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Original Article

Predictors of Sleep Quality and Sleepiness in the Iranian Adult: A population Based Study

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Abstract

Introduction: Information on the sleepiness and sleep quality is limited for Asians. This study was conducted to determine the prevalence of sleepiness and sleep quality among the adult population in Iran.

Materials and Methods: This is a descriptive and explorative design study in which 1100 participants randomly selected from the Kerman city population in South –East of Iran. Using two questionnaires, Pittsburgh Sleep Quality Index (PSQI) and the Epworth Sleepiness Scale (ESS), sleep quality and prevalence of the sleepiness of samples was assessed.

Results: Our findings showed that the prevalence of sleepiness was 34.3%. Moreover, daytime sleepiness correlated with marriage status (p= 0.048), work shift (p= 0.0001), and work hours (p= 0.004). 57.5% of the participants reported that they have poor sleep quality. The mean and standard deviation of PSQI component scores are widely ranged. The lowest score belonged to "hypnotic medication use" component (mean= 0. 38), and the highest score belonged to "sleep duration" component (1.14 ± 0.90). Sleep quality also was found to be correlated with age (p=0.045), work shift (p= 0.0001), and work hours per day (p= 0.015). Pearson correlation coefficient showed a significant correlation between sleep quality and sleepiness (p=0.0001) among participants. According to Binary logistic regression results, the risk of sleepiness among participants with poor sleep quality was 4.2 times more than that among those who had good sleep quality.

Conclusions: The results indicate almost high prevalence of poor sleep quality and sleepiness among our study population. Therefore, improving the quality of population's sleep requires cultural preparation and public education through the media and also by well-educated nurses.

Keywords: Sleep; Population; Adult; Sleep Disorders

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Introduction

Sleep quality and daytime sleepiness are salient and clinically relevant dimensions of sleep-wake function. Poor sleep quality and insomnia symptoms have been associated with worse health, increased health care costs and utilization, absenteeism from work, and increased risk for psychiatric disorders, including depression .

Daytime sleepiness has been associated with increased risk of motor vehicle accidents, worse physical health, and increased mortality risk [1, 2, 3]. Sleep difficulties represent a common problem among the adult population. It has been shown that, in different countries, between 10% to 40% of the population suffer from insomnia [4]

Sleep quality and daytime sleepiness and their side effects have been discussed by many clinicians. These sleep problems have been found to be associated with health-related problems such as smoking, invasive and aggressive behaviors [5] and may activate the stress system with neurohormonal stress responses and can cause immune system alteration. They also affect cognitive and limbic systems [6, 7]. Furthermore, they may increase arousals [8], tension, irritability, depression, confusion and consequently caused lower life satisfaction [9].

According to Olutayo and Aloba, poor sleep quality and daytime sleepiness can result family economic burden [10].In the literature review two Asian studies, across a wide variety of populations were found that demonstrated the prevalence of poor sleep quality and daytime sleepiness [12, 13].

In a cross-sectional study, the overall prevalence of EDS among Korean people was found 12.2% (10.7% for men and 13.7% for women) [11] .In Japanese the prevalence rates of poor sleep quality were 26.4% for males and 31.1% for females [12]. In Iran Mousavi et al., conducted a study among the population of Shahrod in North-East of Iran, and examined their EDS. They reported that 13.9% of participants have severe and 41.6% have moderate sleepiness. They showed that 53% of participants have no sleepiness [13] Asghari et al (2012) also reported that 37.0% of urban community of Tehran categorized as poor sleeper [4].

Poor sleep quality and daytime sleepiness may have great consequences, including traffic and industrial accidents, decreased productivity, and interpersonal problems [14,15]. Yet despite these adverse consequences, information on the epidemiology of sleep quality and daytime sleepiness, as well as the relationship between them, is limited in the general population of Iran, especially in a large sample covering a wide range of ages. The aim of this study was to examine subjective sleep quality and daytime sleepiness in the Iranian adult.

Materials & Methods

Design

The study employed a descriptive, explorative design, and was conducted in Kerman city in South –East of Iran.

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Sample

The study sample consisted of population of Kerman city in South –East of Iran. A cluster random sample of 1100 adult people was gathered. The size of sample was selected based on previous published research [16, 17, 18, 19] using the same instrument and was assumed to be sufficient.

The instruments

Socio-demographic characteristics

First, a questionnaire was designed to obtain background information which was assumed to influence Sleepiness and sleep quality. It included questions about Gender, age, employment, marriage status, educational level, work hours per day, work shift.

Epworth Sleepiness Scale

The Epworth Sleepiness Scale was used to determine the level of daytime sleepiness. The ESS is a questionnaire that examines subjective sleep propensity [2] , which has been translated into 52 languages and were used in a wide range of population-based and clinical studies [3, 20, 21].

The ESS is a short questionnaire including eight items within individual rates on the likelihood that they would doze in eight common, quiescent situations. The response rate were ranged between 0 (would never doze) and 3 (high chance of dozing). The score of the ESS is the sum of ratings for the eight items [2, 20]. A sum of 9 or more from the eight individual scores reflect "very sleepy and should try to find medical advice [2].

The Pittsburgh Sleep Quality Index (PSQI)

The PSQI is a 24-item questionnaire. It is divided into seven components; sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medications and daytime dysfunction. The scores in seven subscales ranged between 0-3 (0= Not during the past month; 1= Less than once a week; 2= Once or twice a week; 3= Three or more times a week). The addition of these seven components yields a global score of subjective sleep quality. This scale estimate the prevalence rate of sleep problems (PSQI global score > 5) in the general Japanese adult population [22].

Validity and reliability of instruments

In earlier studies in Iran validity and reliability of both (PSQI, ESS) questionnaires were conducted by Farrahi et al., [23], Masoudzadeh et al., [24] They used content validity and alpha coefficients of internal consistency. The alpha coefficient for ESS was 0.70 and for PSQI was 0.88.

Procedure

The ethics committee of Kerman Medical university vice chancellor for research approved the study protocol (Ethical Code: A K /85/71), and informed consent was obtained for participants after the aims of the study were explained to them. They were also told not to state any name or other personal information on the questionnaires in order to secure confidentiality. The three questionnaires were completed by the participants.

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Statistical analysis

Data from the questionnaires were analyzed using the Statistical Package for Social Scientists (SPSS). Descriptive analysis was used to determine the characteristics of sample. Chi square and Pearson correlation coefficient was used to identify relationship between sleep quality and sleepiness. In addition, Binary logistic regression analysis was conducted to identify factors influencing EES and PSQI. The significance level was set to $P < 0.05$.

Results

Socio-demographic characteristic

The socio-demographic characteristics of the study subjects were shown in Table 1.

44.5% of participants were males and 55.5% were females. The mean age of participants was 34.05 years.

Table 1. Socio-demographic characteristics of study participants

Characteristics	N	%
Gender		
Male	528	44.5
Female	659	55.5
Marriage status		
Single	479	40.4
Married	658	55.4
Divorced	50	4.2
Work shift		
Yes	223	20.3
No	877	79.7
Work hours per day		
≤8	847	77
>8	253	23

Sleepiness

The prevalence of sleepiness among participants was 34.3% (Table 2). In ESS questionnaire, descriptive analysis showed that the highest score belonged to the items 5 (lying down to rest in the afternoon when circumstances permit) and 7 (sitting quietly after a lunch without alcohol).

Table 2. Sleep quality and sleepiness scores among participants

Variable		N	%
Sleepiness	Yes	406	34.4
	No	777	65.5
Sleep	good	494	42.5
quality	poor	668	57.5

According to chi square test there was a significant differences between marital status and sleepiness so that participants who were married, were more likely to be sleepy (p= 0.048). The results also showed the relationship between different work shift (day and night) and sleepiness. The participants who have night shift, have higher rates of sleepiness (p=0.0001). Furthermore, a significant differences found between work hours per day and sleepiness so that those who work more than 8 hour per day, were more likely to be sleepy (p= 0.004) than who work less than 8 hours per day. However, there was no significant differences between sleepiness

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and gender, age, education as well as employment (p= ≤0/05).

Sleep Quality

A descriptive analysis indicated that more than half of the participants (57.5%) reported poor sleep quality (Table 3). The mean global PSQI score was 4.43 ± 2.67 with a range of 0-16. In PSQI the lowest score belonged to "hypnotic medication use" component (mean= 0. 38), and the highest score belonged to "sleep duration" component (mean=1.14) (table 4).

The result also showed a significant difference between age and sleep quality so that the prevalence of poor sleep quality tended to be higher among participants who were aged more than 26 years than those had less than 26 years (p=0.045).

Table 3. The ESS Items scores of study participants

Situation	would never doze (0) %	slight chance of dozing (1) %	moderate chance of dozing (2) %	high chance of dozing (3) %	(Mean ± SD)
1. Sitting and reading	62.9	23.1	9.4	4.6	0.56 ± 0.84
2. Watching television	62.2	22.3	10.1	5.4	0.59 ± 0.88
3. Sitting inactive in a public place (e.g. a theater or meeting)	73.5	15.2	7	4.4	0.42 ± 0.80
4. As a passenger in a car for an hour without a break	58.5	20	11.4	10.1	0.73 ± 1.02
5. Lying down to rest in the afternoon when circumstances permit	18.4	23.1	25.4	33.1	1.73 ± 1.11
6. Sitting and talking to someone	89.6	6.9	1.8	1.8	0.16 ± 0.52
7. Sitting quietly after a lunch without alcohol	38	30.3	17.4	14.2	1.08 ± 1.06
8. In a car, while stopped for a few minutes in the traffic	88.6	8.6	1.6	1.2	0.15 ± 0.48

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Table 4. The PSQI component scores of study subjects

PSQI component	0 (%)	1 (%)	2 (%)	3 (%)	(Mean ± SD)
Sleep quality	32	55.4	10	2.4	0.83±0.70
Sleep latency	36.4	31.4	25.6	6.6	1.02±0.94
Sleep duration	29.2	33.4	32.2	5.3	1.14±0.90
Sleep efficiency	81.4	11.6	3.3	3.7	0.29±0.71
Sleep disturbance	12.4	67.5	19	1.1	1.09±0.59
Hypnotic medication use	80.4	8.6	3.3	7.7	0.38±0.87
Daytime dysfunction	51	31	15	3	0.70±0.83

The chi square test showed a relationship between different work shift and sleep quality. This means that respondents who had night shift, have greater prevalence of poor sleep quality (p= 0.0001) than those who had not. A significant differences was also found between work hours and sleep quality so that participants who work more than 8 hour per day, have greater prevalence of poor sleep quality (p= 0.015) than those who work less than 8 hours per day. However, there was no significant difference between gender, marriage, employment, and sleep quality (P= 0.05).

The results, as well, showed relationship between sleep quality and sleepiness (p=0.0001). Furthermore, according to Binary logistic regression results, the risk of sleepiness among participants with poor sleep quality was 4.2 times more than that among those who had good sleep quality.

Discussion

According to the results, the prevalence of sleepiness among a sample of population in South-East of Iran was moderate (34.3%). This is almost similar to the reported prevalence of sleepiness in earlier Asian studies [11, 14]. Soon Jae et al reported that 12.2% of Korean adults had daytime sleepiness [12]. Liu et al also reported that 24.4% of Japanese adults suffered from daytime sleepiness [14].

There is a varied range of sleepiness prevalence of earlier studies that could be due to the methodological differences and how they define sleepiness. Based on the findings, 57.5% of the participants reported poor sleep quality. Asghari etal (2012) also reported that 37.0% of the urban community of Tehran categorized as poor sleeper [4]. Zeitlhofer et al., who used PSQI, assessed Austrian population's sleep quality and they found that 32.1% of participants reported poor sleep quality [26]. Kiejna et al., stated that 10% of Polish inhabitants reported poor sleep quality. Poor sleep quality found in this study could be related to some socio- cultural factors[27]. Moreover, in the Iranian context despite of many Western and Eastern countries there is one day as the holiday rather than two days, so the rest time is less than that in many other countries. Some environmental factors such as weather may also cause poor sleep quality. The

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research context is in the desert (Loot desert) with hot and dry weather. Divito et al., claimed that hot climate can cause periods of increased sleepiness [28]. In the research of Wright, daily sleep data showed statistically significant seasonal patterns [29].

Based on the findings, in PSQI questionnaire, the lowest score belonged to the component of "hypnotic medication use" and the highest score belonged to the component of "sleep duration". Similarly Doi et al., found that the PSQI component scores widely ranged. In their study, the lowest score belonged to hypnotic medication use component and the highest score belonged to sleep latency [11]. The scores of PSQI components in several studies are different [11, 26, 25, 30, 31] Differences in mean subcomponents scores of PSQI could be related to sleep differs among cultures. The difference may indicate that different cultures have different perception of sleep and its related problems [30].

The results of this study revealed that sleep quality is related with sleepiness. Findings also showed that both sleep quality and sleepiness influenced by work related factors (work shift and work hours per day). In a study of Ng and TP, almost 15.1% of Asian multi-ethnic adults have work shift, and they reported that work shift was a risk factor for daytime sleepiness. They asserted that daytime sleepiness is commonly the result of disruption of the sleep–wake circadian cycle, typically seen in work shift [15]. It can be supported by Patel et al., where they claimed that differences in health behavior (for example, self-efficacy, perception, attitudes and value expectancy, psychosocial circumstances, and environment (social and physical) can disparately affect sleep quality [32].

We observed significantly higher prevalence of poor sleep quality among participants aged ≥26 years. This is consistent with the findings of Doi study. They stated that adults aged more than 20 years reported poor sleep quality than the younger ones[22]. Kiejna et al., also found that the quality of sleep decreased with age [32]. Based on the findings, marriage status has relationship with Sleepiness. Subjects who were married experienced more sleepiness than single ones. Kiejna et al., (2004) found marital status was correlated with sleep quality ($P < 0.05$).

The results confirm almost high prevalence of poor sleep quality and sleepiness among 1100 Iranian population. Sleep quality and sleepiness was associated with several factors including age, marital status, and work related factors. Many of these factors are highly prevalent in the population. They affect health significance of sleep quality and sleepiness in the community. So, this study provides nurses with some valuable insights about how these factors may influence population's sleep quality. On the basis of these data, it may be suggested that the poor sleep quality increased tendency to sleepiness during the daytime.

Daytime Sleepiness is also a clinical demonstration of many disorders that cause frequent arousals from sleep and sleep disruption, thus affecting the quality of sleep. The study showed that sleep quality is

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multidimensional and may vary in different cultural contexts. Therefore, improving the quality of population's sleep requires cultural preparation and public education through the media and also by well educated nurses. The convenience sample of population which is not the representative of all Iranian population could deteriorate the generalization of the findings. Furthermore, use of the self report questionnaires may have led to an overestimation of some of the findings due to variance which is common in different methods.

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Refrences

1. Sateia MJ, Nowell PD. Insomnia. The Lancet. 2004; 364(9449):1959-73.
2. Johns MW. A new method for measuring daytime sleepiness: the Epworth Sleepiness Scale. Sleep. 1991; 14(6):540-5.
3. Buysse DJ, Hall ML, Strollo PJ, et al. Relationships Between the Pittsburgh Sleep Quality Index (PSQI), Epworth Sleepiness Scale (ESS), and Clinical/Polysomnographic Measures in a Community Sample. Journal of Clinical Sleep Medicine. 2008 ; 4(6):563–71.
4. Asghari A, Farhadi M, Kamrava SK, et al. Subjective Sleep Quality in Urban Population. Arch Iran Med. 2012; 15(2):95-8.
5. Yen CF, King BH, Tang TC, et al. The association between short and long nocturnal sleep durations and risky behaviors and the moderating factors in Taiwanese adolescents. Psychiatry Res. 2010; 179(1):69-74.
6. McEwen BS. Allostasis and allostatic load: implications for Neuropsychopharmacology. Neuropsychopharmacology. 2000; 22(2):108-24.
7. Murray JC, O'Farrell P, Huston P. The experiences of women with heart disease: what are their needs. Can J Public Health. 2000; 91(2):98-102..
8. Bonnet MH, Arand DL. Activity, arousal and the MSLT in patients with insomnia. Sleep. 2000; 23(2):205-12.
9. Ancoli-Israel S, Roth T. Characteristics of insomnia in the United States: results of the 1991 National Sleep Foundation Survey. I. Sleep. 1999; 22 Suppl 2:S347-53.
10. Aloba OO, Adewuya AO, Ola BA, et al. Validity of the Pittsburgh Sleep Quality Index (PSQI) among Nigerian university students. Sleep Med. 2007; 8(3):266-70.
11. Doi Y, Minowa M, Uchiyama M, et al. Subjective sleep quality and sleep problems in the general Japanese adult population. Psychiatry Clin Neurosci. 2001; 55(3):213-5.
12. Joo S, Baik I, Yi H, et al. Prevalence of excessive daytime sleepiness and associated factors in the adult population of Korea. Sleep Med. 2009; 10(2):182-8.
13. Mousavi SA, Mirzayi E, Khosravi A. Sleep Pattern and Daytime Sleepiness in Over-15-Year-Old People in Shahroud. Knowledge & Health. 2010; 4(4).45-48.

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14. Liu X, Uchiyama M, Kim K, et al. Sleep loss and daytime sleepiness in the general adult population of Japan. Psychiatry Res. 2000; 93(1):1-11.
15. Ng TP, Tan WC. Prevalence and determinants of excessive daytime sleepiness in an Asian multi-ethnic population. Sleep Med. 2005; 6(6):523-9..
16. Bixler EO, Vgontzas AN, Lin HM, et al. Excessive Daytime Sleepiness in a General Population Sample: The Role of Sleep Apnea, Age, Obesity, Diabetes, And Depression. J Clin Endocrinol Metab. 2005; 90(8):4510-5.
17. Martikainen K, Hasan J, Urponen H, et al. Daytime sleepiness: a risk factor in community life. Acta Neurol Scand. 1992; 86(4):337-41.
18. Roberts RE, Shema SJ, Kaplan GA, et al. Sleep complaints and depression in an aging cohort: a prospective perspective. Am J Psychiatry. 2000; 157(1):81-8.
19. Hays JC, Blazer DG, Foley DJ. Risk of napping: excessive daytime sleepiness and mortality in an older community population. J Am Geriatr Soc. 1996; 44(6):693-8.
20. Doi Y, Minowa M, Uchiyama M. Subjective sleep quality and sleep problems in the general Japanese adult population. Psychiatry Clin Neurosci. 2001; 55(3):213-5.
21. Farrahi Moghaddam J, Nakhaee N, Sheibani V, et al. Reliability and validity of the Persian version of the Pittsburgh Sleep Quality Index (PSQI-P). Sleep Breath. 2012; 16(1):79-82.
22. Masoudzadeh A, Zanganeh A, Shahbazzadeh, L. "Study of sleepiness in medical students of Mazandaran University of Medical Sciences. JMUMS. 16(52); 75-8.[Persian]
23. Doi Y, Minowa M, Uchiyama M, et al. Psychometric assessment of subjective sleep quality using the Japanese version of the Pittsburgh Sleep Quality Index (PSQI-J) in psychiatric disordered and control subjects. Psychiatry Res. 2000; 97(2-3):165-72.
24. Zeitlhofer J, Schmeiser-Rieder A, Tribl G. Sleep and quality of life in the Austrian population. Acta Neurol Scand. 2000; 102(4):249-57.
25. Kiejna A, Rymaszewska J, Wojtyniak B, et al. Characteristics of sleep disturbances in Poland- results of the National Health Interview Survey. Acta Neuropsychiatr. 2004; 16(3):124-9.
26. Divito A, Larsgaard A, Parks S, et al. Weather's Effects on Adolescent Mood and Sleep Patterns. Available from: http://jrscience.wcp.muohio.edu/nsfall05/FinalArticles/Final1.WeathersEffectsonA.html; 2005.
27. Wright KP. Seasonal Changes in Night-Length and Impact on Human Sleep. Encyclopedia of Neuroscience. 2008; 497-99.
28. Doi Y, Minowa M, Uchiyama M et al. Prevalence of sleep disturbance and hypnotic medication use in relation to sociodemographic factors in the general Japanese adult population. J Epidemiol. 2000; 10(2):79-86.
29. Kim K, Uchiyama M, Okawa M, et al. An epidemiological study of insomnia among the Japanese general population. Sleep. 2000; 23(1):41-7.
30. Patel NP, Grandner MA, Xie D, et al. Sleep disparity in the population: poor sleep quality is strongly associated with poverty and ethnicity. BMC Public Health. 2010; 10:475.