



## The Prevalence of Symptoms of Shift Work Disorder (SWD) among Nurses in the Northwestern Region, Saudi Arabia

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### ABSTRACT

**Aims:** This is the first study investigating the prevalence of SWD concerning depression, anxiety, insomnia, and fatigue in the Kingdom of Saudi Arabia. This study looks at the relationship between SWD Symptoms and shift work per week and work hours per week. **Methodology:** This study makes use of the descriptive-correlational design, and there are 250 respondents. The focus of this study is the government hospitals in Ha'il, Saudi Arabia. This study used a combination of established questionnaires which are: Hospital Anxiety and Depression Scale, Epworth Sleep Scale, and Fatigue Severity Scale. The Statistical Package for Social Sciences (SPSS) version 22 was used in the analysis of data. Frequency, percentage, and standard deviation, mean and Pearson-r was utilized. **Results:** The mean score for SWD symptoms are as follows: anxiety is 6.20, depression is 6.80, insomnia is 8.07, and fatigue is 35.28. On the relationship between shift work per week and SWD Pearson-r revealed scores ( $r=0.05$ ,  $n=199$ ,  $p=0.50$ ), ( $r=0.11$ ,  $n=199$ ,  $p=0.14$ ), ( $r=0.04$ ,  $n=199$ ,  $p=0.60$ ), ( $r=0.11$ ,  $n=199$ ,  $p=0.14$ ) for anxiety, depression, insomnia, and fatigue respectively. Finally for the relationship between work hours per day and SWD symptoms, Pearson-r revealed scores ( $r=0.25$ ,  $n=199$ ,  $p=0.001$ ), ( $r=0.26$ ,  $n=199$ ,  $p=0.03$ ), ( $r=0.16$ ,  $n=199$ ,  $p=0.001$ ), ( $r=0.25$ ,  $n=199$ ,  $p=0.03$ ) for anxiety, depression, insomnia, and fatigue respectively. **Conclusion:** This study found out that the most prevalent shift work symptom is slight dozing. Shift work per week does not influence the prevalence of shift work symptom; instead, working hours per day has a minimal influence on the shift work symptom.

**Keywords:** Correlation study, Epidemiology, Nurses, Shift work disorder, Ha'il Saudi Arabia

### INTRODUCTION

Shift work disorder (SWD) is a condition clinically recognized affecting people working at night, start work in the morning (4 am-7 am) or working in a rotating shift schedule [1]. This condition affects employee's health, family, and even decision-making leading to poor performance in the organization. Indeed, the study result has confirmed that employees affected by SWD are more likely to be affected to attend to their social and family obligations as compared to those who were not affected by SWD [2]. In particular, of all the professions, it has been publicized that health service workers receive a higher percentage in a shift system [3,4] and thus, as expected, health professionals are exposed to SWD. The likes of the nursing profession which operates round the clock are likely to be affected due to the nature of the work, and its demands in the quality of work. As such, the creation of a healthy work setting for the nursing profession is essential in sustaining the workforce in place [5]. Thus, the need to investigate the prevalence of symptoms of SWD is a must for the nursing workforce to prosper towards its expected outcomes.

Previous researchers Di Milia, et al. and Vanttola, et al. have investigated the prevalence of SWD. However, there is a dearth in the literature in the local context with the consideration of the characteristics of the population [6,7]. The previous study has shown that SWD has not been recognized in the clinical setting, and there is paucity in research in the assessment of its symptoms towards diagnosis [8,9]. Such problems include personal and health symptoms which affect job performance and eventually compromising the outcomes. Of the SWD's magnitude, employees are

vulnerable to health problems associated with work schedules with the likes of cardiovascular diseases, gastrointestinal problems, fatigue, cancer, mood disorders, anxiety, and sleep problems [10].

Further, with the shift of scheduling, employees are prone to sleep deprivation, memory impairment, dysfunctional cognition, thus resulting in poor decision-making [11,12]. Meanwhile, Moustaka and Constantinidi conveyed that nurses who were stressed are more predisposed to the incidence of accidents and on-the-job injuries and diseases [13]. Shifting of scheduling can increase the chance of medical problems, it also increases the chance of committing medical errors due to sleepiness and insomnia, and work-associated accidents as well as diseases [14]. Given the increasing data showing the impact of SWD on the individuals, there is the dearth in the literature of what SWD in the Kingdom of Saudi Arabia is. To the knowledge of the researchers, this is the first study conducted in Saudi Arabia investigating the prevalence of SWD concerning depression, anxiety, insomnia, and fatigue.

While this study provides data about the prevalence of SWD among nurses in the Ha'il region, Kingdom of Saudi Arabia, it is as well to offer a more focus basis to develop an intervention with the use of new facts to advance the health among nurses thereby improving the organizational outcomes. Significantly, this study may serve as an enhancement to shifting or scheduling of nurses aiming to prevent SWD. Further, this can benefit the patients who are the primary recipient of care from nurses in a healthy work setting. This study specifically investigates the prevalence of SWD symptoms among nurses in terms of depression, anxiety, insomnia, and fatigue. Further, it undermines the existing relationship between SWD symptoms and the shift in work and work hours per day.

## MATERIALS AND METHODS

### Research Design

This study makes use of the descriptive-correlational design using a questionnaire. This study has no controlled variables and explained the existing relationship between SWD symptoms and frequency of shift in work per week and work hours per day. Hence, this design is appropriate for this study [15].

### Setting and Sampling

The respondents of this study were the nurses in the government hospitals in Ha'il, Saudi Arabia. Approximately there are 718 nurses in the said hospitals, using Lynch formula with a 95% confidence level and five percent confidence interval, the sample size is 250. Convenience sampling was applied in this study [16].

### Instrumentation

The main instrument utilized in data gathering is a questionnaire. The questionnaire is divided into two parts; Part I covers the profile of the respondent that includes: age, sex, shift work per week, and the number of work hours per day. Part II was adapted from three widely-used and available tools; the Hospital Anxiety and Depression Scale was used (HADS) to determine the existence of anxiety and depression among the respondents. According to Djukanovic, et al. [17], who conducted a validity and reliability test for HADS, they found out that HADS showed to be a valid instrument to measure psychological distress with a score for factor loadings ranged between 0.73 and 0.84 for HADS Anxiety and between 0.54 and 0.82 for HADS Depression.

The internal consistency reliability was also examined with traditional alpha and scored 0.87 for HADS Anxiety and 0.81 for the HADS Depression. The Epworth Sleep Scale (ESS) was adapted to measure the prevalence of insomnia. Johns [18], conducted validity and reliability test of the ESS he found out that there is only one factor that is being measured by the questionnaire using factor analysis, and in terms of reliability, the questionnaire had a Cronbach's alpha score of 0.88, which means it has a high level of internal consistency. The Fatigue severity scale (FSS) utilized to determine was adapted. Impellizzeri, et al. [19], conducted a construct validity test, and the questionnaire factor analysis revealed that only 1 factor was extracted explaining 63% of the variance. The reliability test was done through Chronbach's alpha and scored 0.94, which means it has a relatively high internal consistency.

While the validity and reliability in the individual questionnaire were satisfactorily for the study, the researchers subjected the tool for validity and reliability test of the combined questionnaire as one construct. The face validity was performed by three experts in the field of nursing. One of them is an Assistant Professor in the Philippines with a Ph.D., and currently handling the medical-surgical nursing course. Another expert is the Dean of the College of Nursing in the Philippines specializing in Psychiatric Nursing and Critical Care Nursing. The third expert is the

Assistant Director for Nursing Education in a government hospital in Saudi Arabia. The mean combined score for the face validity from the validators was 4.7, which indicates that the instrument is relatively highly valid.

Before the actual data collection, the researchers conducted a pilot test to check the internal consistency of the combined questionnaire, including the profiling, HADS, ESS, and FSS. Twenty nursing students participated in a University in Hail. The Cronbach alpha yielded a score of 0.94, for the 35-item questionnaire [16]. With all the data that have been gathered, these warrant the researchers to use the combined tools to measure the prevalence of SWD among the respondents.

### **Ethical Considerations**

This study has obtained ethical approval from the Ethics Review Board (ERB) of the University of Hail (H-2016-059). The privacy, anonymity, confidentiality, and, respect for the person were fully insured in all the phases of this study. The participation of the respondents in this study was subject to their availability and willingness to answer the questionnaire; no force or coercion was done to them to answer the questionnaire. The researchers provided the respondents with information about the purpose and nature of the study, their extent of participation, as well as their rights.

### **Data Gathering Procedure**

Data gathering commenced with the orientation of the nurses about the aims of the objectives of the study. Approval of the authorities from the participating hospital was sought. The data gathering conducted between May and July 2018.

### **Tools for Data Analysis**

The data collected was organized using Microsoft excel and was processed using the Statistical Package for Social Sciences (SPSS) version 22. The frequency, percentage, standard deviation, and mean are utilized for the descriptive statistics. The Pearson-r was used to determine the significant Relationship between SWD Symptoms, and shift work per week and work hours per week.

## **RESULTS**

Half 126 (50.40%) of the respondents belong to the 25-29 age group, followed by 27.20% under the 30-34 bracket, while 11.20% in the 35-39 bracket and very few of the respondents were under 20-24 (4.40%) and 35-39 (4.00%). Only 2.80% of the respondents were aged 45 years and more. Regarding sex, almost all (91.60%) were female and very few 8.40% of the respondents are male. As to the workdays per shift work, the majority (54.80%) had five and above shifts per week while more than a third (28.40%) of the respondents had 1-2 shift work per week, and few (16.80%). Regarding the number of hours per day worked by the respondents, most of them (88.40%) had 8-9 hours, very few (7.20%), (2.80%), (1.60%) more than 11 hours, 10-11 hours and 6-7 hours a day respectively.

A majority (65.40%) of the respondents reported a normal state of anxiety ( $M=6.20$ ;  $[SD=3.85]$ ), few (21.60%) are in the borderline, and very few (13.10%) has an abnormal anxiety level. On the state of depression, respondents reported a normal depression level ( $M=6.80$   $[SD=3.70]$ ) and more than half of the majority (57.80%) of the respondents claimed a normal of depression, some (27.60%) are in the borderline, and few (14.60%) has abnormal depression level. Generally, the respondents are experiencing slight dozing ( $M=8.07$   $[SD=5.04]$ ) such that the majority (51.8.80%) of nurses reported that they did not experience dozing, some (26.60%) are experiencing moderate dozing, few (14.60%) are experiencing slight dozing, and very few (7.00%) are experiencing high dozing. Although the issue of fatigue was reported as close to the absence of fatigue ( $M=35.25$   $[SD=12.14]$ ) in general, the majority (54.80%) of the respondents are experiencing fatigue, and almost half (45.20%) of the respondents are not experiencing fatigue.

Using Pearson-r, they found no significant results on shift work per week to anxiety ( $r=0.05$ ,  $n=199$ ,  $p=0.50$ ), depression ( $r=0.11$ ,  $n=199$ ,  $p=0.14$ ); insomnia, ( $r=0.04$ ,  $n=199$ ,  $p=0.60$ ); and, fatigue ( $r=0.11$ ,  $n=199$ ,  $p=0.14$ ). On the other hand, pearson-r revealed a positive weak relationship between work hours per day to SWD symptoms; anxiety ( $r=0.25$ ,  $n=199$ ,  $p=0.001$ ); depression; ( $r=0.26$ ,  $n=199$ ,  $p=0.03$ ); insomnia ( $r=0.16$ ,  $n=199$ ,  $p=0.001$ ); and, fatigue ( $r=0.25$ ,  $n=199$ ,  $p=0.03$ ) (Tables 1-4).

**Table 1 Summary of mean scores and interpretation of SWD symptoms**

Component	Mean Scores	Interpretation
HADS Anxiety	0.00-7.99	Normal
HADS Depression	8.00-10.99	Borderline
	11.00-21.00	Abnormal
Epworth Sleep Scale	0.00-7.99	Would Never Doze
	8.00-9.99	Slight Doze
	10.00-15.99	Moderate Doze
	16.00-24.00	High Chance of Doze
Fatigue Severity Scale	1.00-35.99	Absence of Fatigue
	36.00-63.00	Presence of Fatigue

**Table 2 Distribution of respondents, N=250**

Profile	Frequency	Percentage (%)	SD
<b>a. Age</b>			
20-24	11	4.40%	1.09
25-29	126	50.40%	
30-34	68	27.20%	
35-39	28	11.20%	
40-44	10	4.00%	
45-49	4	1.60%	
50 and above	3	1.20%	
<b>b. Sex</b>			
Male	21	8.40%	-
Female	229	91.60%	
<b>c. Work Days Per Shift Work</b>			
1-2	71	28.40%	0.88
3-4	42	16.80%	
5 and above	137	54.80%	
<b>d. Work Hours Per Day</b>			
6-7	4	1.60%	0.55
8-9	221	88.40%	
10-11	7	2.80%	
more than 11	18	7.20%	

**Table 3 Prevalence of Shift Work Symptoms, N=250**

Symptom	Frequency	Percentage (%)	Mean	SD	Interpretation
<b>a. Anxiety</b>					
Normal	130	65.30%	6.2	3.85	Normal
Borderline	43	21.60%			
Abnormal	26	13.10%			
<b>b. Depression</b>					
Normal	115	57.80%	6.8	3.7	Normal
Borderline	55	27.60%			
Abnormal	29	14.60%			
<b>c. Insomnia</b>					
No Doze	103	51.80%	8.07	5.04	Slight Dozing
Slight Doze	29	14.60%			
Moderate Doze	53	26.60%			
High Doze	14	7.00%			
<b>d. Fatigue</b>					
Absence of Fatigue	90	45.2. %	35.28	12.14	Absence of Fatigue
Presence of Fatigue	109	54.80%			

**Table 4 Significant Relationship between SWD Symptoms, shift work per week and work hours per week, N=250**

Profile	Symptom	r-value	p-value	Interpretation
Shift Work Per Week	Anxiety	0.05	0.5	No Significant Relationship
	Depression	0.11	0.14	No Significant Relationship
	Insomnia	0.04	0.6	No Significant Relationship
	Fatigue	0.01	0.93	No Significant Relationship
Work Hours Per Day	Anxiety	0.25**	0.001	Positive Weak Relationship
	Depression	0.26**	0.03	Positive Weak Relationship
	Insomnia	0.16*	0.001	Positive Weak Relationship
	Fatigue	0.12*	0.001	Positive Weak Relationship

\*\*Correlation is significant at the 0.01 level (2-tailed); \*Correlation is significant at the 0.05 level (2-tailed)

## DISCUSSION

This study investigates the prevalence of symptoms of Shift Work Disorder (SWD) among the nurses in terms of depression, anxiety, insomnia, and fatigue. In this present study, insomnia was a common prevalent symptom found experienced by the shift nurses. This symptom reported by nurses was triggered by a shift work schedule that can cause poor sleep quality and insufficient sleep. Indeed, nurses with shifting work patterns generally experience disturbance in their sleep routine associated with insomnia, depression, and inability to focus at work [20], thus affecting both their health and performance outcomes. Such finding agrees with Drake [21] reporting that employees with SWD due to shifting work have had persistent insomnia as well as excessive sleepiness. On the other hand, Yazdi, et al. [22], claimed that the occurrence of insomnia, quality of poor sleep, and sleepiness during daytime was drastically noted with employees in shift work.

The non-significant relationship on the shift work per week suggests that nurses are not affected with the SWD symptoms, however, research conducted in this argument revealed otherwise [23] While the reason for this finding has not been explored in this study, it might be brought about by the fact that nurses have maintained a shift work per week avoiding impairment to carry out their tasks. On the other hand, the significant weak the positive relationship found in work hours per day implies adverse outcomes to the performance of nurses. This result supports the experiences of nurses in the studies of Caruso [24] and Okuyan [25] wherein the extended hours in shift work among nurses is extensive, and they are at risk of developing mental problems, the undesirable outcome on health, and reduced work performance. However, anecdotal reports claimed that negative outcomes of work hours per day often disregard the anxiety felt because work and income are more vital for the sustenance of their family.

Lastly, this present finding suggests that as the working hours of the respondents' increases the fatigue of the respondents' also increases. Indeed, fatigue is the most common response to working beyond shift work. This result relates to the general findings of the earlier research conducted that with the prolonged work shifts, the greater the likelihood of fatigue [26], such that it reduced the state of alertness, thus possibly leads to further adverse events [26,27]. This present study finding supports the idea that a nurse must have work and life balance in order to keep up the quality of work leading to better performance outcomes. Basically, the need to have a workplace culture that fosters respect for nurses with a regard rest day, breaks, going home on time and having an option to decline over time with no reprisal is advocated [26] Hence, having these as ideals can improve nurses' performance.

## CONCLUSION

This study found out that the most prevalent shift work symptom is slight dozing. Shift work per week does not influence the prevalence of shift work symptom; instead, working hours per day has a minimal influence on the shift work symptom. Data from this research could inform nurse managers in reforming their policies as regards shift work.

## DECLARATIONS

### Conflicts of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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