Effect of Shift Working on Depression Prevalence and Sexual Life of Female Nurses: A Correlational Study in Turkey

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ABSTRACT

Objectives: This study aimed to determine the effect of nurses' way of working on depression indications and their sexual lives ($N = 163$). *Methods:* The study had a correlational design. The present study was conducted with the participation of 163 women nurses who met the criteria for participation in the research in Turkey. The questionnaire included three psychometrically tested scales: the Female Sexual Function Index (FSFI), the Beck Depression Inventory (BDI), and the Visual Analog Scale (VAS), as well as the participant information form. *Results:* The study found that the total mean score of BDI of nurses who worked in shifts was higher than that of those who worked only in daytime ($p < .001$). The study also found that the total mean score of FSFI and its subscales other than desire ($p > .05$) were significantly lower than that of those who worked only in daytime. *Conclusion:* Nurses who worked night shifts had higher rates of depression (based on the BDI) and higher rates of sexual dysfunction.

Introduction

Hospitals provide continuous services for 24 hours to maintain healthcare services. Shift work can negatively affect an employee's psychological, physiological, and social life. The regular release of hormones such as melatonin and cortisol in shift-workers gets disturbed (Dolu et al., 2013; Korompeli et al., 2009; Rouzi et al., 2015). Melatonin is secreted by the pineal gland and is linked to the sleep–wake cycle (Luria et al., 2013). Melatonin and cortisol releases in the body are inversely correlated. The cortisol level of individuals who work in shifts increases with the decrease in their melatonin release. Stress and depression are commonly encountered by individuals working in shifts because an increased cortisol release also increases the anxiety and worry statuses of a person (Freeman et al., 2000; Ramachandran et al., 2016). Psychological factors, including anxiety and depression, have been linked to a higher risk of sexual dysfunction

(Bodenmann & Ledermann, 2008; Squibb et al., 2019).

Sexual health is more than the absence of disease. Sexual pleasure and satisfaction are integral components of wellbeing and require universal recognition and promotion. The brain is the center of sexuality. A large number of central nervous system areas are associated with sexuality (Andersen et al., 2011; Hertlein et al., 2015; Ford et al., 2019). Therefore, changes in hormones such as cortisol and melatonin resulting from working in shifts affect the desire level. The change in the level of hormones reduces free testosterone and steroid-binding hormone levels. This may lead to sexual aversion and orgasm difficulties in night-shift workers (Jardim-Perassi et al., 2014; Stamatiou et al., 2016). Literature revealed that Stamatiou et al. examined the sexual dysfunction levels of female health care personnel and found that individuals working in shifts experienced more sexual dysfunction than those

who worked only day shifts, which was consistent with published studies (Stamatiou et al., 2016).

The aim of this study was to determine the effect of working in shifts on the level of depression prevalence and women's sexual lives.

The questions of the study were as follows:

1. Does working in shifts affect female sexual function?
2. Does working in shifts affect depression prevalence?
3. Is there any difference between the sexual satisfaction of nurses who work only in daytime and in shifts?
4. Is there an association between depression prevalence and women's sexual lives?

Materials and methods

The study had a correlational design, which used both relational analysis and regression. The study was performed between May and July 2018 at two medical faculty hospitals in Istanbul, Turkey. The sample of the study included volunteer female nurses who worked at these hospitals. The inclusion criteria were as follows: having an active sex life for at least a year and volunteering to participate in the study. The exclusion criteria were as follows: male, using any drug that could affect sexual function, being pregnant, having diagnosed with a mental disorder, and going through menopause. The present study was conducted with the participation of 163 women nurses who met the criteria for participation in the research.

Participating nurses completed the participant information form, the Female Sexual Function Index (FSFI), and the Beck Depression Inventory (BDI). Ethical committee permission (Date and No: 18235917-903.07.01- 4110-70) and informed consents of all participants were taken to conduct the study.

Participant information form

This form, developed by the researchers by benefiting from the related literature, included 19 questions about age, education level, income level, and obstetric information (Rouzi et al., 2015; Stamatiou et al., 2016). Partner compatibility, sexual satisfaction, and physical tiredness levels were assessed using the Visual Analog Scale (VAS). Partner compatibility, ability to live together and comply with each other's expectations, as well as the ability to resolve disputes and communicate were assessed based on self-reporting. VAS is commonly used in scientific researches and assesses participants' personal experiences in a reliable way. The score that can be obtained on the VAS varies between 0 and 10 (min and max; Wewers & Lowe, 1990).

FSFI

The FSFI is a questionnaire developed by Rosen et al. in 2000. It examines the six subscales of female sexual function (Rosen et al., 2000). It assesses sexual function or problems in the last 4 weeks. The index has six subscales named desire, arousal, lubrication, orgasm, satisfaction, and pain. All subscales are scored between 1 and 6. The total score varies between 2 and 36. Sexual functions are maintained more sufficiently as the score gets higher. Wiegel determined the cutoff score of the scale as 26.55, and scores below 26.55 were assessed as sexual dysfunction (Wiegel et al., 2005). The Turkish validity and reliability study of FSFI was conducted by Oksuz and Malhan (2006).

BDI

The BDI was developed by Beck to measure depression risk, level of depressive symptoms, and change in severity (Beck et al., 1961). Tegin and Hisli carried out its validity and reliability study and determined the cutoff point as 17. Getting a higher score on the scale indicates high levels of depression severity (Tegin, 1980; Hisli, 1988).

Data analysis

The data were analyzed using the IBM SPSS Statistics 21 program. The compatibility of variables to normal distributions were assessed using the Kolmogorov–Smirnov test and histograms. Mean, standard deviation, frequency, and

Table 1. Nurses' Sociodemographic Characteristics and Nurses' Way of Working and Descriptive Characteristics ($N = 163$).

Characteristics	$M \pm SD$	n	Min–max	%
Age (year)	36.01 ± 6.37		25–59	
Partner/spouse's age (year)	39.18 ± 7.59		27–66	
Duration of cohabitation with partner/spouse (year)	11.14 ± 7.66		1–42	
Education level				
High school		17		10.4
Undergraduate		124		76.1
Postgraduate		22		13.5
Income level				
Low		32		19.6
Equal		112		68.7
High		19		11.7
Way of working				
Always daytime		62		38.0
Shift working		91		55.8
Always nighttime		10		6.1
Monthly night shift				
96 hr and less		31		30.7
96–108 hr		22		21.8
108 h and more		48		47.5
Duration of night shift				
8 hr		3		3.0
12 hr		18		17.8
18 hr		80		79.2

frequency distribution were used as descriptive statistics, and Mann–Whitney U test and chi-square test were used to compare variables. Multiple logistic regression was used appropriately. The significance value was determined to be $p < .05$.

Results

Of the 173 nurses participating in this study, 163 (94.2%) answered all the questions and were included in the study, and 12 did not answered all the questions. Table 1 shows the participants' sociodemographic and obstetric characteristics. The mean age of the nurses was 36.01 ± 6.37 years; most of them were university graduates (76.1%) and had equal incomes and expenses (68.7%).

The study found that 62.0% ($n = 101$) of nurses worked in shifts, and 47.5% ($n = 48$) of those who worked in shifts worked for 108 hr or more in a month (Table 1). Sexual satisfaction levels ($p < .01$) and partner compatibility ($p = .005$) of nurses working in shifts were statistically lower than those who worked only in daytime, and their physical tiredness levels ($p < .001$) were significantly higher (Table 2).

Of the participants, 16.0% ($n = 26$) had a supraliminal value (depressive) on BDI

(9.70 ± 8.06). The sexual function of nurses was at a moderate level (25.54 ± 6.03), and 47.2% ($n = 77$) of them experienced sexual dysfunction according to the FSFI. Table 3 shows nurses' mean scores obtained from the BDI as well as the FSFI and its subscales. The study found a weak inverse correlation between the BDI score and the total FSFI score and its subscales named desire, arousal, lubrication, orgasm, satisfaction, and pain ($p < .001$). A weak negative correlation was found between the nurses' physical tiredness levels and the total FSFI score and its subscales while a weak, positive, statistically significant correlation was found between physical tiredness levels and BDI score ($p < .05$). A weak positive correlation was found between the nurses' partner compatibility levels and the total FSFI score and its subscales while a weak, negative, statistically significant correlation was found between partner compatibility levels and BDI score ($p < .05$; Table 3).

Multiple regression analysis was carried out to determine the level of influence of physical tiredness and partner compatibility levels of nurses on the total score of the BDI and FSFI and their subscales (Table 4). Predictive coefficient of physical tiredness was determined as $R^2 = 0.395$. Change in the physical tiredness score was found to be associated with the change in the total score

of the FSFI. Predictive coefficient of partner compatibility was determined as $R^2 = 0.432$. Change in the partner compatibility score was found to be associated with the total score of lubrication, orgasm, and the FSFI. The model constituted according to F analysis result in the analysis of variable table was statistically significant and linear (physical tiredness: $F = 4.511$, $SD = 0.886$, $p < .001$; partner compatibility: $F = 5.085$, $SD = 0.801$, $p < .001$). No significant correlation was found between the statuses of nurses' way of working with the BDI below or above the cutoff point ($p = .087$). The study found that the total mean scores of the BDI of nurses working in shifts were significantly higher ($p < .001$). Despite no statistically significant difference between the total FSFI and the mean desire subscale score of nurses' way of working ($p > .05$), nurses working in shifts had a significantly lower sexual function ($p < .001$, Table 5). The sexual dysfunction rate of nurses working in shifts was significantly higher than that of nurses who worked only in daytime (68.0% and 18.0%, respectively; $\chi^2 = 22.604$, $p = .002$). No significant differences were found between the duration of nighttime shift and monthly shift and the total mean scores obtained from the BDI and FSFI ($p > .05$).

Table 2. Sexual Satisfaction, Physical Tiredness, and Partner Compatibility of Nurses ($N = 163$).

VAS	Always daytime $M \pm SD$	Shift working $M \pm SD$	U^a (p)
Sexual satisfaction	7.36 ± 2.13	5.02 ± 2.08	−6.271 (<.01)
Physical tiredness	7.16 ± 2.23	8.31 ± 1.76	−3.190 (<.001)
Partner compatibility	8.15 ± 1.69	7.34 ± 1.88	−2.834 (.005)

Note. VAS Visual Analog Scale.
[a]Mann–Whitney U test.

Table 3. Participants' Scores Obtained from the FSFI and BDI and Correlations ($N = 163$).

	FSFI							
Variable	Desire	Arousal	Lubrication	Orgasm	Satisfaction	Pain	Total	BDI
$M \pm SD$	3.45 ± 0.94	3.92 ± 1.09	4.65 ± 1.25	4.46 ± 1.24	4.59 ± 1.20	4.44 ± 1.39	25.54 ± 6.03	9.70 ± 8.06
Min–max	1.20–6	1.20–6	1.20–6	1.20–6	1.20–6	1.20–6	2–35.4	0–38
Partner compatibility, VAS[a]	.307***	.393***	.228**	.380***	.322***	.221**	.361***	−.196**
Physical tiredness, VAS[a]	−.360***	−.348***	−.209**	−.295***	−.289***	−.180**	−.323***	.279***
BDI[a]	−.363**	−.472**	−.380**	−.446**	−.474**	−.359**	−.491**	

Note. FSFI = Female Sexual Function Index; BDI = Beck Depression Inventory; VAS = Visual Analog Scale.
[a]Pearson correlations analysis (two-tailed).
*$p < .05$. **$p < .01$. ***$p < .001$.

Table 4. Linear Regression Analysis of Nurses' Physical Tiredness and Partner Compatibility ($N = 163$).

						Interval confidence	
Variable	B	Beta	SE	t	p	Lower	Upper
Physical tiredness, VAS							
FSFI							
Desire	−0.473	−0.220	0.229	−2.066	**.004**	−0.925	−0.021
Arousal	−0.204	−0.110	0.280	−0.729	.467	−0.758	0.349
Lubrication	0.093	0.058	0.216	0.431	.667	−0.334	0.520
Orgasm	−0.179	−0.110	0.254	−0.706	.481	−0.681	0.323
Satisfaction	−0.37	−0.022	0.261	−0.143	.887	−0.553	0.479
Pain	0.098	0.067	0.170	0.578	.564	−0.237	0.434
Total	10.089		0.886	11.389	**< .001**	8.339	11.839
BDI	0.034	0.133	0.021	1.567	.119	−0.009	0.760
Partner compatibility, VAS							
FSFI							
Desire	−0.316	−0.161	0.288	−1.098	.274	−0.885	0.252
Arousal	−0.014	−0.008	0.393	−0.036	.972	−0.791	0.763
Lubrication	−0.663	−0.448	0.305	−2.171	**.031**	−1.266	−0.060
Orgasm	4.860		0.801	6.064	**< .001**	3.277	6.444
Satisfaction	−0.507	−0.330	0.416	−1.219	.225	−1.327	0.314
Pain	−0.507	−0.381	0.294	−1.723	.087	−1.088	0.074
Total	0.454	1.477	0.230	1.976	**.05**	0.000	0.908
BDI	0.001	0.004	0.048	0.48	.962	−0.037	0.039

Note. FSFI: Female Sexual Function Index; BDI: Beck Depression Inventory; VAS: Visual Analog Scale.

Table 5. Comparison of Mean Scores of FSFI and Subscales With Independent Variables (N = 163).

Variable	FSFI							BDI M ± SD
	Desire M ± SD	Arousal M ± SD	Lubrication M ± SD	Orgasm M ± SD	Satisfaction M ± SD	Pain M ± SD	Total M ± SD	
Way of working								
Only in daytime	3.66 ± 0.98	4.37 ± 0.99	5.02 ± 1.15	4.91 ± 1.104	4.98 ± 1.08	4.91 ± 1.32	27.88 ± 5.58	6.83 ± 7.11
Shift working	3.32 ± 0.89	3.64 ± 1.05	4.42 ± 1.26	4.18 ± 1.25	4.36 ± 1.22	4.15 ± 1.36	24.09 ± 5.86	11.46 ± 8.14
MWU(Z)[a]	−1.789	−4.713	−3.557	−3.967	−3.536	−3.636	−4.475	−4.150
p	.074	<.001	<.001	<.001	<.001	<.001	<.001	<.001
Monthly night shift								
96 h and less	3.50 ± 0.12	3.88 ± 0.11	4.70 ± 0.15	4.50 ± 0.15	4.65 ± 0.17	4.32 ± 0.21	25.57 ± 0.27	11.25 ± 1.65
96–108 h	3.27 ± 0.18	3.47 ± 0.26	4.21 ± 0.32	4.20 ± 0.27	4.25 ± 0.27	4.07 ± 0.30	23.49 ± 1.42	12.00 ± 2.02
108 h and more	3.22 ± 0.14	3.56 ± 0.16	4.35 ± 0.19	3.97 ± 0.20	4.21 ± 0.19	4.09 ± 0.20	23.42 ± 0.92	11.35 ± 0.98
KW χ^2[b]	0.686	1.894	0.839	2.486	2.003	0.437	2.441	0.428
p	.710	.388	.657	.288	.367	.804	.295	.807

Note. FSFI: Female Sexual Function Index; BDI: Beck Depression Inventory; [a]MWU = Mann–Whitney U test; [b]KW χ^2 = Kruskal–Wallis H test.

Discussion

Hospitals provide continuous services for 24 hr to maintain healthcare services. Women are more likely to be in nursing jobs or similar care jobs more than men. Unfortunately, working night shifts can cause mental and social health issues by distorting the daily dynamics of the individual. Adverse psychological problems related to professions with night shift working have become a concern negatively affecting the quality of life (Korompeli et al., 2009). This also negatively affects sexual life, which is a quality-of-life parameter.

Studies conducted on nurses in Turkey and other countries were similar to this study in terms of sociodemographic characteristics (Dolu et al., 2013; Enns et al., 2015; Gunaydin, 2014; Wang et al., 2015). Selvi et al. and Akyuz showed that depression levels of nurses working in night shifts were higher than those of nurses who worked only in daytime (Akyuz, 2015; Selvi et al., 2010). Similarly, Chiang and Chang found that depression levels of nurses working in night shifts were higher. However, Chiang and Chang found an inverse correlation between duration of work hours and depression The present study found a correlation only between the way of working and the depression level ($p = .005$); no correlation was found between duration of work hours and depression ($p < .005$) (Chiang & Chang, 2012).

Sreelakshmy et al. examined the sexual dysfunction prevalence among women complaining of depression. They found that women with higher depression levels had more complaints about sexual dysfunction (Sreelakshmy et al., 2017). Moreover, Bel et al. examined the effect of depression levels of individuals with inflammatory bowel syndrome on sexual dysfunction. They found that depression was the most significant factor for distorted sexual function (Bel et al., 2015). The present study showed that the BDI scores of nurses working in night shifts were higher than those of nurses who worked only in daytime. In addition, sexual functions of nurses working in night shifts were in a more adverse status compared with those of nurses who worked only in daytime according to their FSFI scores. Stamatiou et al. examined the sexual dysfunction levels of female healthcare personnel

and found that individuals working in night shifts experienced more sexual dysfunction than those who worked only in daytime, which was consistent with published studies (Ustun & Yucel, 2011).

Ustun and Yucel conducted a study with 97 nurses to examine the sleep quality of nurses and found that nighttime shifts negatively affected the lives of 59.9% of nurses and 83.5% felt tired at the end of their shift (Ustun & Yucel, 2011). Balci et al. examined the tiredness and burnout level of nurses and found that 66.3% of the participants worked in night shifts and 76.9% of them experienced chronic tiredness (Balci et al., 2013). This study found that 77.3% of nurses experienced physical tiredness according to the VAS scores.

Blazquez et al. examined the effect of tiredness on sexual dysfunction and found that women experiencing tiredness symptoms had sexual dysfunction complaints ($p < .05$) (Blazquez et al., 2015). Goldin et al. conducted a study on 200 participants and determined that an increased tiredness level negatively affected the sexual activity cycle (Goldin et al., 2014). The present study found that physical tiredness levels of female nurses working in night shifts were higher than those of nurses who worked only in daytime. Sexual response cycle starts with the arousal phase. This cycle being broken at any phase may cause sexual function problems. If the phases of sexual desire and arousal do not occur in a female, the result is a decrease in lubrication causing pain during sexual intercourse (Hertlein et al., 2015). This study determined that nurses working in night shifts had lack of sexual drive and arousal problems according to the results of FSFI. Participants stated that they had a decrease in lubrication and experienced pain during sexual intercourse. The results showed the nurses experienced sexual dissatisfaction and orgasm problems, which may lead to lack of sexual drive and pain in females ($p < .001$).

Conclusion

The present study found that female nurses working in night shifts had a higher rate of experiencing sexual dysfunction and depression compared with nurses who work only in daytime. The study also found that female nurses working in night shifts had higher levels of physical tiredness and depression prevalence compared with nurses who work only in daytime. In parallel with published studies, this study found that female sexual function was closely related to physical tiredness and depression level.

Research limitations

The study was limited to female nurses who agreed to participate in the study at the two hospitals. The research results could not be generalized to the whole society. Menopausal women, pregnant women, and women with mental problems were not included in the study. Hence, large-sample studies should be conducted in the future. Support programs for female nurses working in shifts should include sexual life and mental status.

Disclosure statement

The authors declare that there is no conflict of interest. The authors alone are responsible for the content and writing of the paper.

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