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Sleep, Dietary Habits, Smoking Status and Physical Activity among Jordanian Nurses

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ABSTRACT

Background: Healthy lifestyle is important in promoting health and reducing risk of chronic diseases. Nurses' lifestyle could be affected negatively by working night shifts or always rotating shifts, long working hours and high exposure to work-related stress. ***Purpose***: This study aims to assess nurses' lifestyle and factors associated with it. ***Methods***: A cross-sectional design with an online survey was used in this study. The sample included 203 Jordanian nurses from four hospitals. Sleep quality was assessed using the Pittsburgh Sleep Quality Index, while dietary habits were assessed using the Rapid Eating Assessment for Participants-Shortened Version. Physical activity was assessed using the International Physical Activity Questionnaire. ***Results***: Nurses' mean age was 32.7±5.66 years and on average, they have 8.27±5.63 years of experience. Approximately, 25% of nurses were tobacco smokers. The majority of nurses reported poor sleep quality (n = 174, 85.5%). Approximately, 58% of nurses were overweight or obese and 41.9% of nurses had poor dietary habits. Only 39.5% of nurses reported moderate or high levels of activity. ***Conclusion***: Jordanian nurses' lifestyle showed poor quality in most aspects. ***Implications for Nursing***: Nurses should be aware of the importance of adopting a healthier lifestyle to prevent possible complications. Nurse leaders should consider the health status of nurses and prevent illnesses by encouraging a healthier lifestyle of nurses.

Keywords: Nurses, Lifestyle, Sleep quality, Dietary habits, Nutritional status, Physical activity.

What does this paper add?

1. Jordanian nurses' lifestyle showed poor quality in most aspects.
2. More than a half of Jordanian nurses were either overweight or obese.
3. The gender of the nurse, years of experience and type of shift worked regularly have significant effects on the lifestyle of nurses.

Introduction

Nurses represent 50% of the healthcare professionals, with approximately 27 million nurses worldwide (World Health Organization: WHO, 2022). In Jordan, the total number of nurses and midwives is 36,617 (Jordan Nurses and Midwives Council: JNMC, 2021). The lifestyle is defined as a way of life for people or individual's activities, behaviors and living conditions over which people have control and may

affect their health status (Berman et al., 2021). Lifestyle may include many behaviors, such as dietary habits, physical activity, sleep pattern, smoking or alcohol use and the use of seatbelt or helmet (Berman et al., 2021).

Healthy lifestyle is important in promoting health, reducing risk of chronic diseases or different types of cancer and reducing earlier mortality. Approximately, 50% of coronary artery disease cases are attributed to unhealthy lifestyle (Khera et al., 2016). Nowadays, most people have an unhealthy lifestyle because of advanced technology and rapid pace of life. Consequently, more people, including healthcare professionals and nurses, are being classified as smokers, overweight or obese, physically inactive and having poor sleep quality (Priano et al., 2018). The prevalence of smoking among healthcare professionals is ranging between 17% and 31% globally, while in Jordan, it reaches 56% (Abou-ElWafa et al., 2021; Nilan et al., 2019). In addition to the well-known negative physiological consequences of smoking, nurses are considered a role model for their patients and thus, when patients see nurses smoking, this may affect the trust relationship negatively and patients may not comply with nurses' advice anymore (Zapka et al., 2009).

A high percentage of nurses suffer from sleep disorders. For example, Tsai and Liu (2012) reported that 35.5% of nurses in China have sleep disorders, while in the USA, a half of nurses reported sleeping less than 7 hours and 31% of nurses had chronic insomnia (American Academy of Sleep Medicine: AASM, 2019). Also, Suleiman et al. (2020) reported that 92.1% of emergency nurses in Jordan have poor sleep quality. There are several negative consequences of sleep disorders, which may include high levels of stress and mental disorders, mainly depression, which can increase the rate of suicide. Also, sleep disorders are associated with high risk of obesity, hypertension, diabetes mellitus, myocardial infarction, strokes and respiratory failure (AASM, 2019; Mieda and Sakuri, 2013; Rosado et al., 2015). Also, sleep disorders can increase distractibility and carelessness in work, which may lead to medical errors (AASM, 2019).

Background

Several studies have focused on patients' lifestyle and nurses' role in promoting the health of patients, but few studies have examined the nurse lifestyle (Priano et al., 2018). Previous studies that have examined nurse

lifestyle showed that most nurses have unhealthy behaviors. For example, these studies showed that approximately two-thirds of nurses were physically inactive and were at high risk for poor dietary habits (Nahm et al., 2012; Priano et al., 2018). Previous studies showed that most nurses have an unhealthy lifestyle related to higher exposure to work-related stress (Hensel, 2011; Kurnat-Thoma et al., 2017). Also, nurses have an unhealthy lifestyle, because they use ineffective coping methods to deal with stressors, like smoking, overdrinking of coffee, overeating or poor dietary options and being physically inactive (Kurnat-Thoma et al., 2017).

Nurses' lifestyle could be affected negatively for several reasons. Nurses have different work day and night shifts and this shift rotation, in addition to long working hours, have negative consequences. For example, nurses in night shift compared with other shifts showed higher levels of insomnia, fatigue, obesity, smoking, chronic diseases, higher levels of stress, reduced job performance, increased absenteeism and job dissatisfaction (Caruso, 2014; Chang and Ping 2021; Priano et al., 2018). But, this does not mean that nurses who are working the day shift have a healthy lifestyle. While being less prone to sleep problems and have organized meal times compared to nurses who are working in night or rotating shifts, they remain physically inactive (Caruso, 2014; Chang and Ping, 2021).

Many nurses are experiencing anxiety, depression, sleep disturbances, obesity, poor nutritional status, fatigue, increase absenteeism, job dissatisfaction and increased rates of medical errors (Caruso, 2014; Chang and Ping, 2021). So, it is important to examine nurses' lifestyle, because this may help leaders and policy makers determine nurses' physical, social and occupational functioning, which may require making some changes in institutions' policies that may facilitate adopting a healthier lifestyle by nurses. Also, the results of this study may help nurses be aware of the unhealthy behaviors and make necessary changes to adopt a healthier lifestyle. Previous studies that investigated nurses' lifestyle focused only on one aspect, such as sleep, physical activity, eating habits and smoking. This is the first study in Jordan that explored these aspects all at once, which gives a more accurate and comprehensive assessment of nurses' lifestyle.

Methods

Design

A cross-sectional correlational design was used in this study. The study was conducted in four hospitals: two governmental hospitals, one private hospital and one university hospital.

Sample

Nurses were included in the study if they were registered nurses, with an age range between 20 and 50 years and work full-time in bedside care. Nurses who self-reported severe chronic diseases and nursing managers or administrators were excluded. The sample size was calculated by using G* Power software (Faul et al., 2007), ANOVA was used as the main analysis method to calculate the sample size, with a level of significance equal to 0.05, a power equal to 0.8, a medium effect size and 4 groups of comparison. So, the total sample size was 203 registered nurses. Convenience sampling was used to recruit the nurses through connections with nursing leaders and social-media groups (WhatsApp) at each hospital.

Measures

Demographic, Smoking and Work-related Data

This part was developed by the researchers and consisted of many demographical variables, such as age, gender, … etc., to describe the study sample and examine their effects on nurses' lifestyle. Also, this part included personal and work-related variables, such as department, working shift, owning a private car and height and weight of participants. These variables were chosen based on literature, which showed that they could influence lifestyle. Finally, to examine unhealthy behaviors, this part included questions to assess smoking, such as tobacco-smoking status, number of cigarettes per day, the use of e-cigarette smoking and frequency of using these methods per day.

The Pittsburgh Sleep Quality Index (PSQI)

PSQI is a self-rated questionnaire to measure sleeping habits, sleep quality and disturbances over a 1-month time interval. It has 19 individual items and participants should answer questions by choosing the option that represents their sleeping habits. To calculate the PSQI total score, seven component scores are derived, each scoring from 0 (no difficulty) to 3 (severe difficulty). The component scores are summed to produce a total score (ranging from 0 to 21), with higher scores meaning poorer sleep quality. The cut-off value is 5 and thus, total scores higher than 5 indicate poor sleep quality (Park et al., 2018; Suleiman et al., 2020). The reliability coefficient of the PSQI in Arabic population was acceptable (Cronbach's alpha = 0.70) (Suleiman et al., 2010). The same level of reliability (Cronbach's alpha = 0.70) was found in this study.

Rapid Eating Assessment for Participants - Shortened Version (REAPS)

REAPS is an instrument developed by Segal-Isaacson (2004) to assess dietary habits during the past 7 days. It has 16 items and for the first 13 items, participants should answer by choosing the option that represents their food habits (1 usually – 3 rarely/never). For the first 13 items, the total score ranges between 13 and 39, with higher scores meaning healthier food choices and dietary habits. The cut-off value is 26 and thus, total scores less than 26 indicate poor dietary habits. The last three questions have a different scoring system (yes/no questions or 5-point Likert scale) and ask about cooking preferences and the participant's willingness to change dietary habits in the future. The REAPS showed good reliability scores previously (Cronbach's alpha = 0.86) (Johnston et al., 2018). In this study, REAPS showed good reliability scores (Cronbach's alpha = 0.86).

The International Physical Activity Questionnaire (IPAQ)

IPAQ consists of 7 items to measure health-related physical activity. The items measure walking time, vigorous-intensity physical activity, moderate-intensity physical activities and sedentary activity during the last 7 days (Craig et al., 2003). The participant should answer by writing the number of minutes spent performing physical activity per day. Next, this will be transformed into minutes a week (METs), which represent the amount of energy expended to perform physical activity (Craig et al., 2003). IPAQ classifies people into 3 groups according to their level of activity during the week: low, moderate and high. Low (sedentary) level of activity is scored if the person achieved less than 600 MET minutes/week. Moderate level of activity is scored if the person reported 5 or more days of any combination of walking, moderate-intensity or vigorous-intensity activities, achieving a

minimum total physical activity of at least 600 MET minutes/week (Craig et al., 2003). High level of activity is scored if the person reported 7 or more days of any combination of walking, moderate-intensity or vigorous-intensity activities, achieving a minimum total physical activity of at least 3000 MET minutes/week. The IPAQ Arabic version showed acceptable to excellent levels of reliability (Helou et al., 2018). In this study, IPAQ showed an acceptable level of reliability (Cronbach's alpha = 0.77).

Data Collection and Ethical Considerations

Data was collected using an online survey. Google Form was used to develop the survey and the link was distributed *via* e-mails and WhatsApp groups of the four hospitals. The data was collected by the researchers during approximately one month during the period from 18 July 2020 to 12 August 2020. Data was kept in a laptop that has a password and is used only by the researchers. The Institutional Review Board (IRB) acceptance was obtained from the study setting. All participants were informed through the online survey about the purpose and significance of the study, handling data with complete confidentiality and clarifying to the participants the right to withdraw from the study at any time. Informed consent was obtained from all participants during the first step of the survey by answering a yes/no question indicating their approval/willingness to participate in the study.

Data Analysis

Statistical analysis was conducted using the Statistical Package for Social Sciences software (SPSS), version 25. Data was screened for errors, missing data and outliers before actual analysis. The researchers used descriptive statistics to estimate sample characteristics and describe nurses' lifestyle. They conducted inferential statistics using Pearson's correlation, independent t-test, one-way ANOVA and chi-square test.

Results

The sample included 203 nurses, with a 71.2% response rate. The mean age of participants was 32.7±5.66 years, their age ranged from 20 to 50 years and they reported having 8.27±5.63 years of experience. More than a half of participants were females (n = 118, 58.1%). Most of the participants were married (n = 128,

63.1%), while approximately one-third of the participants were single (n = 67, 33%). Most nurses who have children (n = 131, 64.5%) reported having only one or two children (n = 88, 69.5%). Approximately, 44.3% of nurses reported that they are always rotating shifts and approximately, 60% of nurses have private cars. Almost a quarter of the nurses were tobacco smokers (n = 52, 25.6%), while 29.1% (n = 59) of them reported e-cigarette smoking. See Table 1.

Table 1. Demographic, personal and work-related characteristics (N = 203)

Variable	Frequency %
Gender	
Male	85 (41.9)
Female	118 (58.1)
Marital status	
Single	67 (33)
Married	128 (63)
Widowed	1 (0.5)
Divorced	7 (3.5)
Number of children	
1-2	88 (69.5)
3-4	29 (22.1)
5-6	11 (8.4)
Educational level	
BSN	172 (84.7)
MSN	26 (12.8)
PhD	5 (2.5)
Unit/floor	
Critical Care Unit	93 (45.8)
General Unit	110 (54.2)
Regular shift	
Day shift	51 (25.1)
Night shift	62 (30.6)
Rotating always	90 (44.3)
Having a car	
Yes	121 (59.6)
No	82 (40.4)
Tobacco smoking	
No	151 (74.4)
Yes	52 (25.6)
E-cigarette smoking	
No	144 (70.9)
Yes	59 (29.1)

Table 2 shows descriptive statistics of the major concepts in the study. The mean number of sleeping hours was 6.291±1.699 hours. Nurses reported poor sleep quality with very few problems (PSQI mean score = 8.015± 3.473). The majority of nurses reported poor sleep quality (n = 174, 85.5%). Nurses had a relatively high body mass index (BMI) mean score (26.80±4.450)

and more than a half of nurses are classified as being overweight or obese (n = 118, 58%). Nurses had a mean score of REAPS equal to 26.80±5.836 and the findings showed that 41.9% of nurses had poor/bad dietary habits. Questions 14-16 of the REAPS showed that 131 (64.5%) nurses reported that they usually feel well enough to cook rather than ordering from or going to restaurants, while 121 (59.6%) nurses reported that they are willing to change their dietary habits in order to be healthier. Regarding physical activity, the mean score of METs per week was 926.70±1493.699, which reflects moderate physical activity. In this study, 39.5% of nurses reported moderate and high levels of activity (31% moderate and 8.5% high). See Table 2.

Table 2. Descriptive statistics of the major concepts of the study (N = 203)

Variable	Mean (SD)	Range	Category frequency (%)	
Sleep hours	6.291 (1.699)	2.5-12	7 or more hrs	81 (39.9%)
			Less than 7 hrs	122 (60.1%)
PSQI	8.015 (3.473)	1-18	Good sleep	29 (14.5%)
			Poor sleep	174 (85.5%)
BMI	26.010 (4.450)	16.8-42.2	Underweight	8 (3.9%)
			Normal weight	77 (38.1%)
			Overweight	85 (41.7%)
			Obese	33 (16.3%)
REAPS	26.803 (5.836)	13-39	Good dietary habits	118 (58.1%)
			Poor dietary habits	85 (41.9%)
No. of cigarettes	24.67 (23.44)	1-60		
IPAQ METs/Week	926.702 (1493.699)	0-11268	Low PA	123 (60.5%)
			Moderate PA	63 (31%)
			High PA	17 (8.5%)

PSQI: The Pittsburgh Sleep Quality Index.
BMI: Body Mass Index.
REAPS: Rapid Eating Assessments for Participants.
IPAQ: The International Physical Activity Questionnaire.

Factors Affecting Smoking Status

Chi-square was used in this analysis. There was a significant association between smoking and gender (χ^2 = 62.344, p <0.001). Male nurses showed significantly higher tobacco-smoking rates (n = 46, 54.1%) than female nurses (n = 6, 5.1%). Also, there was a significant association between tobacco smoking and shift (χ^2 = 10.378, p <0.006). Nurses working dominantly night shift had the highest smoking prevalence (n = 25, 40.3%), while nurses who work day shifts had the lowest rate (n = 11, 21.6%). There was no significant association between smoking and other demographic and work-related variables.

Factors Affecting Sleep Quantity and Quality

Table 3 shows the comparison between sleeping hours and PSQI total scores based on demographics and work-related factors. Independent t-test was used in this analysis. The results showed no significant differences in sleeping hours between nurses who have children and those who don't. On the other hand, there was a significant difference in sleeping hours based on gender. Female nurses reported significantly more sleeping hours (m = 6.669±1.653) than male nurses (5.765±1.630). Also, nurses who do not smoke tobacco or e-cigarettes and do not have cars had significantly more sleeping hours than those who smoke and those who have cars. Regarding PSQI total scores, the findings showed that female nurses, nurses who have children and those who do not smoke tobacco or e-cigarettes showed significantly better sleep quality as indicated by having significantly lower PSQI scores than male nurses, nurses who do not have children and nurses who do not smoke. See Table 3.

Regarding the type of shift and its effect on sleep, we used one-way ANOVA in this analysis. There was no significant difference between shifts according to sleeping hours (f = 0.820, p = 0.442). However, there was a significant difference between shifts according to PSQI total score (f = 7.833, p= 0.001). *Post-hoc* analysis

revealed that nurses who work night shifts (n= 62, PSQI = 9.016±3.428) showed significantly the highest PSQI total score when compared with nurses in day shift (n = 51, PSQI = 6.479±2.873) and rotating always shift (n = 90, PSQI = 8.144±3.546). *Post-hoc* analysis showed no significant difference in PSQI total scores between nurses who work night shifts and nurses in rotating always shift.

Table 3. The effect of demographic and personal factors on sleep quantity and quality (N = 203)

		N	Sleep hours Mean (SD)	t	PSQI Mean (SD)	t
Gender	F	118	6.669 (1.653)	3.870**	7.603 (3.318)	-1.984*
	M	85	5.765 (1.630)		8.583 (3.621)	
Having a car	No	82	6.683 (1.816)	2.751**	7.889 (3.138)	-0.423
	Yes	121	6.025 (1.567)		8.101 (3.695)	
Having children	No	72	6.514 (1.926)	1.391	8.778 (3.712)	2.356*
	Yes	131	6.168 (1.555)		7.586 (3.269)	
Tobacco-cigarette smoking	No	151	6.603 (1.712)	4.683**	7.493 (3.426)	-3.696**
	Yes	52	5.385 (1.301)		9.500 (3.196)	
E- cigarette smoking	No	144	6.535 (1.610)	3.273**	7.613 (3.241)	-2.600**
	Yes	59	5.695 (1.776)		9.000 (3.839)	

Significance level *≤0.05, **≤0.01, ***≤0.001.
PSQI: The Pittsburgh Sleep Quality Index.

Factors Affecting Nutritional Status

Independent t-test was used to examine differences in BMI and REAPS total scores according to demographic, personal and work-related variables (Table 4). There was a significant difference in BMI according to gender, having children and having a car. Nurses who were male, having children and having cars had significantly higher BMI scores than those who were female, not having children and not having cars. On the other hand, smoking status did not show a significant effect on BMI. There was no significant difference in REAPS total scores according to demographics, personal and work-related factors. See Table 4.

Table 4. The effect of demographic and personal factors on BMI and REAPS (N = 203)

		N	BMI Mean (SD)	t	REAPS Mean (SD)	t
Gender	F	118	25.343 (4.579)	-2.539*	26.763 (5.830)	-0.116
	M	85	26.931 (4.127)		26.859 (5.872)	
Having a car	No	82	25.075 (4.095)	-2.488*	26.659 (5.500)	-0.290
	Yes	121	26.639 (4.592)		26.901 (6.069)	
Having children	No	72	24.466 (3.487)	-3.773**	26.653 (5.758)	-0.271
	Yes	131	26.85 (4.706)		26.886 (5.895)	
Tobacco-cigarette smoking	No	151	25.997 (4.666)	-0.054	27.007 (5.873)	0.847
	Yes	52	26.037 (3.815)		26.212 (5.734)	
E-cigarette smoking	No	144	25.926 (4.669)	-0.408	27.264 (6.019)	1.768
	Yes	59	26.208 (3.912)		25.678 (5.234)	

Significance level *≤0.05, **≤0.01, ***≤0.001.
BMI: Body Mass Index.
REAPS: Rapid Eating Assessments for Participants.

One-way ANOVA was used to examine differences in REAP total scores and BMI according to the type of shift. There was no significant difference in BMI between shifts (f = 0.224, p = 0.799). However, there were significant differences between shifts according to REAPS total scores (f = 5.143, p = 0.007). The REAPS mean scores for night shift, day shift and rotating always shift were (25.935±4.918), (29.019±5.988) and (26.803±5.833), respectively. *Post-hoc* analysis showed that there was a significant difference between nurses who work in day shift and nurses working in night shift (p=0.018) and nurses in rotating always shift (p=0.018). But, there was no significant difference in REAPS scores between nurses working at night shift and nurses working at rotating shift (p = 0.976).

Factors Affecting Physical Activity

Independent t-test was used to examine differences in levels of physical activity according to demographic, personal and work-related factors. No significant differences were found in this analysis. Regarding the shift, we used a one-way ANOVA to examine differences between shifts in their MET per-week total scores. There was no significant difference between shifts according to their MET per-week total scores (f = 0.491, p = 0.613).

Correlation between Concepts

Pearson correlation coefficient was used to test the relationship between concepts of the study (Table 5). There was a significant negative weak association between experience and sleeping hours (r = -0.191, p < 0.01). However, there was a significant positive association between experience and BMI (r = 0.323, p < 0.001) and REAPS total score (r = 0.189, p < 0.01). See Table 5.

Table 5. Pearson correlation matrix between years of experience, sleeping hours, PSQI, BMI, REAPS and IPAQ (N = 203)

Concepts	Experience	PSQI	Sleep hours	BMI	REAPS
PSQI	-0.055				
Sleep hours	-0.191**	-0.631***			
BMI	0.323***	-0.098	-0.116		
REAPS	0.189**	-0.035	0.000	0.113	
IPAQ	-0.020	0.037	-0.042	0.033	0.034

Significance level *≤0.05, **≤0.01, ***≤0.001.
PSQI: The Pittsburgh Sleep Quality Index.
BMI: Body Mass Index.
REAPS: Rapid Eating Assessments for Participants.
IPAQ: The International Physical Activity Questionnaire.

Discussion

The findings showed that the prevalence of tobacco smoking among Jordanian nurses was 25.6%. This was consistent with previous studies that reported similar rates for nurses and healthcare workers (Abou-ElWafa et al., 2021; Alkhatatbeh et al., 2016). The findings showed that the prevalence of e-cigarette smoking (29.1%) is higher than tobacco smoking. Our findings were consistent with a study conducted in the USA, where prevalence of e-cigarette smoking was 22.4% (Pericot-Valverde et al., 2017). The high prevalence of e-cigarette smoking could be related to the nurses' belief that e-cigarettes are used as a way of tobacco-smoking cessation and/or they are less harmful than tobacco smoking (Abdel-Qader and Al Meslamani, 2021).

The results showed that male nurses had significantly higher smoking rates than female nurses. The results were consistent with previous studies (Alkhatatbeh et al., 2016; Martínez et al., 2019). Also, this study found that nurses who work in regular night shift have significantly a higher smoking rate than nurses in other shifts. This is consistent with previous studies conducted in the USA and Poland (Peplonska et al., 2014; Ramin et al., 2015). This high smoking prevalence among nurses who work night shifts could be related to the need to stay awake and active and thus, they tend to smoke and drink coffee in large amounts during night (Nejman and Gotlib, 2017).

The findings of this study indicated that nurses have a sleep duration of less than the recommended amount.

This is consistent with previous studies (Park et al., 2018; Simonetti et al., 2021; Stimpfel et al., 2020). The mean score of the PSQI in this study (8.02) indicated that Jordanian nurses have poor sleep quality. According to the PSQI cut-off value, 85.5% of Jordanian nurses have poor sleep quality. This is consistent with previous studies that showed a PSQI higher than 7 and a high prevalence of poor sleep quality ranging between 61% and 92% (Dong et al., 2020; Simonetti et al., 2021; Stimpfel et al., 2020; Suleiman et al., 2020). Poor sleep quantity and quality among nurses could be related to the shift work, especially night shifts, which could interrupt the circadian rhythm.

This study showed that female nurses have better sleep quantity and better sleep quality than male nurses. This is inconsistent with previous studies which found that female nurses have poorer sleep quantity and quality than male nurses (Dong et al., 2020; Palhares et al., 2014; Simonetti et al., 2021). This may be related to the location of studies and the effect of culture. The collectivist culture and extended families in Jordan may decrease the roles and responsibilities of nurses when they go home, because their relatives may take responsibility for other household roles, such as cleaning, cooking or raising kids. Another possible reason is the very low rate of smoking among females when compared to other studies, which may decrease the stimulation effect, thus contributing to better sleep quality and quantity.

In the current study, findings showed that nurses who regularly work night shifts showed the highest PSQI total score, followed by nurses who shift work and then nurses who regularly work day shift. This means that poorer sleep quality is associated with working more night shifts or shifting work than day shifts. This result was consistent with the previous studies (Chang and Peng, 2021; Dong et al., 2020; Park et al., 2018).

Findings of the current study showed that 41.9% of nurses have poor/bad dietary habits. Consequently, 58% of Jordanian nurses were either overweight or obese. These findings are consistent with previous studies. For example, in Jordan, 50.2% of nurses who work in emergency departments suffer from poor dietary habits (Salah et al., 2020). In the USA, approximately 53%-61% of nurses have poor dietary habits and 59% of them were either overweight or obese (Nahm et al., 2012; Priano et al., 2018). Also in Lebanon, 56% of nurses gained extra weight since they started their work and

50.8% of nurses were either overweight or obese (Samhat et al., 2020). Long working hours, shift rotation and working overtime, lack of options on cafeterias and their opening times and lack of time and energy to cook healthy food at home or perform physical activities are possible causes of poor nutritional status (Phiri et al., 2014). Consequently, nurses are at higher risk to develop diseases such as DM, HTN, hyperlipidemia and cardiovascular diseases (Zapka et al., 2009).

The findings indicated that females reported lower BMI than males. This is consistent with a previous study (Perry et al., 2018). In this study, *post-hoc* analysis showed that nurses who work night shifts had significantly lower REAPS scores (poorer dietary habits) than those who work day shifts. Also, nurses who shift work regularly had significantly lower REAPS scores than those who work day shifts. This is consistent with previous studies that found that poorer dietary habits are more likely associated with working night shifts (Nejman and Gotlib, 2017; Samhat et al., 2020). Approximately 50%-60% of nurses who work night shifts had longer gaps between meals, decreased the total numbers of meals, ate unhealthier snacks, used more stimulants, such as tobacco and coffee, to stay awake and remain more active during the night (Nejman and Gotlib, 2017; Samhat et al., 2020).

The findings indicated that 39.5% of Jordanian nurses are physically active. This is less than Australian nurses (65%), but higher than nurses in Brunei, Lebanon and even Jordan (10%-24.7%) (Daud et al., 2021; Happell et al., 2014; Salah et al., 2020; Samhat et al., 2020). More importantly, 60.5% of Jordanian nurses reported sedentary physical activity, which put them at risk to develop negative health outcomes. Physical activity is essential for nurses' physical and occupational functioning, because it can decrease risk of hypertension, DM type 2, cardiovascular diseases, arthritis and osteoporosis (Daud et al., 2021; Samhat et al., 2020). Also, physical inactivity may lead to mental disorders, including anxiety, depression and Alzheimer's disease (Hawker, 2012).

Several strengths of this study can be identified. This was the first study in Jordan that explored multiple and important aspects of lifestyle together, which gives a more accurate and comprehensive assessment of nurses' lifestyle. Also, we used highly valid and reliable tools to measure the concepts in the study. Finally, the study was conducted using multi-sites, which may improve the

representativeness of the sample. On the other hand, limitations include the use of the convenience-sampling method. So, the findings can be generalized only to nurses with similar characteristics. Also, this was a cross-sectional study and thus, it was difficult to determine cause-effect relationships between the study variables. So, it is recommended to conduct similar studies in the future using random sampling and longitudinal design. Finally, although we tried to capture all details related to nurses' lifestyle, we missed some details. For example, we did not ask about other methods of smoking, such as hookah and we did not examine the social, psychological, economical and spiritual aspects of nurses' lifestyle.

Implications for Nursing

Based on the study results, nurses should be aware of that a relatively large percentage of them have an unhealthy lifestyle, which may increase the risk of chronic diseases, such as DM, HTN, hyperlipidemia and cardiovascular diseases. Nurses should adopt a healthier lifestyle, such as smoking cessation, better sleep quantity and quality, healthier food choices and practicing adequate physical activity, with moderate to vigorous intensity, during leisure time. Nurse leaders and policy makers should encourage and facilitate adopting a healthier lifestyle by nurses through developing or modifying work policies. For example, nurses should be provided with healthier food choices during work and more time for food breaks and they can be encouraged to take naps during night shifts. In addition, nurse leaders can initiate a reward system for nurses who show better outcomes after changing their behaviors. For example, nurse leaders should reward nurses who quit smoking or nurses who show a decrease in their weight.

Conclusion

Jordanian nurses' lifestyle showed poor quality in most aspects. Jordanian nurses reported high smoking rates. Also, they reported poor sleep quantity and quality and poor dietary habits, supported by high prevalence of overweight and obesity. Finally, Jordanian nurses showed low levels of physical activity. The findings showed that gender of nurses and type of shift affected most aspects of nurses' lifestyle. Nurses should be aware of the importance of adopting a healthier lifestyle and act earlier to modify their lifestyle to prevent possible complications. Nurses should be encouraged to quit smoking, eat a healthier diet and decrease weight by performing moderate to high levels of physical activity during leisure time. Nurse leaders and policy makers should consider the health status of nurses and prevent illnesses by conducting awareness campaigns to show the importance of adopting a healthy lifestyle. Also, nurse leaders can establish a reward system for nurses who adopt a healthy lifestyle. For example, rewards can be given to nurses who quit smoking or show a significant decrease in their BMI. Nurse leaders and policy makers can modify the work environment to make it easier for nurses to adopt a healthier lifestyle. For example, nurses can be given healthier food choices and the opportunity for taking naps.

REFERENCES

Abdel-Qader, D.H., & Al Meslamani, A.Z. (2021). Knowledge and beliefs of Jordanian community toward e-cigarettes: A national survey. *Journal of Community Health*, *46* (3), 577-586. https://doi.org/10.1007/s10900-020-00896-8

Abou-ElWafa, H.S., Zoromba, M.A., & El-Gilany, A.-H. (2021). Cigarette smoking at workplace among resident physicians and nurses in Mansoura University hospital. *Archives of Environmental & Occupational Health*, *76* (1), 37-44. https://doi.org/10.1080/19338244.2020. 1771249

Alkhatatbeh, M.J., Alefan, Q., & Alzghool, M. (2017). Smoking prevalence, knowledge and attitudes among primary healthcare professionals: A study from Jordan. *Eastern Mediterranean Health Journal*, *22* (12), 872-879. https://doi.org/10.26719/2016.22.12.872

American Academy of Sleep Medicine. (2019, June 7).

Uncover sleep. https://aasm.org/sleep-deprivation-disorders-nurses/

Berman, A., Synder, S., & Frandsem G. (2021). *Kozier & Erb's fundamentals of nursing: Concepts, process and practice*. (11ᵗʰ edn.), Pearson.

Caruso, C.C. (2014). Negative impacts of shiftwork and long work hours. *Rehabilitation Nursing*, *39* (1), 16-25. https://doi.org/10.1002/rnj.107

Chang, W.-P., & Peng, Y.-X. (2021). Influence of rotating shifts and fixed night shifts on sleep quality of nurses of different ages: A systematic literature review and meta-analysis. *Chronobiology International: The Journal of Biological & Medical Rhythm Research*, *38* (10), 1384-1396. https://doi.org/10.1080/07420528.2021.1931273

Craig, C.L., Marshall, A.L., Sjöström, M., Bauman, A.E., Booth, M.L., Ainsworth, B.E., Pratt, M., Ekelund, U., Yngve, A., Sallis, J.F., & Oja, P. (2003). International physical activity questionnaire: 12-country reliability and validity. *Medicine and Science in Sports and Exercise*, *35* (8), 1381-1395. https://doi.org/10.1249/01.MSS.0000078924.61453.FB

Daud, N., Ongsang, S., Tengah, A., Abdul Rahman, H., & Abdul-Mumin, K. (2021). Physical activities among medical–surgical nurses: A descriptive cross-sectional study. *Journal of Public Health*, *29* (2), 319-324. https://doi.org/10.1007/s10389-019-01125-w

Dong, H., Zhang, Q., Zhu, C., & Lv, Q. (2020). Sleep quality of nurses in the emergency departments of public hospitals in China and its influencing factors: A cross-sectional study. *Health & Quality of Life Outcomes*, *18* (1), 1-9. https://doi.org/10.1186/s12955-020-01374-4

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power-analysis program for the social, behavioral and biomedical sciences. *Behavior Research Methods*, *39* (2), 175-191. https://doi.org/10.3758/bf03193146

Happell, B., Gaskin, C.J., Reid-Searl, K., & Dwyer, T. (2014). Physical and psychosocial well-being of nurses in a regional Queensland hospital. *Collegian*, *21* (1), 71-78. https://doi.org/10.1016/j.colegn.2013.02.005

Hawker, C.L. (2012). Physical activity and mental well-being in student nurses. *Nurse Education Today*, *32* (3), 325-331. https://doi.org/10.1016/j.nedt.2011.07.013

Helou, K., El Helou, N., Mahfouz, M., Mahfouz, Y., Salameh, P., & Harmouche-Karaki, M. (2018). Validity and reliability of an adapted Arabic version of the long international physical activity questionnaire. *BMC Public Health*, *18* (1), 49. https://doi.org/10.1186/s12889-017-4599-7

Hensel, D. (2011). Relationships among nurses' professional self-concept, health and lifestyles. *Western Journal of Nursing Research*, *33* (1), 45-62. https://doi.org/10.1177/0193945910373754

Johnston, C.S., Bliss, C., Knurick, J.R., & Scholtz, C. (2018). Rapid eating assessment for participants [shortened version] scores are associated with healthy eating index-2010 scores and other indices of diet quality in healthy adult omnivores and vegetarians. *Nutrition Journal*, *17* (1), 89. https://doi.org/10.1186/s12937-018-0399-x

Jordan Nurses and Midwives Council. (2021, October 9). *Overview and statistics*. https://jnmc.jo

Khera, A.V., Emdin, C.A., Drake, I., Natarajan, P., Bick, A.G., Cook, N.R., Chasman, D.I., Baber, U., Mehran, R., Rader, D.J., Fuster, V., Boerwinkle, E., Melander, O., Orho-Melander, M., Ridker, P.M., & Kathiresan, S. (2016). Genetic risk, adherence to a healthy lifestyle and coronary disease. *The New England Journal of Medicine*, *375* (24), 2349-2358. https://doi.org/10.1056/NEJMoa1605086

Kurnat-Thoma, E., El-Banna, M., Oakcrum, M., & Tyroler, J. (2017). Nurses' health promoting lifestyle behaviors in a community hospital. *Applied Nursing Research*, *35*, 77-81. https://doi.org/10.1016/j.apnr.2017.02.012

Martínez, C., Baena, A., Castellano, Y., Fu, M., Margalef, M., Tigova, O., Feliu, A., Laroussy, K., Galimany, J., Puig, M., Bueno, A., López, A., & Fernández, E. (2019). Prevalence and determinants of tobacco, e-cigarettes and cannabis use among nursing students: A multi-center cross-sectional study. *Nurse Education Today*, *74*, 61-68. https://doi.org/10.1016/j.nedt.2018. 11.018

Mieda, M., & Sakurai, T. (2013). Orexin (hypocretin) receptor agonists and antagonists for treatment of sleep disorders: Rationale for development and current status. *CNS Drugs*, *27* (2), 83-90. https://doi.org/10.1007/ s40263-012-0036-8

Nahm, E.S., Warren, J., Zhu, S., An, M., & Brown, J. (2012). Nurses' self-care behaviors related to weight and stress. Nursing Outlook, *60* (5), e23-e31. https://doi.org/10.1016/j.outlook.2012.04.005

Nejman, M., & Gotlib, J. (2017). Impact of nurses' shift work on their nutrition attitudes. *Polish Nursing/Pielegniarstwo Polski*e, *63* (1), 13-19. https://doi.org/10.20883/pielpol.2017.1

Nilan, K., McKeever, T.M., McNeill, A., Raw, M., &

Murray, R.L. (2019). Prevalence of tobacco use in healthcare workers: A systematic review and meta-analysis. *PloS One*, *14* (7), e0220168. https://doi.org/10.1371/journal.pone.0220168

Palhares, V. de C., Corrente, J. E., & Matsubara, B. B. (2014). Association between sleep quality and quality of life in nursing professionals working rotating shifts. *Revista de Saude Publica, 48* (4), 594-601. https://doi.org/10.1590/s0034-8910.2014048004939

Park, E., Lee, H.Y., & Park, C.S. (2018). Association between sleep quality and nurse productivity among Korean clinical nurses. *Journal of Nursing Management, 26* (8), 1051-1058. https://doi.org/ 10.1111/jonm.12634

Peplonska, B., Bukowska, A., & Sobala, W. (2014). Rotating night shift work and physical activity of nurses and midwives in a cross-sectional study in Łódź, Poland. *Chronobiology International: The Journal of Biological & Medical Rhythm Research*, *31* (10), 1152-1159. https://doi.org/10.3109/07420528.2014.957296

Pericot-Valverde, I., Gaalema, D.E., Priest, J.S., & Higgins, S.T. (2017). E-cigarette awareness, perceived harmfulness and ever use among U.S. adults. *Preventive Medicine*, *104*, 92-99. https://doi.org/10.1016/ j.ypmed.2017.07.014

Perry, L., Xu, X., Gallagher, R., Nicholls, R., Sibbritt, D., & Duffield, C. (2018). Lifestyle health behaviors of nurses and midwives: A "fit for the future" study. *International Journal of Environmental Research and Public Health*, *15* (5), 1-16. https://doi.org/10.3390/ijerph15050945

Phiri, L.P., Draper, C.E., Lambert, E.V., & Kolbe-Alexander, T. L. (2014). Nurses' lifestyle behaviours, health priorities and barriers to living a healthy lifestyle: A qualitative descriptive study. *BMC Nursing*, *13* (1), 38. https://doi.org/10.1186/s12912-014-0038-6

Priano, S.M., Hong, O.S., & Chen, J.-L. (2018). Lifestyles and health-related outcomes of U.S. hospital nurses: A systematic review. *Nursing Outlook, 66* (1), 66-76. https://doi.org/10.1016/j.outlook.2017.08.013

Ramin, C., Devore, E.E., Wang, W., Pierre-Paul, J., Wegrzyn, L.R., & Schernhammer, E.S. (2015). Night shift work at specific age ranges and chronic disease risk factors. *Occupational & Environmental Medicine*, *72* (2), 100-107. https://doi.org/10.1136/oemed-2014-102292

Rosado, I.V., Russo, G.H., & Maia, E.M. (2015). Generating health elicits illness? The contradictions of work performed in emergency care units of public hospitals. *Ciencia & Saude Coletiva*, *20* (10), 3021-3032. https://doi.org/10.1590/1413-812320152010. 13202014

Salah, R.A., Malak, M.Z., & Bani Salameh, A.K. (2020). Relationship between shift-work and life-style behaviors among emergency-department nurses in Jordan. *Archives of Environmental & Occupational Health*, 1-8. https://doi.org/10.1080/19338244.2020.1841721

Samhat, Z., Attieh, R., & Sacre, Y. (2020). Relationship between night shift work, eating habits and BMI among nurses in Lebanon. *BMC Nursing*, *19* (1), 1-6. https://doi.org/10.1186/s12912-020-00412-2

Segal-Isaacson, C.J., Wylie-Rosett, J., & Gans, K.M. (2004). Validation of a short dietary assessment questionnaire: The rapid eating and activity assessment for participants, short version (REAP-S). *The Diabetes Educator*, *30* (5), 774. https://doi.org/10.1177/0145 72170403000512

Simonetti, V., Durante, A., Ambrosca, R., Arcadi, P., Graziano, G., Pucciarelli, G., Simeone, S., Vellone, E., Alvaro, R., & Cicolini, G. (2021). Anxiety, sleep disorders and self-efficacy among nurses during COVID-19 pandemic: A large cross-sectional study. *Journal of Clinical Nursing*, *30* (9/10), 1360-1371. https://doi.org/10.1111/jocn.15685

Stimpfel, A.W., Fatehi, F., & Kovner, C. (2020). Nurses' sleep, work hours and patient care quality and safety. *Sleep Health*, *6* (3), 314-320. https://doi.org/10.1016/ j.sleh.2019.11.001

Suleiman, K., Hijazi, Z., Kalaldeh, M.A., et al. (2020). Factors associated with sleep quality among emergency nurses in Jordan. *Sleep Vigilance*, *4*, 11-16. https://doi.org/10.1007/s41782-019-00082-4

Suleiman, K.H., Yates, B.C., Berger, A.M., Pozehl, B., & Meza, J. (2010). Translating the Pittsburgh sleep quality index into Arabic. *Western Journal of Nursing Research*, *32* (2), 250-268. https://doi.org/10.1177/ 0193945909348230

Tsai, Y.C., & Liu, C.H. (2012). Factors and symptoms associated with work stress and health-promoting lifestyles among hospital staff: A pilot study in Taiwan. *BMC Health Services Research*, *12*, 199. https://doi.org/10.1186/1472-6963-12-199

World Health Organization. (2022, November 5). *Nursing and midwifery*. https://www.who.int/news-room/fact-sheets/detail/nursing-and-midwifery

Zapka, J.M., Lemon, S.C., Magner, R.P., & Hale, J. (2009). Lifestyle behaviours and weight among hospital-based nurses. *Journal of Nursing Management*, *17* (7), 853-860. https://doi.org/10.1111/j.1365-2834.2008.00923.x