



Sleep Disorders; Prevalence, Risk Factors and Its Impact On Functional Outcomes Among Young Adults in Faiyum; A Community-Based Study

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ABSTRACT

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Background: Sleep is necessary for human beings. As it accounts for almost one-third of our lives, its disturbance may have serious consequences on our quality of life and everyday function. **Objective:** to assess the prevalence of different types of sleep disorders, and to assess risk factors and impact of sleep disorders on functional outcomes **Method:** The design was a cross sectional community-based study. Multistage cluster sampling was used to recruit participants. Sleep Disorders Questionnaire (SDQ), and Functional Outcome of Sleep Questionnaire (FOSQ-10) were used. **Results:** A total 586 participants were included in the current analysis. Out of them, 75.7% were under 30 years old, 63.8% were female, and 72.4% were single. The mean SDQ score was 31.5 ± 9.7 , with a range of 16 to 61. The mean FOSQ-10 score was 28.4 ± 6.6 , with a range of 10 to 40. Insomnia had the highest prevalence of sleep disorders (82.3%), followed by apnoea (67.6%). Poor functional outcome represents 65.9% of study individuals. Those with insomnia, psychiatric disorders, circadian rhythm disorder, or apnoea had significantly poor functional outcomes (p-values 0.045, 0.005, 0.013, and 0.030 respectively). Additionally, caffeinated drinks, family history of sleep disorders, and asthma or psychological disorders had significantly poor functional outcomes (p-values 0.001, 0.006, 0.008, and 0.011 respectively). **Conclusions:** Poor functional outcomes had significant associations with sleep disorders as well as lifestyle and medical risk factors. Health education campaign to raise awareness about sleep disorders and screening sleep disorders are recommended to overcome the serious consequences of sleep disorders.

INTRODUCTION

Sleep is a main item in the hierarchy of human needs. The individual must have a good and quality sleep cycle, which can affect physical and spiritual well-being.¹ Certain duration of good sleep is essential for the human body to recover and continue with the responsibilities of the next day. Sleep deprivation is linked to sequences of poor physical and mental health.² Sleep duration needs vary over the lifespan and from person to person. According to American Academy of Sleep Medicine (AASM) and the National Sleep Foundation (NSF) all people should obtain at least 7 hours of sleep every

day. Individuals who sleep beyond the usual range on a regular basis may be displaying indications or symptoms of major health problems.³ Sleep disorders are defined by any abnormalities in sleep timing, duration, and quality. The most prevalent and common sleep disruptions in the general population are those characterizing insomnia, with difficulty starting, recovering, or sustaining sleep.²⁻⁴ Despite the adverse health effects of insufficient adequate sleep, sleep disorders are commonly misdiagnosed and untreated.⁵ Untreated sleep disorders increase the risk of developing a variety of

health outcomes such as obesity, diabetes, hypertension, and coronary heart disease, as well as cognitive impairment, anxiety, and depression, and have a negative impact on the course and management of these chronic illnesses once they emerge, as well as being associated with overall mortality.⁶⁻⁷ Sleep quality has an impact on different life quality aspects, including physical, mental, and psychological health. Poor sleep quality, not shorter sleep duration, was associated with poor quality of life.⁸⁻⁹ Evaluating the relationship between sleep quality and those quality-of-life aspects might provide social policymakers and

METHODS

The design was a cross sectional community-based study. Target population for current study was Faiyum governorate population.

Based on Egypt census 2017, Faiyum population count was (3,596,954).¹³ Using the Epi Info 2000 software, which is located in Atlanta, Georgia,¹⁴ the sample size of 471 individuals was computed. With a 97% power level, a type I error of 0.05, and an estimated prevalence of 50%.¹² In order to accommodate for sampling stages, non-response or missing data, the number was raised to 600. The study used multistage cluster sampling sample to recruit participants. The sample unit, the house, was selected at random. Six health care facilities out of 170 (centers and units) were chosen at random to represent various urban and rural areas based on population size. The next step was choosing the major main street in the catchment area of the healthcare facilities. Every second house was enrolled in the study. Over the course of four months, 150 houses were visited in order to collect a sample. Researchers skipped that residence and moved on to the next one when an individual refused. All residents of the chosen house who were at least 16 years old and consented to participate in the research were enrolled. The current study recruited 586 people in total, with a response rate of 97.66%.

Data collection tool: A self-administered questionnaire was used in the current study. The data collector read and explained the questionnaire's questions to any illiterate participants before recording their answers. The questionnaire developed in English language then translated by fluent bilingual professional to Arabic version. The questionnaire had four components. The first component included demographic characteristics as (age, sex, residence, educational level, marital status

and occupation). In addition, risk factors for sleep disorders in form of lifestyle risk factors (body weight, smoking, eating fast food, and caffeine intake). For medical risk factors, it included (family history of sleep disorders, asthma, esophageal reflux, psychiatric problems, ear, nose, and throat problems, and chronic disease (hypertension, diabetes, liver/kidney/cardiac disease, hormonal disturbance).

The second component was Socio-Economic Scale that included 10 items regarding socio-economic status with a total score of 48 points. Based on the total score participants classified to low, middle and high socioeconomic status.¹⁵ The third component was Sleep Disorders Questionnaire (SDQ) was a 16 items scale. It assesses five domains insomnia, psychiatric disorders, circadian rhythm disorders, movement disorders, and parasomnia. SDQ rated on five points Likert scale starting from never "1 point" to always "five points".¹⁶⁻¹⁷ The fourth component was Functional Outcome of Sleep Questionnaire (FOSQ-10) it included 10 items scale. It assesses the impact of sleepiness disorders on multiple activities of everyday living a particular aspect of health-related quality of life. FOSQ-10 rated on four points Likert from no difficulty "4 points" to extreme difficulty "1 point". The total score will be utilized. Better functional status indicated by lower scores. A total score less than 18 reflect good sleep quality.¹⁸ A pilot study was conducted on 25 participants to test the clarity and accuracy of questions and to analyze the validity and reliability of questionnaire. The reliability test of the questionnaire showed a Cronbach's Alpha of (0.816) for Sleep Disorders Questionnaire (SDQ), and (0.828) for Functional Outcome of Sleep Questionnaire (FOSQ-10).

Legally authorized representative: Illiterate individuals are enrolled in the study if they understand the concepts of the study, can evaluate the risks and benefits of participation in the study when given verbally, and can express acceptance or refusal. An unbiased educated witness (family member or friend) should be present during the informed consent procedure. After explaining the goal of the study and all questions to the participant and witness, the witness reviewed the questionnaire and the participant indicated approval or rejection to participate in the study.

Statistical analysis: The IBM Statistical Package for Social Science (SPSS) 22 program was used to analyze the data.¹⁹ Simple descriptive analysis of qualitative data in the form of numbers and percentages, and arithmetic means as a measure of

central tendency, standard deviations as a measure of dispersion of quantitative parametric data. The Chi Square test and Fisher's exact test with a 95%

confidence interval were used to compare qualitative variables (where the proportion of projected frequency less than 5 exceeded 20%). Statistical

Table 1: Associations between sleep disorders domains and Functional outcomes of sleep among study group (n=586)

Sleep disorders domains		FOSQ-10		p-value
		Poor	Good	
		No. (%)	No. (%)	
Insomnia	No	2 (1.9)	102 (98.1)	0.045*
	Yes	36 (7.5)	446 (92.5)	
Psychiatric disorder	No	28 (5.4)	494 (94.6)	0.005*
	Yes	10 (15.6)	54 (84.4)	
Circadian rhythm disorder	No	32 (5.8)	52 (94.2)	0.013*
	Yes	6 (18.8)	26 (81.3)	
Movement disorder	No	14 (5.4)	244 (94.6)	0.401
	Yes	24 (7.3)	304 (92.7)	
Parasomnia	No	24 (6.5)	344 (93.5)	0.99
	Yes	14 (6.4)	204 (93.6)	
Apnea	No	6 (3.2)	184 (96.8)	0.030*
	Yes	32 (8.1)	364 (91.9)	

*Significant difference with p-value <0.05

significance was determined as a p-value of less than or equal to 0.05.

experts with greater insights into the lives of people.¹⁰ Adults with sleep disorders have significantly higher rates of health care utilization and expenditures, indicating that screening and treatment for sleep-related issues could be an important component of controlling health care costs.¹¹ Sleep disorders show a high prevalence in different communities (40 to 60%)¹² and are associated with poor health outcomes, screening for sleep disorders in primary care might help in reducing the burden of chronic illnesses and health care expenses. There is limited evidence to support the relationships of sleep disorders with quality of daily life activities. Furthermore, just a few research on sleep problems have been undertaken in Egypt. The current study sought to close this knowledge gap by assessing the prevalence of sleep disorders, as well as their risk factors and their impact on functional outcomes.

RESULTS

Out of the 586 study participants, 444 (75.7%) were under 30 years old, 374 (63.8%) were female, 316 (53.9%) lived in rural areas, 424 (72.4%) were single, 450 (76.8%) had university degrees versus 136 (23.2%) had low to middle level education, 486 (82.9%) were unemployed, and 323 (55.1%) belonged to a middle socioeconomic status level versus 163(27.8%) belonged to low level of

socioeconomic status. Study participants who were included in the life-style risk factors for sleep disorders included 486 (82.9%) who used drinks contain caffeine more than three times daily and 144 (24.6%) who had abnormal weight greater than 25 body mass index (BMI). Psychiatric issues account for 190 (32.4%) of the medical risk factors, while asthma responsible for 162 (27.6%), Ear Nose and Throat health problem represent 142 (24.4%), participants with chronic diseases (hypertension, diabetes, liver / kidney/ cardiac disease, hormonal disturbance) were 96 (16.4%), and esophageal reflux represent 64(10.9%) finally family history of sleep disorders were 46 (7.8%). The mean score for sleep disorders was (31.5 ± 9.7), with a range of 16 to 61. In terms of sleep problem domains, insomnia had the highest prevalence 482 (82.3%), followed by apnea 396 (67.6%). Parasomnia presented in 218(37.2%) of participants, Psychiatric disorder presented in 64 (10.9%). Circadian rhythm disorder had the lowest prevalence, with 32 (5.5%) individuals. The mean functional outcome score of (28.4 ± 6.6) ranged between 10 and 40 with 386 (65.9%) of individuals show a poor functional outcome.

Those who complain insomnia, psychiatric disorders, circadian rhythm disorder, or apnea, show significantly poor functional outcomes with a p-value (0.045, 0.005, 0.013, and 0.030 respectively)

(Table 1). Those who drink caffeinated drinks more than three times daily, have a family history of sleep disorders, have asthma or psychological disorders, show significantly poor functional outcomes with a

p-value (0.001, 0.006, 0.008, and 0.011 respectively) (Table 2). When lifestyle factors and various sleep disorders were studied, it was shown that a body

Table 2: Associations between functional outcome of sleep and both lifestyle and medical risk factors among study group (n=586)

		FOSQ-10		p-value
		Poor No. (%)	Good No. (%)	
Lifestyle risk factors				
Abnormal weight (>25BMI)	No	28 (6.3)	414 (93.7)	0.846
	Yes	10 (6.9)	134 (93.1)	
Frequent fast food (once/week)	No	30 (6.3)	446 (93.7)	0.671
	Yes	8 (7.3)	102 (92.7)	
Caffeine intake (> 3 times/day)	No	0 (0)	100 (100)	0.001*
	Yes	38 (7.8)	448 (92.2)	
Smoking	No	32 (6)	498 (94)	0.246
	Yes	6 (10.7)	50 (89.3)	
Medical risk factors				
Family history of sleep disorders	No	30 (5.6)	510 (94.4)	0.006*
	Yes	8 (17.4)	38 (82.6)	
Esophageal reflux	No	30 (5.7)	492 (94.3)	0.055
	Yes	8 (12.5)	56 (87.5)	
Asthmatic	No	20 (4.7)	404 (95.3)	0.008*
	Yes	18 (11.1)	144 (88.9)	
Psychiatric problems	No	18 (4.5)	378 (95.5)	0.011*
	Yes	20 (10.5)	170 (89.5)	
ENT problems	No	26 (5.9)	418 (94.1)	0.326
	Yes	12 (8.5)	130 (91.5)	
Chronic disease	No	34 (6.9)	456 (93.1)	0.374
	Yes	4 (4.2)	92 (95.8)	

*Significant difference with p-value <0.05

mass index more than 25 was significantly associated with insomnia, apnea, psychiatric, and movement disorders. Both parasomnia and apnea were associated with frequent fast-food consumption. It was discovered that caffeine use and smoking were associated to parasomnia. (Table 3). Regarding medical risk factors, psychotic disorders, movement disorders, and parasomnia were associated with a family history of sleep disorders. Movement disorders and parasomnia were significantly associated with esophageal reflux. Insomnia, psychiatric disorder, movement disorders, parasomnia, and apnea were associated with each of asthma, Psychiatric disease and the ears, nose, and throat (ENT) issues. Last but not least, other chronic diseases associated with psychiatric disorders, movement disorders, and apnea. (Table 4)

There was no statistical significance difference between socio-demographic characteristics of

participants (age, sex, residence, education, marital and occupation) and developing insomnia with p-value >0.05. Psychiatric disorder show a statistical significant higher percentage in females more than males (14.4% versus 4.7%) respectively with a p-value of 0.001, with no significant association with other socio-demographic characteristics. Circadian rhythm disorder it was found to be associated with middle socio-economic level (7.4% versus 4.9%) in low level and no cases in high level with p-value 0.016. Movement disorder show a statistically significant higher percentage in females (59.4% versus 50%) in male with a p-value of 0.031. In addition, a high prevalence of movement disorder was found in low and middle socio-economic level (58.3%, 58.5% respectively versus 44% in high level) with a p-value of 0.030), with no significant association with other socio-demographic characteristics. Parasomnia was statistically higher among males (43.4% versus 33.7%) in female with

a p-value of 0.021. Apnea was more prevalent in participants aged older than 30 years (77.5% versus 64.4%) in younger than 30 years old with p-value 0.004 in addition to married participants (76.5%

versus 64.2%) in unmarried population with a p-value of 0.004. employed participants (78% versus 65.4%) of unemployed with p-value of 0.014. Low and middle level of socio-economic status had a

Table 3: Associations between sleep disorders domains and lifestyle risk factors among study group (n=586)

Lifestyle risk factors		SDQ domains					
		Insomnia (n=482)	Psychiatric (n=64)	Circadian rhythm(n=32)	Movement (n=328)	Parasomnia (n=218)	Apnea (n=396)
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
BMI >25	No	352 (73)	38 (59.4)	22 (68.8)	230 (70.1)	156 (71.6)	284 (71.7)
	Yes	130 (27)	26 (40.6)	10 (31.3)	98 (29.9)	62 (28.4)	112 (28.3)
p-value		0.004*	0.003*	0.399	0.001*	0.112	0.003*
Frequent fast food (once/week)	No	392 (81.3)	48 (75)	22 (68.8)	260 (79.3)	160 (73.4)	306 (77.3)
	Yes	90 (18.7)	16 (25)	10 (31.3)	68 (20.7)	58 (26.6)	90 (22.7)
p-value		0.895	0.177	0.099	0.201	<0.001*	<0.001*
Caffeine intake (> 3 times/day)	No	82 (17)	10 (15.6)	6 (18.8)	58 (17.7)	48 (22)	72 (18.2)
	Yes	400 (83)	54 (84.4)	26 (81.3)	270 (82.3)	170 (78)	324 (81.8)
p-value		0.99	0.861	0.809	0.740	0.017*	0.348
Smoking	No	432 (89.6)	54 (84.4)	30 (93.8)	292 (89)	190 (87.2)	358 (90.4)
	Yes	50 (10.4)	10 (15.6)	2 (6.3)	36 (11)	28 (12.8)	38 (9.6)
p-value		0.197	0.110	0.758	0.205	0.042*	0.999

*Significant difference with p-value <0.05

higher prevalence of apnea (69.9%, 70.6% respectively versus 54% in high level with a p-value of 0.006.

When assessing the association between functional outcomes and socio-demographic characteristic it illustrated that age, sex, education, marital and occupation status show no significance impact on FOSQ-10 levels with p-value >0.05. However, participants inhabited rural area show higher percentage of poor functional outcome of sleep that urban area (8.9%, versus 3.7% with p-value 0.012).

DISCUSSION

Sleep disorders are a common condition that interrupts the natural circadian cycle, significantly affecting both psychological and physical health. There are many types of sleep disorders, the most common of which are insomnia, obstructive sleep apnea, and circadian rhythm abnormalities. Sleep disorders are associated not only with poor life quality and with productivity, but also with increased medical and psychological health problems.²⁰

In the current study, the most prevalent disorder was insomnia (82.3%), followed by apnea (67.6%). Circadian rhythm disturbance was the least common, accounting for (5.5%) of all cases. (6.5%)

of people have poor functional outcomes. In a Georgian study, 27.4% of the study population experienced insomnia, and 34.2% indicated a risk of obstructive sleep apnea. Both disorders have been associated with a reduction in physical and mental well-being.²¹ In a French research, 39.5% reported chronic insomnia, 10.5% reported sleep apnea syndrome, 4.1% reported restless legs syndrome, 15.5% showed excessive daytime sleepiness, and 24.6% reported in-flight sleep while on duty.²² An American study revealed that the most frequent condition was insomnia (20.0%), followed by obstructive sleep apnea (9.4%), restless legs syndrome (9.4%), Narcolepsy (1.2%) and behavior-induced inadequate sleep syndrome (1.9%).²³ Egyptian youths reported insomnia, everyday drowsiness, and sleep deficit at rates of 59.6%, 29.5%, and 12.1%, respectively.²⁴

According to current study results those who suffer from insomnia, psychiatric disorders, circadian rhythm disorder, or apnea have significantly poor functional outcomes. Individuals who experience difficulties before and during sleep, such as trouble falling asleep, chewing teeth, or talking in their sleep, frequently waking up at night has a negative impact on sleep quality, and these occasions impede

getting up refreshed in the morning, resulting in fatigue during the daytime.¹⁻²⁵ Poor sleep quality was found to be a predictor of poor functional outcomes.²³⁻²⁶

It was shown that in current study a body mass index above 25 was significantly associated with insomnia, apnea, psychiatric, and movement sleep

Table (4): Relation between sleep disorders domains and medical risk factors among study group.

Medical risk factors		SDQ domains					
		Insomnia (n=482)	Psychiatric (n=64)	Circadian rhythm(n=32)	Movement (n=328)	Parasomnia (n=218)	Apnea (n=396)
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Family history of sleep disorders	No	442 (91.7)	50 (78.1)	28 (87.5)	294 (89.6)	192 (88.1)	364 (91.9)
	Yes	40 (8.3)	14 (21.9)	4 (12.5)	34 (10.4)	26 (11.9)	32 (8.1)
p-value		0.546	<0.001*	0.305	0.013*	0.007*	0.870
Esophageal reflux	No	424 (88)	52 (81.3)	28 (87.5)	278 (84.8)	182 (83.5)	346 (87.4)
	Yes	58 (12)	12 (18.8)	4 (12.5)	50 (15.2)	36 (16.5)	50 (12.6)
p-value		0.081	0.052	0.769	<0.001*	0.001*	0.066
Asthmatic	No	332 (68.9)	28 (43.8)	22 (68.8)	202 (61.6)	146 (67)	264 (66.7)
	Yes	150 (31.1)	36 (56.3)	10 (31.3)	126 (38.4)	72 (33)	132 (33.3)
p-value		<0.001*	<0.001*	0.685	<0.001*	0.028*	<0.001*
Psychiatric disease	No	312 (64.7)	22 (34.4)	20 (62.5)	202 (61.6)	130 (59.6)	240 (60.6)
	Yes	170 (35.3)	42 (65.6)	12 (37.5)	126 (38.4)	88 (40.4)	156 (39.4)
p-value		0.001*	<0.001*	0.562	<0.001*	0.002*	<0.001*
ENT problems	No	352 (73)	40 (62.5)	20 (62.5)	222 (67.7)	140 (64.2)	282 (71.2)
	Yes	130 (27)	24 (37.5)	12(37.5)	106 (32.3)	78 (35.8)	114 (28.8)
p-value		0.001*	0.013*	0.088	<0.001*	<0.001*	<0.001*
#Other chronic disease	No	402 (83.4)	46 (71.9)	28 (87.5)	258 (78.7)	176 (80.7)	318 (80.3)
	Yes	80 (16.6)	18 (28.1)	4 (12.5)	70 (21.3)	42 (19.3)	78 (19.7)
p-value		0.884	0.011*	0.805	<0.001*	0.166	0.002*

*significance difference with p-value <0.05; # Other chronic disease (diabetes mellitus, hypertension, cardiac disease, chronic liver and renal diseases)

disorders. Both parasomnia and apnea were associated with frequent fast-food consumption. It was discovered that caffeine use and smoking were associated to parasomnia. Poor sleep connected with harmful behaviors such as smoking among youths.²⁷ in addition it associated with an increase in calorie intake and body weight.²³⁻²⁸ Dietary habits is essential to sleep wellbeing Long-term dietary considerations may influence inflammatory state, which is also associated with sleep disorders.²⁰ Caffeine's effects on sleep quality and duration vary depending on when it is consumed. Caffeine use in the late hours has been associated to sleep problems.²⁹ According to an Egyptian study, smokers and obese adolescents had significantly higher rates of high-risk insomnia and obstructive sleep apnea.²⁴ In contrast to these findings, an American research found no association between sleep and BMI.²⁶ In our study females had a higher prevalence of psychiatric and movements sleep disorders. Males

had a significantly greater rate of Parasomnia. Apnea was more common in people above the age of 30. Circadian rhythm, movement disorder and apnea disorder had been associated to a low and middle socioeconomic status. It could be explained by that socio-economic burden affect physical, psychological and mental health all show impact on sleep duration, quality and disorders.³⁰ An Egyptian study had shown that, insomnia and Restless legs syndrome were much more prevalent in females and those aged 15-20 years.²⁴ An American study reported that insomnia is more frequent in those who were older, had lower family income, and had less education.³¹ According to present study findings there was an association between various forms of sleep disorders and physical and psychiatric disease. These findings were in agreement with many studies in United States, Italy, India, and Germany.²³⁻²⁹⁻³²⁻³³ The current study had some limitations. It did not examine the various components of sleep duration

and quality to examine their association with functional outcomes and daily activities. Additionally, it did not consider all forms of sleep disorders. Finally, it did not take into account all of the risk factors that may affect sleep quality.

CONCLUSIONS

The current study concluded that insomnia was the most common sleep disorder among study population 482 (82.3%), followed by apnea 396 (67.6%). Caffeine use, obesity, eating habits and smoking, as well as both physical and psychiatric diseases, all have significant associations with sleep disorders. Sleep disorders have a detrimental influence on functional outcomes. It can have major negative repercussions on quality of life and daily function when interrupted or agitated; hence, sleep disorders should be addressed. Basic screening tools for sleep disorders for risk assessment and management should be better integrated into regular medical care services and public health programs. Develop a public health campaign focused on raising awareness of sleep disorders and specific guidelines for appropriate sleep quality and duration. A specialist referral should be considered where appropriate. Future research should address the effect of sleep quality and duration on functional outcomes.

Ethical Consideration

The current study was approved by the research ethics committee of Faiyum University's Faculty of Medicine. The study number was R 299, dated November 13, 2022. The methods for the study were carried out in compliance with the Helsinki Declaration's ethical standards. Before the data collection was initiated, the study population was instructed about the research's aims and the confidentiality of their information. People who agreed to participate did so freely and signed a consent form.

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Author contribution: Asmaa El Sary created the idea, conceived the study, design; data collection, statistical analysis, and shared in drafting, editing

and revision of the manuscript, and publication. Naglaa El-Sherbiny conceived the study, design; and shared in drafting, editing and revision of the manuscript.

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