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Research paper

Prevalence of insomnia and its associated factors among rural elderly: a community based study

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Abstract

Background: Insomnia is a common problem among older adults and can lead to several complications affecting the quality of life of elderly people.
Aim: To estimate the prevalence of insomnia and its associated factors among community-dwelling elderly.
Study design: This is a cross-sectional descriptive study carried out on 1059 elderly living in three villages affiliated to Mansoura District, Egypt. Data collected during an interview included: socio-demographic and clinical features, habits before sleeping, environmental factors that could affect sleeping, the geriatric depression scale and Athens insomnia scale. Logistic regression analysis was done to find out the independent predictors of insomnia.
Results: The prevalence of insomnia was 62.1%. The logistic regression revealed that insomnia is less likely among elderly of 75 and more (AOR=0.3) compared to those aged 60-75 years. The risk of insomnia is high among those with depression (AOR=6.4 and 14.6 for mild and moderate/severe depression; respectively), fear of death (AOR=14.7), life stressors (AOR=7.1), presence of musculoskeletal disorders (AOR=5.6), respiratory disorders (AOR=4.5), worry about children (AOR=4.5) and cold bedroom (AOR=2.7).
Conclusion: Slightly less than two-thirds of the studied subjects have insomnia, and most of the associated factors are preventable and/or controllable.
Recommendations: According to the results of the present study, the following recommendations are suggested: Design educational program for elders to enhance sleep through emphasizing on the importance of sleep hygiene practice, behavioral and non-pharmacological interventions, and healthy lifestyle.

Keywords: *Insomnia; Elderly; Risk Factors; Prevalence; Rural.*

1. Introduction

Sleep is one of the important aspects of life, and it allocates one-third of everybody's life span. Insomnia is one of the most important sleep problems among older adults. It is a chronic or acute sleep disorder characterized by a subjective complaint of difficulty initiating, and/or maintaining sleep, poor-quality sleep, or inadequate sleep duration (Kamel, Gammack, 2006; Buysse, 2011; Passos, 2011). Previous studies reported prevalence rates of sleep disorders to be ranged from 42% to 80% among elderly (Sukying, 2003;Shives, 2004; Tablosky, 2006; Rongve, 2010; Hosseini et al, 2011; Chen, 2012; Tsou, 2013). In Egypt, a study done among elderly living in a community in Alexandria City; reported that the prevalence of insomnia was 33.4 % (Makhlouf, 2007). Several changes that occur with the aging increase the risk for sleep problems, including comorbidity, greater medications use, age-related changes in various circadian rhythms, and environmental and lifestyle changes (Roepke, 2010).
However, previous studies suggested that sleep disturbances in the elderly may arise from a variety of psychosocial and biologic factors rather than aging (Tanaka, 2002; Shives, 2004; Rwin, 2008). Specifically, retirement from work generally results in fewer daily scheduled events, which may influence the timing of sleep and napping. Many aged individuals develop various health conditions such as nocturia, arthritis, headache, gastrointestinal illness, bronchitis, cardiovascular symptoms, diabetes, menopause, stroke, dementia, and depression, all of which have been shown to disrupt sleep in the aged (Hosseini, 2011).
Furthermore, medication side effects, physical disabilities, cognitive brittleness, reduced coping skills, death or disabilities of the spouse, financial strain, and stressful life events all may induce dysphoria, which then may result in sleep disturbances (Liu, 2005). The Gerontological nurse must understand normal sleep patterns and be able to identify common age-related changes in sleep patterns and common sleep disorders, to assess, plan, intervene, and evaluate appropriately and effectively. Also she should know the risk factors in order to apply appropriate measures based on accurate analysis for the problem (Reid, 2010; Morin, Benca, 2012). In Egypt, there is a dearth of information about sleep disorders among elderly specially those living in rural communities. Therefore, this study was carried out to determine the prevalence and the factors associated with insomnia among community dwelling rural elderly.

2. Aim of the study

To determine the prevalence and the factors associated with insomnia among community dwelling rural elderly.

3. Research question

What are the prevalence and factors associated with insomnia among community dwelling rural elderly?

4. Subjects and method

4.1. Research design

A cross-sectional descriptive design was used in this study.

4.2. Setting

It was carried out during period from May 1 to October 31, 2016 in three randomly selected villages (Awesh El-Hagar, Shoha and Menyet Sandoub) from 23 villages affiliated to El -Mansoura District, Egypt.

4.3. Subjects or sample

The target population is elderly of 60 years or more, of both sexes and able to comprehend and communicate.
Sample size was calculated by using (https://www.dssresearch.com/KnowledgeCenter/toolkitcalculators/samplesizecalculators.aspx). A previous study in Egypt found that the prevalence of insomnia among the elderly =33.6% (Shokry, 2014), with alpha error=5%, study power=80% and precision of 5%, the expected sample size should be 1059. These were distributed proportionally between the three villages according to the number of elderly registered in the local Family Medicine Centers (377 from Awesh El-Hagar, 352 from Shoha and 330 from Menyet Sandoub). From each village, elders were selected from the family files using a systematic random sample. Data was collected during an interview with the elderly at their home on a mutually agreed day and time as arranged by rural leader (Rayda Refia) affiliated to the local Family Medicine Center.

4.4. Tools for data collection

Tool 1: Study questionnaire covered the socio-demographic data, medical history of chronic diseases, habits before sleeping and environmental condition of sleeping room.
Tool II: The geriatric depression scale (GDS) short form:
This scale was developed by Sheikh and Yesavage (1986). It is 15 items self-reported instrument, used in the present study to assess depression and general wellbeing of the elderly. The scale was translated into Arabic and approved to be valid and reliable by Elhuseiny (2013). The older adult chooses the best answer either yes: one (1) or No: zero (0) for how he/ she has felt over the last week. From the 15 questions, 10 questions were indicating the presence of depression when answered positively, while the rest (question numbers 1, 5, 7, 11, 13) were indicating depression when answered negatively. Scores ranges from zero to 15, items are summed for total scores. Score from zero to 4 indicates no depression, score from 5 to 8 was indicating mild depression, and score from 9 to 11 was indicating moderate depression and score from 12 to 15 indicates severe depression.
Tool III: Athens insomnia scale (AIS):
This scale was developed by Soldatos et al. (2000). It is originally designed to assess the degree of insomnia through a detailed sleeping history during the last month. It was translated into Arabic and approved to be valid and reliable by Shokry, 2014; the inter-rater correlation coefficient of different items ranged from 0.7 to 0.9 with Cronbach's alpha of 0.73. The scale includes eight elements. The first five elements cover night-time symptoms of insomnia, while the last three elements ask for daytime consequences of disturbed sleep. The eight elements of this scale were ranked from zero (0) to (3), where zero (0) indicates no problem and 3 indicate very serious problem. The study subjects are asked to determine the severity of the complaints (absent = 0, mild = 1, severe = 2, and very severe = 3). The study subject who had a score of 6 or higher was considered as a positive case for insomnia.

4.5. Validity and reliability

The study tools were revised by seven experts (staff) in the field of gerontological nursing, psychiatric and mental health nursing, as a jury to test its content validity and feasibility, and the necessary modifications were done.

4.6. Pilot study

A pilot study was carried out on 20 elderly selected from El Baramon village, Mansoura to test clarity and feasibility of the tools; and the approximate time needed for the interview.

4.7. Ethical considerations

The study was approved by the Research Ethics Committee of the Faculty of Nursing, Mansoura University. An official permission was obtained from the directors of the Family Medicine Center in each village. Verbal consent was obtained from elderly persons after complete description of the purpose and nature of the study. Confidentiality of data, privacy was assured, and they were informed that data collected will be used only for the research purpose.

5. Limitations of the study

The possibility of recall bias cannot be excluded as there is no documented diagnosis of insomnia. Urban elderly were not included due to difficulty in approaching them. A national large-scale study will provide the full of insomnia in elderly.

6. Data analysis

Data were analyzed using SPSS (Statistical Package for Social Sciences) version 20. Variables were presented as number ofand percent. Chi square was used to test the significance in bivariate analysis and crude odds ratios (CRO) and their 95% CI were calculated. Variables significantly associated with depression were entered into a multivariate logistic regression model using forward Wald method. Adjusted OR and their 95% CI were calculated. $P \leq 0.05$ was considered statistically significant.

7. Results

The age of study subjects ranged from 60 to 91 years with a mean of 67.24 ±7.14 years.
Table (1): Show that, the prevalence of insomnia is 62.1% of the study subjects. The prevalence of insomnia is significantly lower in older age groups and those with just enough income (COR=0.6). However it is significantly higher in females (COR=2.0), housewives (COR=2.1), elderly living alone (COR=2.5) and still working elders (COR=2.4)
Table (2): Revealed that the presence of morbidities is associated with an increased risk of insomnia, COR were 2.1, 4.4, 2.2, 3.8, 11.5 and 6.3 for cardiovascular, musculoskeletal, gastrointestinal, urological and neurological disorders; respectively
Table (3): Shows that the risk of insomnia is higher with cold sleeping rooms (COR=3.7). Furthermore, day naps, night medication and changing clothes due to incontinence are associated with more risk of insomnia (COR=1.5, 25.2 and 3.0; respectively).
Table (4): Reveals that life stressors, worry about children, fear of death, fear of thieves, bad dreams, responsibilities/duties, mild depression, moderate/severe depression and caffeinated drinks before sleep are associated with increased risk of insomnia (COR=11.9, 7.2, 13.2, 15.5, 2., 11.5, 55.4 and 1.4; respectively).

However, night praying is associated with lower risk of insomnia (COR=0.6).

Table (5): The logistic regression revealed that the independent predictors of insomnia are older age groups (AOR=0.3), musculo-skeletal disorders (AOR=5.6), respiratory disorders (AOR=4.5), cold sleeping room (AOR=2.7), life stressors (AOR=7.1), worry about children (AOR=4.5), fear of death (AOR=14.7), mild depression (AOR=6.7) and moderate/severe depression (AOR=14.6).

Table 1: Prevalence of Insomnia and Its Variation with Socio-Demographic Characteristics of the Study Subjects

	Total	Insomnia N(%)	P	COR(95% CI)
Overall	1059	658(62.1)		
Age (years):				
60-	881	587(66.6)		1(r)
75-	135	59(43.7)	≤0.001	0.4(0.3-0.6)
85 +	43	12(27.9)	≤0.001	0.2(0.1-0.4)
Sex:				
Male	531	286(53.9)		1(r)
Female	528	372(70.5)	≤0.001	2.0(1.6-2.6)
Marital status:				
-Married	641	395(61.6)		1(r)
-Widow	383	236(61.6)	0.0	1.0(0.8-1.3)
-Others*	35	27(77.1)	0.06	2.1(0.9-4.7)
Level of education:				
-Illiterate	591	367(62.1)		1(r)
-Read and write	290	187(64.5)	0.5	1.1(0.8-1.5)
-Basic education	65	38(58.5)	0.6	0.9(0.5-1.4)
-Secondary education	71	42(59.2)	0.4	0.8(0.4-1.5)
-University education	42	24(57.1)	0.5	0.8(0.4-1.5)
Occupation before retirement:				
-Farmers	165	86(52.1)		1(r)
-Employees	314	179(57.0)	0.3	1.2(0.8-1.8)
-Housewives	449	311(69.3)	≤0.001	2.1(1.4-3.0)
-Others	131	82(62.6)	0.07	1.5(0.96-2.5)
Living condition:				
-Own home with family	634	389(61.4)		1(r)
-Own home alone	155	124(80.0)	≤0.001	2.5(1.6-3.9)
-With sons/relatives	270	145(53.7)	0.03	0.7(0.5-0.97)
Income:				
-Not Enough	483	329(68.1)		1(r)
-Enough	535	302(56.4)	≤0.001	0.6(0.5-0.8)
-Enough and safe	41	27(65.9)	0.09	0.9(0.5-1.8)
Still working: --No	1020	627(61.5)		1(r)
-Yes	39	31(79.5)	0.023	2.4(1.1-5.3)

*Single, divorced& separated COR=crude odds ratio CI=Confidence interval

Table 2: Variation of the Prevalence of Insomnia According to Clinical Data of the Study Subjects

	Total	Insomnia N(%)	Significance	COR(95% CI)
Cardiovascular disorders:				
No	640	355(55.5)		1(r)
Yes	419	303(72.3)	≤0.001	2.1(1.6-2.7)
Endocrine disorders:				
No	768	467(60.8)		1(r)
Yes	291	191(65.8)	0.15	1.2(0.9-1.6)
Musculoskeletal disorders:				
No	896	518(57.8)		1(r)
Yes	163	140(85.9)	≤0.001	4.4(2.8-7.0)
Gastrointestinal disorders:				
No	947	572(60.4)		1(r)
Yes	114	86(76.8)	0.001	2.2(1.4-3.4)
Respiratory disorders:				
No	985	595(60.4)		1(r)
Yes	74	63(85.4)	≤0.001	3.8(2.0-7.2)
Urological disorders:				
No	1021	622(60.9)		1(r)
Yes	38	36(94.7)	≤0.001	11.5(2.8-48.2)
Neurological disorders:				
No	1037	638(61.5)		1(r)
Yes	22	20(90.9)	0.005	6.3(1.5-26.9)
Ophthalmological disorders:				
No	1044	647(62.0)		1(r)
Yes	15	11(73.3)	0.4	1.7(0.5-5.3)
Cancer: No	1049	148(43.8)		1(r)
Yes	10	10(100.0)	0.013	Undefined

COR=crude odds ratio CI=Confidence interval

Table 3: Variation of the Prevalence of Insomnia According To Environmental Factors and Personal Habits of the Study Subjects

	Total	Insomnia N(%)	Significance	COR(95% CI)
Environmental factors				
Noise:				
No	582	357(61.3)	0.6	1(r) 1.1(0.8-1.4)
Yes	477	301(63.1)		
Hot sleeping room:				
No	679	419(61.7)	0.7	1(r)
Yes	380	239(62.9)		1.1(0.8-1.4)
Cold sleeping room: No	877	505(57.6)	≤0.001	1(r)
Yes	182	182(84.1)		3.7(2.5-5.6)
Excess lighting:				
No	889	549(61.8)	0.6	1(r)
Yes	170	109(64.1)		1.1(0.8-1.6)
Uncomfortable bed:				
No	975	600(61.5)	0.17	1(r)
Yes	84	58(69.0)		1.4(0.9-2.3)
Shared bed room:				
No	1024	633(61.8)	0.2	1(r)
Yes	35	25(71.4)		1.5(0.7-3.3)
Snoring:				
No	1021	633(61.8)	0.2	1(r)
Yes	38	25(71.4)		1.2(0.6-2.3)
Shared bed:				
No	1040	643(61.8)	0.13	1(r)
Yes	19	15(78.9)		2.3(0.8-7.0)
Personal habits				
Day naps:				
No	665	389(58.5)	0.002	1(r)
Yes	394	269(68.3)		1.5(1.2-2.0)
Taking medication at night				
No	1019	619(60.7)	≤0.001	1(r)
Yes	40	39(97.5)		25.2(3.4-184.2)
Changing clothes due to incontinence:				
No	1036	639(61.7)	0.041	1(r)
Yes	23	19(82.6)		3.0(1.1-8.7)

COR=crude odds ratio CI=Confidence interval

Table 4: Variation of he Prevalence of Insomnia According to Psychological Factors and Habits Before Bed Time

	Total	Insomnia N(%)	Significance	COR(95% CI)
Psychological factors				
Life stressors:				
No	805	422(52.4)	≤0.001	1(r)
Yes	254	236(92.9)		11.9(7.2-19.6)
Worry about children:				
No	643	299(46.5)	≤0.001	1(r)
Yes	416	359(86.3)		7.2(5.3-10.0)
Praying: No	757	494(65.3)		1(r)
Yes	302	164(54.3)	≤0.001	0.6(0.5-0.8)
Fear of death:				
No	857	468(54.6)	≤0.001	1(r)
Yes	202	190(94.1)		13.2(7.2-22.9)
Fear of thieves: No	987	589(59.7)		1(r)
Yes	72	69(95.8)	≤0.001	15.5(4.9-49.7)
Bad dreams: No	994	605(60.9)		1(r)
Yes	65	53(81.5)	≤0.001	2.8(1.5-5.4)
Responsibilities/duties:				
No	1018	617(60.6)	≤0.001	1(r)
Yes	41	41(100.0)		Undefined
Lack of privacy:				
No	1001	622(62.1)	1.0	1(r)
Yes	58	36(62.1)		1.0 (0.6-1.7)
Depression: No	552	208(37.7)		1(r)
Mild	438	383(87.4)	≤0.001	11.5(8.3-16.0)
Moderate/Severe	69	67(97.1)	≤0.001	55.4(13.4- 228.5)
Habits before bed time				
Drinking water:				
No	558	334(59.9)	0.11	1(r)
Yes	501	324(64.7)		1.2(1.0-1.6)
Eating:				
No	658	410(62.3)	0.99	1(r)
Yes	401	248(61.8)		0.98(0.8-1.3)
Watching TV and reading:				
No	685	419(61.7)	0.4	1(r)
Yes	374	239(63.9)		1.1(0.9-1.5)

Caffeinated drinks:				
No	773	464(60.0)	0.02	1(r)
Yes	286	194(67.8)		1.4(1.1-1.9)
Smoking:				
No	926	572(61.8)	0.5	1(r)
Yes	133	86(64.7)		1.1(0.7-1.7)
Reading in bed:				
No	1040	647(62.6)	0.7	1(r)
Yes	19	11(57.9)		0.8(0.3-2.1)

COR=crude odds ratio CI=Confidence interval

Table 5: Multivariate logistic regression analysis of independent predictors of insomnia

	β	P	AOR(95% CI)
Age (years): 60-	-		1(r)
75-	-1.1	≤0.001	0.3(0.2-0.6)
85 +	-1.1	0.039	0.3(0.1-0.9)
Musculoskeletal disorders:			
No	-		1(r)
Yes	1.7	≤0.001	5.6(3.1-10.2)
Respiratory disorders:			
No	-		1(r)
Yes	1.5	≤0.001	4.5(2.0-10.3)
Coldness:			
No	-		1(r)
Yes	0.98	≤0.001	2.7(1.5-4.6)
Life stressors:			
No	-		1(r)
Yes	2.0	≤0.001	7.1(4.0-12.9)
Worry about children:			
No	-		1(r)
Yes	1.5	≤0.001	4.5(3.0-6.8)
Fear of death:			
No	-		1(r)
Yes	2.7	≤0.001	14.7(7.4-29.3)
Depression:			
No	-		1(r)
Mild	1.9	≤0.001	6.7(4.5-10.0)
Moderate/Severe	2.7	≤0.001	14.6(3.2-65.8)
Constant	-1.6		
Model $\chi 2$	652.6, ≤0.001		
Per cent correctly corrected	82.9		

AOR=Adjusted odds ratio CI=Confidence interval.

8. Discussion

Insomnia is highly prevalent, especially at advanced age (Altena, 2010, Leger, 2010). Several factors, such as gender, age, socioeconomic status have been associated with the prevalence of insomnia. Aging is another significant factor associated with increased prevalence of insomnia (Ohayon 2002). Therefore, this study was carried out to determine the prevalence, and the factors associated with insomnia among community dwelling rural elderly. The present study revealed a high prevalence of insomnia among the studied subjects (62.1%). This proposes that insomnia should be deliberated for an important public health issue for elderly people. This result is in agreement with previous findings (Reid, 2006; Makhlouf, 2007; Enomoto, et al, 2010, Sabry, 2010, Jaussent, 2011). However, other studies in urban localities in Egypt reported a much lower rate of insomnia down to 33.4% (Bakr, 2012; Saber, 2013 and Shokry, 2014). This contradiction cloud be explained by differences in the socio-demographic characteristics of studied elderly.

The present study revealed that the risk of insomnia decreased significantly among older elderly compared to young elderly (AOR =0.3). It is can be rationalized by that the young elderly had some responsibilities and duties as housekeeping activities, providing care to their family members, and some of them especially male are still working. These findings come in agreement with some studies (Su, 2004; Tsou, 2013; Shokry, 2014). In contrast other studies reported significant association between increasing the age and sleeping quality and insomnia (Makhlouf, 2007; Wong, 2011; El Kady, 2012). However, Adetola et al (2014) found no association between age and insomnia.

Insomnia and other sleep disorders can occur as a consequence of chronic diseases. Chronic diseases correlate closely with various sleep disturbances in older adults. Medical conditions associated with chronic pain (e.g. arthritis, back pain), cardiovascular disease (heart failure), respiratory diseases, are known to be associated with chronic insomnia (Taylor et al, 2007). Moreover, the result of the present study is a good example of the reciprocal relationship between insomnia and health problems. As the subjects with chronic medical problems, especially musculoskeletal and respiratory disorders had a higher risk of insomnia than those without chronic medical problem. This can be explained by that insomnia may be associated with the symptoms of the chronic diseases or due to side effects of the drugs used to control them (Fernandez, 2002; Bloom, 2002 and Jaussent, 2011). These results agree with other studies (Anderson, 2006; Makhlouf, 2007; Shokry, 2014, Weronika et al, 2016).

Environmental conditions particularly uncomfortable low temperature can be problematic for older adults and significantly influence sleep patterns. The current study findings revealed that, the elderly who had feeling of coldness experiences insomnia than those who haven't. This in accordance with a study done in Egypt by Shokry (2014) who reported that coldness is the most environmental factors affecting the sleep.

Stress is an important issue related to insomnia (Akersted, 2006). The occurrence of stressful life events has been shown to be strongly associated to chronic insomnia (Robaina et al., 2009). The results from this study have shown that older people who are exposed to the pressures of life, and have worry over their children had a higher risk of insomnia compared with the elderly who are not exposed to these pressures. It is possible that the life stressors are associated with difficulty falling asleep, frequent arousals during the night and difficult returning to sleeping, which makes the elderly, anxious and frustrated. This is in agreement with other studies conducted by Makhlouf (2007), Morphy et al, 2007

Furihata (2011) and Leblanc (2015) who reported that insomnia was significantly correlated with daily stress events.

Death generates attitudes such as fear and anxiety for the majority of elders. The fear of death is a concept that is occurred in the dying process, and includes the fear of death itself and what happens after it. Some of the elderly think that waiting for death worse than death itself (Lehto, 2009). The present study revealed that the elderly who reported that they have fear of death are significantly associated with high risk of insomnia than those who haven't. This is in agreement with previous studies (Cacioppo et al., 2002; Stromberg 2008; Fitzsimons 2007; Suguna et al, 2015).

Depression is one of the most common psychiatric disorders among the elderly. It is a disabling pathological condition that is hugely damaging to the functional and social lives of elderly. Depression may also be strongly associated with sleep problems; people who are depressed take longer time to fall asleep (Hirst, 2015 and Gonzalez, 2016). The current study revealed that, the elderly who reported moderate and severe depression had a greater risk of insomnia than those who have mild depression. The depressed elderly may have less deep sleep; awaken more frequently during the night and earlier in the morning and feel less rested in the morning. This result is in agreement with other studies conducted (Makhlouf, 2007; Khater, 2008; Botts, 2009; Tsou, 2013; Shokry 2014).

9. Conclusion

Nearly two-thirds of the studied subjects have insomnia that is associated with multiplicity of preventive and/or controllable factors. Early detection and treatment of morbidities, especially musculoskeletal, respiratory disorders and depression will contribute to prevention of insomnia. Suitable temperature of sleeping room, control of life stressors, keeping children away from elderly during sleep and religious and psychiatric treatment of fear of death, all these will contribute to further prevention of insomnia. Special attention should be paid to be younger elderly. The nurse has an important and active role in teaching and motivating the elderly persons to participate in the exercise program, by emphasizing the benefits in terms of improves quality of life, maintaining and increasing functional abilities, improving flexibility and strength and improves sleep quality of the elderly.

10. Recommendations

According to the results of the present study, the following recommendations are suggested:

- Design educational program for elders to enhance sleep through emphasizing on the importance of sleep hygiene practice, behavioral and non-pharmacological interventions, and healthy lifestyle.
- In-service training program to all care providers about importance of sleep and the avoidance of risk factors of insomnia, and should take these factors into consideration, when dealing with older adults complain from insomnia and plan for adequate management of these factors may help in overcoming insomnia and its complication.

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