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RELATIONSHIP BETWEEN SLEEP QUALITY AND PERCEIVED PSYCHOLOGICAL STRESS IN LITHUANIAN CLINICAL NURSES: A CROSS-SECTIONAL STUDY

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Abstract. When sleep quality is one of the most important factors in determining a person's quality of life, it puts carers at increased risk of sleep disorders. It should be noted that without provoking factors (psychological stress), predisposing factors alone would not cause sleep disorders. The aim of the study was to identify and assess the association between psychological stress and sleep quality among nurses working in Lithuanian healthcare institutions. The results of the study showed that almost one in two nurses working in Lithuanian healthcare institutions is at risk of sleep disturbance and experiencing high levels of psychological distress. The analysis of the data showed that psychological stress is significantly correlated with poorer sleep quality among nurses working in Lithuanian healthcare institutions ($r = -0.4$, $p < 0.001$). In order to reduce psychological stress and improve sleep quality among nurses working in Lithuanian healthcare institutions, our study recommendations should be targeted at eliminating risk factors for psychological stress and rationalising the use of coping methods.

Keywords: clinical nurses, nurses' health, psychological stress, sleep quality

INTRODUCTION

A third of a person's life is spent sleeping, which is why it is so important for the body. Sleep is a process that is essential for the recovery of the body's functions and the maintenance of energy used during the day (Smith et al., 2018). The quality of sleep is also one of the most significant factors determining the quality of human life.

On the one hand, sleep affects the ability to learn, memory consolidation, decision-making ability and critical thinking (Siddiqui et al., 2016). On the other hand, poor sleep quality can have a negative impact on a person's daytime performance, leading to fatigue, irritability, drowsiness, memory impairment, impaired concentration, and an increased risk of accidents or sick days. Thus, sleep disturbances are associated with a wide range of health conditions (Varoneckas et al., 2012). More specifically, both sleep duration and poor sleep quality are associated with the development of various health conditions such as type 2 diabetes (Baden et al., 2020; Knutson et al., 2006), cardiovascular disease (Kwok et al., 2018; Sofi et al., 2014), or even with higher mortality (Hoevenaar-Blom et al., 2011; Rod et al., 2011). While research has shown that sleep hygiene can determine sleep quality, there is still insufficient evidence on risk factors contributing to the symptomatology of sleep disorders.

Nurses are at increased risk of sleep disorders. Sleep disturbances in nurses cause irritability, affect mood, impair communication skills, can lead to interpersonal relationship problems, and impair responsiveness to patients' needs (Gomez-Garcia et al., 2016). Fatigue caused by sleep disturbances leads to reduced concentration, impaired cognitive function, which undermines nurses' productivity, decision-making ability and increases the likelihood of professional errors (Kaliyaperumal et al. 2017).

It should also be noted that psychological stress in nursing is inevitable and is of global concern in the current context. For example, a study in Australia found that as many as three-quarters of nurses experienced high levels of stress, which unequivocally impacted on the quality of their work performance (Happell et al., 2013). Among other things, one of the more important risk factors for sleep disturbances is the psychological stress experienced. Research has shown that higher levels of psychological stress lead to poorer sleep quality. Although it is well documented that sleep disturbances are prevalent among nurses working in healthcare settings (Dong et al., 2017; Leonavičiūtė, 2024), and that psychological distress can lead to clinically significant symptomatology of sleep disturbances, there are currently insufficient scientific data based on epidemiological studies to assess the association between sleep quality and psychological distress among nurses.

The Spielman or “3P” model of insomnia development was chosen as the theoretical basis for our study. The hypothesis of this model is based on one of the mechanisms that can explain how insomnia develops (Chawla, 2018). According to this model, 3 groups of factors (predisposing, provoking and supporting) determine the occurrence of insomnia. Based on the aforementioned model, stress is classified as a provoking factor (Perlis et al., 2011). Without provoking factors (psychological stress), predisposing factors alone would not cause sleep disorders. Therefore, it can be stated that psychological stress is a provoking factor for sleep disorders. Taking into account the above circumstances, the aim of our study was to identify and assess the links between psychological stress experienced by nurses working in Lithuanian healthcare institutions and sleep quality.

SURVEY ORGANIZATION AND METHODOLOGY

A single-point cross-sectional study was conducted in October-November 2023. The estimated target population was 20,856 nurses working in Lithuanian healthcare institutions. The estimated and formed representative sample size with 10% accuracy and 95% reliability was 96 subjects. The inclusion criteria for respondents in the study were female nurses working in various Lithuanian healthcare institutions. By applying the non-probability convenience sampling method and using the official survey system (https://apklausa.lt/private/forms/) through 2 official Facebook social network groups, 40.8 ± 10.5 year-old subjects (n = 120) were surveyed from all Lithuanian nurses who were sent an invitation to participate in the study (n = 12,000). After applying the exclusion criteria, the final study sample size was 105 nurses.

The survey of the subjects was conducted using a confidential questionnaire method. In order to assess sleep quality, the Pittsburgh Sleep Quality Index (PSQI) (Buysse et al., 1989) was used. The sleep quality assessment methodology based on the calculation of the PSQI was designed to investigate the subjectively assessed quality of sleep over the past month. The PSQI assessment scale consisted of 18 statements that consistently corresponded to the most common characteristics reflecting sleep disorders. Taking into account the assessments of the statements presented in the PSQI scale, each statement acquired a numerical expression from 0 to 3. While there is currently no consensus on the PSQI score threshold referring to poor sleep quality, this study applied the PSQI I score threshold (≥ 7 points), which was established in clinical practice and was associated with poor sleep quality and an increased likelihood of sleep disorders (Beck et al., 2004; Carpenter & Andrykowski, 1989; Zhang et al., 2020). The overall internal consistency and validity of the Lithuanian version of the PSQI questionnaire were confirmed in a study of the Lithuanian population, and Kronbach's alpha was equal to 0.65 (Varoneckas et al., 2007). Using the Reeder Psychological Stress Scale (Metcalfe et al., 2003), translated and adapted into Lithuanian, the psychological stress experienced by nurses was determined and assessed. Taking into account the 7 statements presented to the respondents and evaluating them with a score from 1 to 4 (the maximum possible sum is 28 points), the level of psychological stress experienced was classified as follows: from 7 to 14 points - a high level of psychological stress is experienced, from 15 to 21 points - a medium level of psychological stress is experienced, from 22 to 28 points - a low level of psychological stress is experienced. The last part of the questionnaire consisted of 8 questions, with the help of which information was collected about the sociodemographic characteristics of the respondents, such as biological sex, age, education, income, position held, nature of the work performed, workload and time.

Statistical analysis of data was performed using the statistical program SPSS (Statistical Package for Social Sciences) v. 25.0. (Armonk, NY, USA). The Shapiro-Wilk test was used to check the reliability of the data. Arithmetic means and standard deviations (SD) were calculated for the analysis of quantitative continuous and discrete variables. Considering the single-point cross-sectional study design, the dependent variable was the sleep quality of nurses, and the independent variables were the psychological stress experienced by nurses. The Student's t-test for independent samples, ANOVA and the Pearson correlation coefficient (r) were used to analyze the study data. The difference in results was considered statistically significant, and the relationship was statistically reliable when the p value obtained was less than or equal to 0.05.

RESULTS AND DISCUSSION

The study population consisted of 105 women working as nurses in healthcare institutions. The average age of the study participants was 40.8 ± 10.5 years. 44.8% of the study participants had higher non-university education, 34.2% had higher university education and 21% had medical school education.

According to the average monthly income, the study participants were distributed as follows: 61.9% of nurses earned an average of 1001 - 2000 euros per month, 24.8% earned 501 - 1000 euros per month and 13.3% earned more than 2001 euros per month. A more detailed distribution of nurses by sociodemographic indicators is presented in Table 1.

Table 1

Sociodemographic characteristics of the study population and psychological stress experienced according to the sleep quality index (PSQI)

Variables		n	%	PSQI (points) Mean ± SN	p
Age	20 – 40 years	53	50,5	6,4 ± 2,7	0,541
	41 – 63 years	52	49,5	6,0 ± 3,0	
Average monthly income (euros (€))	501 – 1000 €	26	24,8	6,7 ± 2,8	0,584
	1001 – 2000 €	65	61,9	6,0 ± 2,9	
	≥ 2001 €	14	13,3	6,1 ± 2,4	
Education	Post secondary (medical school)	22	21,0	5,7 ± 3,0	0,186
	Higher non-university	47	44,8	5,9 ± 2,6	
	Higher university	36	34,3	6,9 ± 2,9	

Work experience (seniority) in nursing positions (years)	≤ 15 years	58	55,2	6,0 ± 2,6	0,466
	≥ 16 years	47	44,8	6,4 ± 3,1	
Number of working hours per shift	< 10 hours	52	49,5	6,1 ± 2,7	0,466
	≥ 11 hours	53	50,5	6,3 ± 3,0	
Level of psychological stress	Low to moderate stress levels	60	57,1	5,3 ± 2,3	< 0,001
	High stress level	45	42,9	7,4 ± 3,0	

Based on the research data presented in Table 1, according to the level of psychological stress experienced, nurses were divided into those experiencing high level (57.1%) and low or medium level (42.9%) psychological stress. When assessing sleep quality, the average PSQI was 6.2 ± 2.8 points, and poor sleep quality was determined in 42.9% and good sleep quality in 57.1% of nurses (Figure 1).

Taking into account the sleep quality index, when assessing the distribution of nurses depending on sociodemographic characteristics (age, average monthly income, education, length of service, number of working hours per shift), no statistically significant difference was determined between the analyzed variables ($p > 0.05$). On the other hand, the sleep quality of nurses experiencing high levels of psychological stress (PSQI scores: 7.4 ± 3.0) was significantly worse compared to the sleep quality of those experiencing low or moderate psychological stress (PSQI scores: 5.3 ± 2.3) ($p < 0.001$).

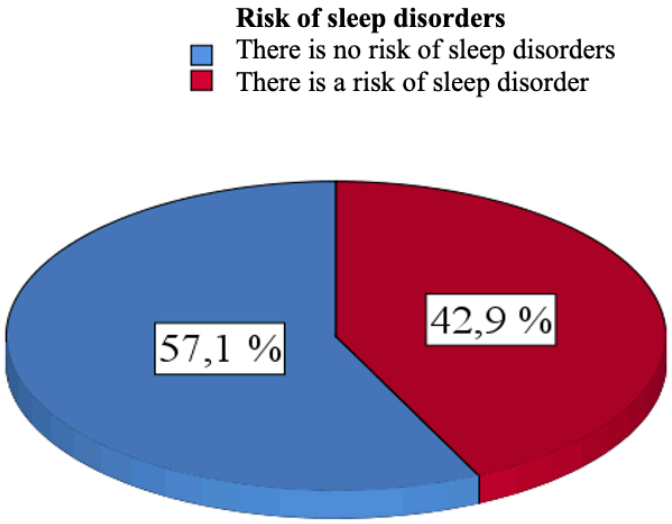

Figure 1. **Distribution of nurses according to potential risk of sleep disorders**

Finally, the correlation analysis of the study data confirmed a statistically significant inverse relationship of moderate strength ($r = – 0.4$, $p < 0.001$) between higher psychological stress experienced by nurses and sleep quality (Figure 2).

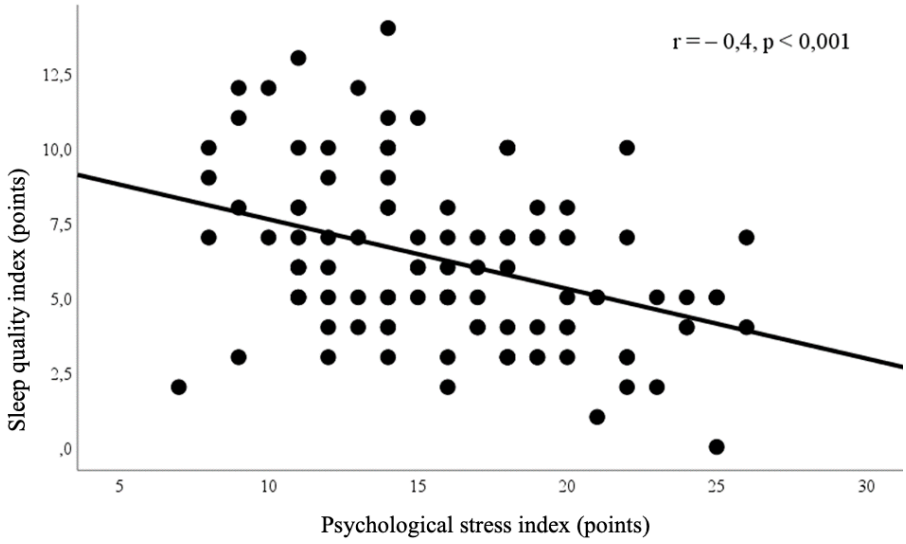

Figure 2. **Relationship between psychological stress experienced by nurses and sleep quality**

In summary, according to our study, the average PSQI of nurses was 6.2 ± 2.8 points. Comparing the results of our study with those obtained in studies conducted abroad (Xia et al., 2021), which refer to a similar level of sleep quality of nurses (PSQI: 5.33 - 7.34 points), determined before the COVID-19 pandemic, it can be stated that the

importance of early diagnosis of symptoms of sleep disorders in order to prevent possible complications related to the health of nurses. It is also noteworthy that the results of our study, which confirmed the relationship between psychological stress experienced by nurses and poorer sleep quality, were consistent when compared with the data published by Bilgiç et al. (2021), which revealed a reliable correlation between psychological stress experienced by nurses and sleep disorder symptoms. Therefore, taking into account the prediction that psychological stress may lead to poorer sleep quality, Lithuanian healthcare institutions are recommended to plan and implement preventive measures to reduce psychological stress among nurses.

CONCLUSIONS

Almost every second nurse working in Lithuanian healthcare institutions is at risk of sleep disorders (42.9%) and experiences high levels of psychological stress (57.1%).

Psychological stress significantly predicts poorer sleep quality among nurses working in Lithuanian healthcare institutions.

In order to reduce psychological stress and improve sleep quality indicators among nurses working in Lithuanian healthcare institutions, the recommendations of our study should be purposefully directed towards eliminating risk factors that promote psychological stress and rationalizing the application of stress coping methods (Baranauskas et al. 2024).

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