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RESEARCH ARTICLE

SLEEP QUALITY, DAYTIME SLEEPINESS, AND DEPRESSION AMONG ER PHYSICIANS IN RIYADH'S REFERRAL HOSPITALS..

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Abstract

Objectives: To assess the prevalence of daytime sleepiness, poor sleep quality and depression among (emergency room) ER physicians in comparison to family medicine physicians.

Methods: We compared 68 ER physicians with 69 family medicine physicians in an observational case control study. A self-administered questionnaire composed of the Epworth Sleepiness Scale (ESS), the Pittsburgh Sleep Quality Index (PSQI) and the Beck Depression Inventory Scale (BDI).

Results: The mean total ESS score of ER physicians was significantly higher than the score of family medicine physicians as 41.2% of ER physicians scored ≥ 10 , while only 14.5% of family medicine physicians scored ≥ 10 . Moreover, ER physicians had a higher on the PSQI (indicating poorer sleep quality), and 83.8% of them had poor sleep quality (≥ 5) in comparison to 50.7% of family medicine physicians. The BDI scores of the ER and family medicine physicians indicated that 41% and 22% suffered from some level of mood disturbance, respectively. Pearson correlation showed a positive and significant relationship between sleep quality and depression among ER physicians ($P < 0.001$, $r = 0.437$).

Conclusion: Our study demonstrated that daytime sleepiness, poor sleep quality and depression are prevalent among ER physicians. Moreover, there was a strong correlation between poor sleep quality and depression.

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Introduction:-

Night shift work is a well-known risk factor for disturbed circadian rhythm¹, leading to significant drawbacks in quality of sleep and sleep efficiency²⁻⁴. Therefore, night shift workers, such as emergency room physicians, have a significant liability to develop poor sleep quality. A fair number of studies have focused on the effects of shift work on the general health, and have found a link between shift work and cardiovascular diseases⁶⁻¹², diabetes mellitus type 2¹³⁻¹⁷, breast cancer²¹, metabolic syndrome²²⁻²³, memory loss²⁴ and obesity²⁵⁻²⁶. In contrast, fewer studies have addressed the relation between shift work and its effect on sleep quality and its negative consequences on sleep patterns and mood. Shift work schedule has numerous effects on the quality of sleep and wakefulness of workers^{25, 27}. Some studies mentioned that the irregular work hours seem to exert acute effects on sleep and alertness of individuals similar to those witnessed in clinical insomnia, which could be responsible for major negative human

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and economic impacts due to fatigue related accidents and diminished productivity²⁵. There is a definite association between low sleep quality and shift work^{27, 28}. A previous study done in Kingdom of Saudi Arabia revealed that the quality of sleep of shift-workers was significantly affected in comparison to those without shift work²⁹. Sleepiness and stress are among the risk factors for worsening sleep quality among shift workers³⁰. Poor sleep quality was associated with increased work injury³⁰. Low sleep quality was reported to correlate with a poor quality of life among nurses working rotating shifts²⁸. Insomnia among shift workers plays a role in experiencing sleep difficulties³¹. Regarding poor sleep quality and depression, one study was done on multiple sclerosis patient had found a link between poor sleep quality and depression³². One studies suggested that the increase in depressive symptoms across adolescence is partially mediated by sleep-related developmental changes³³. Increasing depression among sleep apnea patients was associated with poor sleep quality, as well³⁴.

No study has assessed the effect of shift work on ER physicians on sleep and mood in Saudi Arabia; therefore, we conducted this study to estimate the prevalence of poor sleep quality, daytime sleepiness, and depression among ER physicians.

Methods:-

This is an observational case control study that was conducted between November 2015 and April 2016. The cases were randomly chosen and comprised of 68 emergency medicine physicians from 8 major Riyadh hospitals (King Khalid University Hospital, King Faisal Specialist Hospital and Research Center, King Fahad Medical City, National Guard Hospital, Prince Sultan Military Medical City, King Saud Medical Complex, Imam Abdulrahman bin Faisal Hospital, King Salman Hospital) who have worked regular shifts for at least 3 months. The controls comprised of 69 family physicians randomly chosen from 5 major Riyadh Hospitals (King Khalid University Hospital, King Fahad Medical City, National Guard Hospital, Prince Mohammed bin Abdulaziz Hospital, King Saud Medical Complex). The project was approved by the Ethics Committee and informed consent was obtained from participants.

Data collection and Questionnaire:-

As medicine is taught in English in Saudi Arabia, a self-administered questionnaire in the English language was distributed to all participating physicians. The questionnaire used in this study was composed of four sections: Demographic information, position, previous diagnosis of either depression or a sleeping disorder, and medications.

The Epworth Sleepiness Scale (ESS): This is a validated questionnaire that is used to assess daytime sleepiness. It contains 8 items that assess the likelihood of dozing in a variety of daily living situations. The highest score is 24, and a score ≥ 10 indicates sleepiness³⁶.

The Pittsburgh Sleep Quality Index questionnaire: This is an instrument used to measure the quality and patterns of sleep in adults. It differentiates “poor” from “good” sleep quality by measuring seven areas (components): subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction over the last month. A total score of 5 or higher is indicative of poor sleep quality³⁵.

The Beck Depression Inventory: This is a validated questionnaire to assess depression. It is composed of items relating to symptoms of depression. It contains 21 questions; each answer being scored on a scale value of 0 to 3. Higher total scores indicate more severe depressive symptoms. A score of 11-16 indicates mild mood disturbance, 17-20 indicates borderline clinical depression, 21-30 indicates moderate depression, 31-40 indicates severe depression, and a score of over 40 indicates extreme depression³⁷.

Data Analysis:-

Data were expressed as mean \pm SD for continuous data. Categorical data were expressed as n (%). Student t-test or Mann-Whitney U-test (depending on normality) and chi-square test were used to compare numerical or categorical data, respectively. One way ANOVA or Kruskal Wallis test (if normality assumption violated) were used to compare BDI groups. The results were considered statistically significant if $P \leq 0.05$. Pearson correlation or Spearman rank-order correlation (if normality assumption violated) were used to assess correlation between ESS, PSQI and BDI scores. Statistical Package for Social Sciences (SPSS), IBM version 22 (SPSS Inc., Chicago, IL, USA) software was used for data analysis and management.

Results:-

The study included 68 ER physicians and 69 family medicine physicians. Table 1 shows that the two groups were similar in all parameters except for age; the mean age for ER physicians was 35.2 years (SD: 8.6), and mean age of 40.4 (SD:10.5) in family medicine physicians. There was a difference in the position parameter, as well. There were a higher proportion of male physicians in both groups; 70.6% of ER physicians were males, and 58% were males in family medicine physicians group. One subject of ER physicians reported being diagnosed with a sleeping disorder, and two from the control group, one of them specified being diagnosed with obstructive sleep apnea. In addition, 8.8% of ER physicians are diagnosed with depression; almost the same percentages, 8.7%, of family medicine physicians are diagnosed with depression as well. Three subjects of the ER physicians reported being on Selective Serotonin Reuptake Inhibitors, and one reported being on beta-adrenergic blocking agents. Only one subject of family medicine physicians is on beta-adrenergic blocking agents.

The mean total ESS score of ER physicians was significantly higher than the score of family medicine physicians. Furthermore, 41.2% of ER physicians scored ≥ 10 , while only 14.5% of family medicine physicians scored ≥ 10 [Table 2]. ER physicians also scored higher on the PSQI, 83.8% of them were having poor sleep quality (≥ 5) in comparison to 50.7% of family medicine physicians [Table 2]. Finally, a strong correlation was observed between sleep quality and depression among ER physicians, Pearson correlation shows a positive and significant relation ($P < 0.001$, $r = 0.437$) [Figure, Table 3]. The results of Pearson correlation between ESS score and BDI score represents that daytime sleepiness has a weak correlation with depression in ER physicians ($r = 0.172$) [Figure, Table 3]. Pearson correlation between sleep quality and daytime sleepiness has a weak correlation ($r = 0.178$), as well. [figure, Table 3].

Table I:- Characteristics; comparison between ER physicians and family medicine physicians.

Variable	Mean \pm SD		P-Value
	ER physicians n=68	Family medicine n=69	
Age	35.2 \pm 8.6	40.4 \pm 10.5	0.003
Gender			
Female	20 (29.4)	29 (42)	0.123
Male	48 (70.6)	40 (58)	
Marital Status			
Single	17 (25)	12 (17.4)	0.276
Married/Divorced/Widower/Widow	51 (75)	57 (82.6)	
Position			
Consultant	13 (19.1)	26 (38.2)	0.014
Assistant professor/Registrar/Resident	55 (80.9)	42 (61.8)	
Diagnosed with a sleeping disorder			
No	67 (98.5)	67 (97.1)	1.000
Yes	1 (1.5)	2 (2.9)	
Sleep Disorders Diagnoses			
OSA	0 (0)	1 (1.4)	1.000
Diagnosed with depression			
No	62 (91.2)	63 (91.3)	0.979
Yes	6 (8.8)	6 (8.7)	
Medication			
Not on medication	64 (94.1)	68 (98.6)	0.208
On Medication	4 (5.9)	1 (1.4)	

Table II:- ESS, PSQI and BDI results, comparison between ER physicians and family medicine physicians.

Variable	Mean ± SD		P-Value
	ER physicians n=68	Family medicine n=69	
EES Score	9.1 ± 4.6	6.1 ± 3.8	<0.001
ESS Diagnostic	40 (58.8)	59 (85.5)	<0.001
< 10	28 (41.2)	10 (14.5)	
≥ 10			
Global PSQI Score	8.3 ± 4	5.3 ± 3.2	<0.001
PSQI Diagnostic	57 (83.8)	35 (50.7)	<0.001
≥ 5	11 (16.2)	34 (49.3)	
< 5			
BDI Score	11.5 ± 10.1	6 ± 7.1	< 0.001

ESS: Epworth Sleepiness Scale
 PSQI: Pittsburgh Sleep Quality Index
 BDI: The Beck Depression Inventory

Table III:- Correlations between ESS, PSQI and BDI scores in ER physicians.

Variable	n=68	r	p-Value
ESS Score Vs Global PSQI Score		0.178	0.146
ESS Score Vs BDI Score		0.172	0.161
BDI Score Vs Global PSQI Score		0.437	< 0.001

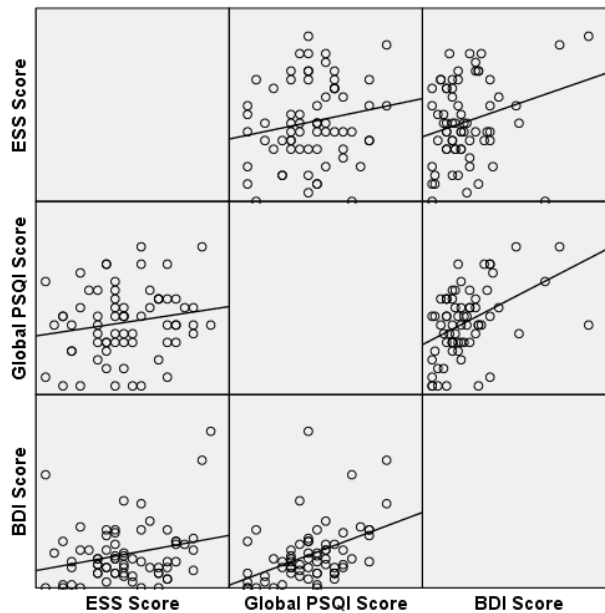


Figure:- Scatter plot between ESS, PSQI and BDI scores in ER physicians.

Discussion:-

This study was conducted to assess the prevalence of daytime sleepiness, poor sleep quality and depression among emergency room physicians with a control group of family physicians in Riyadh referral hospitals.

The results of this study showed by using the PSQI³⁵ that poor sleep quality was prevalent among emergency room physicians with a prevalence of 84% compared to 51% in family medicine physicians. Moreover, we found that falling asleep during daily activities is more prevalent among ER physicians with a prevalence of 41% compared to 14% reported in family medicine physicians. In addition, by using Becks Depression Inventory (BDI)³⁷ it was found to be statically significant and indicating that 41% of emergency room physicians room physicians were depressed

compared to 22% of family medicine physicians who were found to be depressed. Moreover, we found that poor sleep quality in emergency room physicians is strongly associated with depression.

A previous study conducted on male factory workers in Aseer, Saudi Arabia²⁸ showed that poor sleep quality among shift workers was reported to be around 67.6% compared to only 20.3% in non-shift workers. Furthermore, another study was conducted on ER physicians in Pittsburgh³⁸, reported that a percentage of almost 31% suffered from poor sleep quality. In comparison, the percentage of shift workers and ER physicians suffering from poor sleep quality are much less than what was reported in ER physicians in our recent study. Both studies focused on the effect of shift work on the sleep quality of the shift workers. It is possible that doctors in our study do more shifts than ER physicians in the American study.

Limitations:-

A limitation of this study was the relatively small sample size. However, the number of emergency room physicians in Riyadh is relatively small. Another limitations were that a higher proportion of the participants in this study were males.

Conclusion:-

Our study demonstrated that daytime sleepiness, poor sleep quality and depression are prevalent among emergency room physicians. Moreover, there was a strong correlation between poor sleep quality and depression. Efforts are needed to investigate the causes of these problems among emergency room physicians and to propose practical solutions.

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