical changes, new and altered relationships and the conjecture of a modification to a new role of the social status of a woman to a mother [34]. The postpartum period is a public as well as a private occasion and has significance well further than the simple physiological dealings which make it. However, in both developing and developed countries, the attention given during pregnancy and birth had overshadowed the women’s and their newborn health during the postpartum period. The less care the mother gets, the poorer the quality of getting a better health. Therefore, the qualities of postpartum care are long-term ventures in the future well-being of women and their newborn [33].

Malay confinement traditions are focused on overturns the cold circumstances, which mother goes
through at childbirth [35]. In order to „dry” up the blood, „shrink” the swollen tissues, and prevent the internal bleeding, women lie on a „roasting bed” under which a fire burns on varying time a day. However, that particular practice is not practiced by Malay only, but, such heating practices are conceded out in other traditional cultures including Korean, Hmong and Turkish [31, 36]. Some cultures forbid the mother from baths normally and only allow the mothers to wash themselves in unique herbal preparations during the postpartum period to prevent the cold state from becoming established [31, 35, 36]. It is also being practiced traditionally for Chinese women where cold baths or showers are strictly prohibited to prevent from the sore bones and joints together with formation of blood clots [37, 38, 39].

The nutrient needs of human beings show a discrepancy according to age, weight, height, gender and daily activities. The study in 2005 Malaysian Recommended Nutrient Intakes (RNI) had classifies individuals into 33 age-gender collections and lists on a daily basis of the requirements for 15 [40]. There are much instructive involvement has focused on the pregnancy linked nutrition and health inconveniences [41, 42]. Normally, such edification programs are often not being preserved during the postpartum period. Postpartum period received not much consideration as compared with pregnancy and childbirth [43]. The postpartum period starts as soon as an hour after the deliverance of the placenta and includes the following six weeks [33]. By six weeks after the mother gave birth, most of the changes of labour, pregnancy, and delivery have been determined and the body has changed back to the non-pregnant condition [44].

A study by Poh et al. [45], the nutrients needed by the mother’s body were slightly different although most of the nutrients needed could be considered as almost the same. The result of the study is shown in Figure 1.

![Fig 1: Nutrients needed by postpartum mother](image)

Based on the Figure 1, positive views of the current interference include the nutrition information about the women improved to a great extent, thus the intervention has to optimally have constructive consequences on both the women themselves and their babies. The positive influences will facilitate the mothers form a foundation for good nutrition to be followed in afterwards years [46].

The restrictions on foods vary in different countries. However, a study by Poh et al. [45] for a Malaysian Chinese in Maternal and Child Health Clinics and Maternity Hospital, Kuala Lumpur shows that, most of the respondents were very particular on „hot” and „cold” type of foods which almost the same as study in Singapore Chinese by Naser et al. [47]. For Vietnamese postnatal by Le et al. [48], the study had been done in Anhti district, HungYen province and it shows that the mothers being interviewed are very scared to not follow restriction as it can lead to bad health later. The foods that are not allowed such as broccoli, watermelon, and lemon are being categorized with the reasons why the foods are not allowed.

There are lots of food categories that are prohibited during the postpartum period. Those studies revealed the prosperity of traditional birthing practices of Singaporean and Malaysian Chinese including the Vietnamese. It recognized that conventional birthing practices are important to women during the postpartum period.

5. RESEARCH METHODOLOGY

A research methodology is supposed to support the overall of research development. In this paper, the phases of research method are shown in Fig.2.

![Fig 2. Research methodology](image)

The research starts with literature review which will give a conceptual framework for Malay confinement dietary. Then, the data collection starts which using the interview method to obtain the data. The Malay traditional midwives are being interviewed to get the input based on the conceptual framework. From the midwives perspective, for the foods that being allowed and restricted, there is a reason behind them and it is been jotted. Besides that, the gynaecology and dietician are being consulted to analyse the food pyramid and deficiency in postpartum mother. Next, the data analysis using the conceptual analysis which in this research, the categories and patterns of Malay confinement dietary data are studied to produce a set of data representation that is used to get the proposed ontology framework.
6. PROPOSED ONTOLOGICAL FRAMEWORK

At this moment, the collection of Malay confinement dietary is unorganized and unstructured. There are few websites displaying the recipe for the mother in confinement period. The sources come from the experienced mothers. However, there is no preventive reason why the other foods which are not listed on the websites cannot be eaten by the mother during the confinement period. Hence, the data collection in this paper is to gather the data of the staple foods that are allowed and not allowed together with its reason from the traditional Malay midwife.

Data analysis may begin unofficially when frequent subjects and categories become main evident during interviews or observation session. The main purpose of data analysis is to describe the case and its setting in detail. In this paper, the categories and patterns of Malay confinement dietary data are studied to produce a set of data representation that is used to model the data.

From the data collection and analysis, the framework for preserving Malay postpartum dietary can be done which comprises of four main classes. The classes are the food pyramid, food, deficiency and reason. In the food pyramid class, there are four levels of sub classes which indicate the level in food pyramid which is the breads, cereals and grain level, the vegetables and fruits level, milk product and protein levels and fats, oils and sweets level. For the food class, the subclasses involve are the allowed and not allowed food. In deficiency class, the nutrients and vitamins lack are being listed such as calcium, iron, energy and so forth. Lastly, the reason class, the subclasses is the permissive and preventive reasons.

According to the classes, in Food Pyramid class, there are four basic levels which will be linked with Food class. The Food class also will be linked with the Deficiency class and Reason class. Based on the classes and its relationship, the proposed ontological framework for Malay health indigenous knowledge is as follows in Figure 3.

7. DISCUSSION

As the knowledge is not being preserved properly, it can lead to its extinction. In this paper, Malay confinement dietary is considered as the Malay indigenous health knowledge that needs to be preserved. Hence, a proposal of the ontological framework is hoping to overcome the problem. Based on the framework, the food pyramids subclasses are related to allowed and not allowed food class because every food will belong to its own food pyramid level. Besides that, the allowed food will be linked to permissive reason together with the nutrients and vitamin lacks. The link with the deficiency class is hoping to indicate that the food is permissible because of the body had a deficiency of certain vitamins and nutrients. For the non-permissible food, the link with the preventive reason class is to point out that the food is disallowed because of the reason listed in preventive class.

Hence, with this framework, clearer idea on how to preserve Malay confinement dietary knowledge ontologically is hopefully known and will not lead to its disappearance.

8. CONCLUSIONS

This paper explores the ontological framework of Malay indigenous health knowledge. The focus area is on the Malay confinement dietary. The qualities of postpartum care are long-term ventures in the future wellbeing of women and their newborn [33]. The ontological framework for case study is being proposed and it is contained four main classes and a few subclasses for every main class. Each of the subclasses will be linked to any other subclasses to show the relationship for every class. The food pyramid linked with the food class and the food class is related to reason and permissible class. By model this kind of knowledge, it is not only able to value but also will preserve their knowledge for future generation use.

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