BMJ Open Impact of stress and coping strategies on insomnia among Polish novice nurses who are employed in their field while continuing their education: a cross-sectional study

Lena Izabela Serafin , Maja Fukowska, Diana Zyskowska, Justyna Olechowska, Bożena Czarkowska-Pączek

To cite: Serafin LI, Fukowska M, Zyskowska D, *et al.* Impact of stress and coping strategies on insomnia among Polish novice nurses who are employed in their field while continuing their education: a cross-sectional study. *BMJ Open* 2021;**11**:e049787. doi:10.1136/bmjopen-2021-049787

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2021-049787>).

Received 03 February 2021

Accepted 09 November 2021

© Author(s) (or their employer(s)) 2021. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

Department of Clinical Nursing, Medical University of Warsaw, Warszawa, Poland

Correspondence to

Dr Lena Izabela Serafin;
lena.serafin@wum.edu.pl

ABSTRACT

Objectives To determine to what degree particular coping strategies mediate the association between stress and insomnia in novice nurses who are employed while continuing their education and how type of education moderate the relationships between workplace stress, coping strategies and insomnia.

Methods A descriptive cross-sectional study was performed using an online questionnaire, which was completed by 159 novice registered nurses. The questionnaire comprised four components: Athens Insomnia Scale, Perceived Stress at Work (based on Perceived Stress Scale), Brief-Coping Orientation to Problem Experienced (COPE) and metrics with sociodemographic data questions.

Results Stress was found to be a significant predictor of insomnia among novice nurses. After adjusting the coping strategy, work stress ceased to be a significant predictor of insomnia. Among the strategies, the significant predictors that increased severity insomnia were acceptance, denial and self-blame. Predictors that decreased severity insomnia were use of emotional support and venting. Furthermore, the relationship between both active coping and self-distraction strategies and insomnia was significant for part-time students.

Conclusions Insomnia is significant phenomena among novice nurses and are exacerbated by increased stress in the workplace. Choosing appropriate coping strategies for stress that are dependent on the individuals' activities significantly reduce the severity of insomnia caused by work stress.

INTRODUCTION

Sleep disorders comprise problems with the quality, timing and amount of sleep. International Classification of Sleep Disorders-Third Edition identifies seven major categories that include insomnia disorders, sleep-related breathing disorders, central disorders of hypersomnolence, circadian rhythm sleep-wake disorders, sleep-related movement disorders, parasomnias and other

Strengths and limitations of this study

- This study revealed that effective coping strategies to improve sleep should be largely tailored to individual activities.
- The data were collected during the SARS-CoV-2 pandemic, which could have affected the level of stress experienced by nurses, both professionally and personally.
- Our study was quantitative and cross-sectional in design, which makes it impossible to observe in the perspective of time, which could have a fuller insight into the analysed variables.

sleep disorders.¹ Insufficient sleep and poor sleep quality could result in serious health problems such as metabolic syndrome and disturbances in the endocrine and immune systems, which could lead to psychophysiological health disturbances including cardiovascular diseases, cancer, fatigue, emotional problems, daytime distress and impairment in daily life.²⁻⁶

The nature of nurses' professional activity, including perceived stress at work (PSW), makes them more likely to suffer from insomnia.^{7 8} This problem affects also to novice nurses, whose duration of professional experience is <3 years.^{9 10} Many nurses, especially novice nurses, choose to pursue further education by completing the Master Degree Programme (MDP) concurrently with active employment. Additional stress from learning difficulties and burnout could be another risk factor for insomnia. Sleep disorders are known to be more prevalent among university students than among the general population.¹¹ The incidence of various sleep disorders among nurses is widely documented in studies conducted in various geographical

regions, and it ranges from 25.6% to >87%.^{7 12 13} Sleep disorders have been found to be related to job strain, emotional demands, fatigue, age, gender, working experience and rotating shift work.^{7 12 13} Risk factors for sleep disorders among nurses include disrupted circadian rhythm resulting from shift work (including overnight shifts), occupational stress caused by physiological, psychological and sociocultural pressures or from working overtime, which is either mandatory and voluntary depending on staffing availability.^{14 15} Moreover, there is evidence that women experience insomnia more often than men do, which holds particular relevance given that the majority of nurses are female.¹² Sleep problems could impair nurses' job performance and result in medical errors, lower quality of care or decreased patient safety.^{6 16–18} Moreover, there is a relationship between sleep disruption and nurses' job satisfaction, emotional exhaustion and presenteeism.^{19 20}

Nursing is associated with occupational stress resulting from high responsibility and permanent encounter with the diseases, traumas and even deaths.²¹ This stress, as mentioned above, is an important factor affecting sleep quality.^{7 13} Many of newly graduated nurses opt to pursue second cycle education to obtain a master's degree, which could increase the risk of developing sleep problems.²² Furthermore, nursing students have been shown to experience greater levels of stress than do other college students.²³ The professional nursing license in Poland is granted after completing a bachelor's degree (ie, first cycle education). Over 90% of nursing graduates continue their education at second cycle study simultaneously with attending the professional life. There are two types of second cycle education, namely full time and part time (ie, the study programme is conducted from Monday to Friday and from Friday afternoon to Sunday, respectively). Part-time MDP requires more hours of self-study relative to full-time MDP.

Stress is usually followed by one or several coping strategies, which are defined as cognitive and behavioural strategies deliberately employed in response to stress to moderate its effects on well-being.²⁴ Therefore, coping strategies could be associated with and modify stress-induced insomnia. Coping strategies employ a variety of conceptualisations; for the purpose of this study, Carvers' 14 strategies approach was used, which includes problem-oriented strategies (eg, active coping, use of instrumental support and planning), emotion-oriented strategies (eg, use of emotional support, denial and religion) and other strategies (eg, substance use, behavioural disengagement, venting, positive reframing, humour, acceptance, self-blame and self-distraction).²⁵ Emotions are fundamental to nursing and crucial to providing empathetic, patient-focused care.²⁶ Furthermore, the inability to cope with and resolve occupational stress could lead to psychological withdrawal and decreased well-being.²⁴

Therefore, the aim of this study was to analyse how particular coping strategies mediate the association between stress and insomnia in novice nurses who are

employed in their field while continuing their education and how type of education moderate the relationships between workplace stress, coping strategies and insomnia.

METHODS

Design

A descriptive cross-sectional study was performed using an online questionnaire. The Strengthening the Reporting of Observational Studies in Epidemiology reporting guidelines were used in both the framing and reporting of this study.

Sample

Our sample comprised 159 registered nurses. The number of participants was calculated using the software G*Power, assuming the type of analysis (regression analysis) and numbers of predictors (15 variables) with a CI of 95%, a statistical power of 80% and an α of 0.05. The sample was estimated a priori.²⁷ Based on this calculation, 139 respondents were required. A total of 188 questionnaires were returned; 29 questionnaires were rejected for failure to meet the inclusion criteria, which comprised duration of working experience between 3 months and 3 years (considered novice nurses according to Benner's definition)⁹ and attending the MDP part time or full time.

Patient and public involvement

This research was done without patient and public involvement. Participated nurses were not invited to comment on the study design and were not consulted to develop relevant outcomes or interpret the results. They were not invited to contribute to the writing or editing of this document for readability or accuracy.

Data collection

The study was conducted between January and May 2020. A link to the survey was shared via social media, including a public post in Facebook groups for nursing specialties. The questionnaire comprised four parts (online supplemental file 1). The first part was the Athens Insomnia Scale (AIS) validated for the Polish-speaking population.²⁸ It is a self-reported psychometric instrument designed to measure the intensity of insomnia based on the ICD-10 Classification of Mental and Behavioural Disorders, and it consists of eight items with a 4-point Likert-style response scale (0=no problem at all to 3=very serious problem). The possible total score ranges from 0 to 24, where a score above 6 suggests inadequate sleep. The questionnaires' internal validity and consistency (Cronbach's alpha) was 0.89 in the original questionnaire²⁹ and 0.84 in our study.

The second part of the questionnaire was a scale of PSW developed by Chirkowska-Smolak and Grobelny.³⁰ The scale is a Polish adaptation of the Perceived Stress Scale (PSS-10) developed by Cohen and Williamson,³¹ however, it relates directly to work-related stress. It consists of 10 items with a 5-point Likert-style response scale (0=never, 1=almost never, 2=sometimes, 3=fairly often, 4=very

often). PSS scores are obtained by reversing responses to the four positively stated items (items 4, 5, 7 and 8) and then summing across all scale items.) The questionnaire's internal validity and consistency was 0.84–0.87 in the original questionnaire in three subsequent studies³¹ and 0.83 in our study.

The third part of our questionnaire was a Polish version of Brief-COPE developed by Carver,²⁵ which was used to assess how to deal with stress. It consists of 28 statements comprising 14 strategies (two statements in each strategy): self-distraction, active coping, denial, substance use, use of emotional support, use of instrumental support, behavioural disengagement, venting, positive reframing, planning, humour, acceptance, religion and self-blame. Each item is scored from 0 (I haven't been doing this at all) to 3 (I have been doing this a lot). The questionnaire subscales' internal validity and consistency was 0.50–0.90 in the original questionnaire²⁵ and 0.49–0.92 in our study. Detailed Cronbach's Alpha values for each subscale are presented in online supplemental file 2.

The fourth part of the survey was the metrics. It contained six additional questions regarding age, sex, seniority in months, monthly working hours, any type of master's programme (full time and part time), which allowed us to characterise the sample and exclude respondents who did not meet inclusion criteria.

The study was performed in accordance with the Declaration of Helsinki. Each participant received a cover letter explaining the study's purpose and the terms of participation. The cover letter also ensured confidentiality. Voluntarily returning the completed questionnaire was considered consent to participate in the study.

Data analysis

Statistical analyses were performed with IBM SPSS Statistics V.25.0. Descriptive statistics of the collective data were generated using standard parameters, including percentage, mean, SD, median, range (minimum–maximum), skewness and kurtosis. The Kolmogorov-Smirnov test was used to detect normal distribution. The Mann-Whitney U test was used to establish the differences between full-time and part-time students in terms of number of hours worked per month, age, seniority and the frequency and severity of stress and insomnia. Fisher's exact test was used to establish the differences between full-time and part-time students in term of sex. Independent samples t-test was performed to check whether the COVID-19 pandemic had an impact on severity of workplace stress and insomnia. Hierarchical linear regression analysis was performed using the input method to determine whether workplace stress and coping strategies were predictors of insomnia. A series of moderation analyses was carried out to determine whether the programme's status (ie, full time or part time) moderated the relationships between workplace stress, coping strategies and insomnia. The analyses were performed using the PROCESS macro V.3.5.³² To test mediation models, where mediators were individual coping strategies the

Table 1 Sample characteristics

	N (%)	Mean (SD)
Age		24.16 (2.005)
Seniority (months)		12.57 (9.571)
Working hours/month		155.92 (34.66)
Sex		
Male	9 (5.7)	
Female	150 (94.3)	
Type of MDP		
Full time course	130 (81.8)	
Part time course	29 (18.2)	

MDP, Master Degree Programme.

analyses using the PROCESS macro V.3.5 and bootstrap method for 5000 sampling to estimate the significance of the mediation effect were performed.³² Statistical significance was set at $\alpha=0.05$.

RESULTS

Sociodemographic data (age, sex, seniority in months, monthly working hours, any type of master's programme) of our sample are presented in [table 1](#). Part-time students were found to work more hours/month (178.6 hours) than do full-time students (150.78 hours) ($Z=-3.63$; $p<0.001$). Part-time MDP students were also significantly older ($M=24.79$; $SD=1.86$) than full-time MDP students ($M=24.02$; $SD=2.02$) – ($Z=-2.68$; $p=0.007$) and they have longer work experience ($M=16.7$; $SD=11.25$) than full-time students ($M=11.65$; $SD=8.95$) – ($Z=-2.34$; $p=0.019$). No differences were found between full-time and part-time students in terms of the severity of stress ($Z=-0.20$; $p=0.842$) and insomnia ($Z=-1.91$; $p=0.056$). Fisher's exact test did not show any significant relationships between the type of studies and sex ($p=0.669$).

Insomnia, stress and coping with stress

The mean AIS score was 8.31 ($SD=4.42$), indicating that most respondents experienced inadequate sleep. The score of 110 participants (69.2% of the total sample) exceeded 6, indicating inadequate sleep. The mean score of the PSW scale was 19.55 ($SD=5.6$), indicating moderate levels of workplace stress. Furthermore, respondents most often chose effective problem-oriented strategies such as active coping (2.17; $SD=0.62$), use of instrumental support (2.01; $SD=0.78$), planning (2.15; $SD=0.66$) and emotion-oriented behaviour such as use of emotional support (2.08; $SD=0.82$). Conversely, the least frequently used coping strategy was substance use (0.45; $SD=0.71$). The results are presented in online supplemental file 3.

To check whether the COVID-19 pandemic had an impact on the analysed variables (workplace stress and insomnia), an independent samples t-test was performed. Due to the announcement of the epidemic in Poland

Table 2 Differences in the levels of insomnia and workplace stress between respondents who completed the questionnaire before the COVID-19 epidemic and during the COVID-19 epidemic

	Before epidemic COVID-19 (n=82)		During epidemic COVID-19 (n=77)		T	P value	95% CI		Cohen's d
	M	SD	M	SD			LL	UL	
Insomnia	8.91	4.33	7.68	4.46	1.78	0.077	-0.14	2.62	0.28
Workplace stress	19.41	5.86	19.69	5.35	-0.31	0.759	-2.03	1.49	0.05

Cohen's d, effect size; Cohen's d, effect size; LL, lower level; t, t-test result; UL, upper level.

on March 20, the collected sample was divided into two groups - material collected before 20 March 2020 (82 respondents) and collected after 20 March 2020 (77 respondents). This analysis did not reveal significant differences in the level of insomnia and workplace stress between individuals in two studied groups. The results are presented in [table 2](#).

Workplace stress and coping strategies as predictors of insomnia

Workplace stress was found to be a significant predictor of insomnia ($B=0.18$; $p=0.003$) and explained a 5% variance in insomnia. The higher the level of workplace stress, the higher severity of insomnia. After adjusting the coping strategy during data analysis, workplace stress ceased to be a significant predictor of insomnia. The strategies

that were significant predictors of insomnia were acceptance ($B=1.41$; $p=0.009$), denial ($B=0.99$; $p=0.032$) and self-blame ($B=1.41$; $p=0.001$), which were all positively associated with insomnia, and use of emotional support ($B=-1.47$; $p=0.021$) and venting ($B=-1.77$; $p=0.005$), which were negatively associated with insomnia. The results are presented in [table 3](#).

The mediating role of coping strategies for the relationship between workplace stress and insomnia

The conducted analysis showed that four strategies were significant mediators of the relationship between workplace stress and insomnia: use of emotional support ($B=0.05$; $SE=0.02$; 95% CI 0.01 to 0.09), use of instrumental support ($B=0.03$; $SE=0.02$; 95% CI 0.002 to 0.06), behavioural disengagement ($B=0.07$; $SE=0.03$; 95% CI

Table 3 Hierarchical linear regression analysis for insomnia prediction

	Predictors	B	SE	β	T	P value	95% CI of B		R ²	ΔR^2
							LL	UL		
1	(Constant)	4.71	1.21		3.89	<0.001	2.32	7.10	0.05	0.05
	Workplace stress	0.18	0.06	0.24	3.03	0.003	0.06	0.30		
2	(Constant)	5.11	2.49		2.05	0.042	0.19	10.03	0.23	0.18***
	Workplace stress	0.03	0.07	0.04	0.51	0.612	-0.10	0.16		
	Active coping	0.04	0.72	0.01	0.05	0.957	-1.39	1.46		
	Planning	0.45	0.63	0.07	0.71	0.481	-0.80	1.69		
	Positive reframing	-0.20	0.55	-0.03	-0.37	0.711	-1.29	0.88		
	Acceptance	1.41	0.53	0.21	2.66	0.009	0.36	2.45		
	Humour	0.78	0.54	0.11	1.45	0.151	-0.29	1.84		
	Religion	0.09	0.33	0.02	0.26	0.797	-0.57	0.74		
	Use of emotional support	-1.47	0.63	-0.28	-2.33	0.021	-2.72	-0.22		
	Use of instrumental support	-0.08	0.67	-0.02	-0.12	0.904	-1.41	1.25		
	Self-distraction	0.49	0.50	0.08	0.97	0.333	-0.51	1.48		
	Denial	0.99	0.46	0.19	2.16	0.032	0.08	1.89		
	Venting	-1.77	0.62	-0.25	-2.83	0.005	-3.00	-0.53		
	Substance use	-0.22	0.45	-0.04	-0.49	0.623	-1.12	0.67		
	Behavioural disengagement	0.71	0.60	0.11	1.18	0.242	-0.48	1.90		
	Self-blame	1.43	0.41	0.29	3.49	0.001	0.62	2.25		

*** - $p < 0.001$

B, unstandardised regression coefficient; LL, lower level; R², coefficient of determination; ΔR^2 , delta coefficient of determination; t, t-statistic; UL, upper level; β , standardised regression coefficient.

Table 4 Interaction effects for moderation models of the type of MDP for the relationship between work stress, coping strategies and insomnia

Interaction	SE	T	P value	95% CI for B	
				LL	UL
Workplace stress*type of MDP	0.09	−0.94	0.348	−0.25	0.09
Active coping*type of MDP (model 1)	0.73	2.35	0.020	0.28	3.17
Planning*type of MDP	0.70	0.59	0.553	−0.96	1.79
Positive reframing*type of MDP	0.57	−0.77	0.442	−1.57	0.69
Acceptance*type of MDP	0.76	−1.51	0.068	−2.89	0.10
Humour*type of MDP	0.77	−0.22	0.828	−1.69	1.35
Religion*type of s MDP (model 3)	0.42	−2.25	0.026	−1.76	−0.12
Use of emotional support*type of MDP	0.52	0.97	0.335	−0.52	1.53
Use of instrumental support*type of MDP	0.56	0.90	0.372	−0.61	1.61
Self-distraction*type of MDP (model 2)	0.59	2.21	0.028	0.14	2.48
Denial*type of MDP	0.47	0.30	0.768	−0.79	1.07
Venting*type of MDP	0.68	1.34	0.181	−0.43	2.24
Substance use*type of MDP	0.70	0.70	0.484	−0.90	1.88
Behavioural disengagement*type of MDP	0.80	−1.30	0.197	−2.63	0.55
Self-blame*type of MDP	0.52	0.61	0.541	−0.71	1.34

* interaction between strategy and type of MDP

B, unstandardised regression coefficient; LL, lower level; MDP, Master Degree Programme; t, t-statistic; UL, upper level.

0.01 to 0.13) and self-blame ($B=0.07$; $SE=0.02$; 95% CI 0.03 to 0.13). The effect of partial mediation was noted for the first two strategies, while for the next two—the effect of total mediation. Given the mediating role of using both emotional and instrumental support, the relationship between stress and insomnia weakens. However, considering the behavioural disengagement or self-blame, the relationship between the variables is no longer significant—stress is not related to insomnia. The results of the analyses are presented in online supplemental file 4.

Part-time or full-time status of MDP as a moderator of the relationship between workplace stress and coping strategies and insomnia

The moderation analysis showed that the type of MDP is an important moderator of three relationships: active coping and insomnia, self-distraction and insomnia, and religion and insomnia. Table 4 summarises the analysed models. The first model considered the type of MDP as a moderator of the relationship between active coping and insomnia. This model explained 9% of the variability in insomnia (increased by 3% after incorporating the full-time or part-time status of the MDP into the model). The relationship between active coping and insomnia was found to be significant for part-time students ($B=-4.27$; $p=0.002$; 95% CI -6.91 to -1.62). The higher the frequency of active coping among part-time students, the lower the severity of insomnia. However, the relationship between these variables among full-time students was insignificant ($B=-0.82$; $p=0.169$; 95% CI -1.99 to 0.35). The results are illustrated in online supplemental file 5.

The second model considered the type of MDP as a moderator of the relationship between the coping strategy of self-distraction and insomnia. This model explained 5% of the variability in insomnia (increased by 3% after incorporating the full-time or part-time status of the MDP into the model). The relationship between self-distraction and insomnia was found to be significant only for part-time students ($B=-2.09$; $p=0.045$; 95% CI -4.12 to -0.05). The higher the frequency of self-distraction, the lower the severity of insomnia. Among full-time students, the relationship between these variables was found to be insignificant ($B=0.53$; $p=0.359$; 95% CI -0.61 to 1.67). The results are presented in online supplemental file 6.

The third model considered the full-time or part-time status of the MDP as a moderator of the relationship between religion and insomnia. This model explained 6% of the variability in insomnia (increased by 3% after including the type of MDP into the model). The relationship between turning to religion and insomnia was not statistically significant for both part-time and full-time students ($B=1.20$; $p=0.105$; 95% CI -0.25 to 2.66 , and $B=-0.67$; $p=0.083$; 95% CI -1.43 to 0.09 , respectively). The results are presented in online supplemental file 7.

The moderating role of the type of MDP for the relationship between three coping strategies (active coping, self-distraction and religion) and insomnia is presented in online supplemental file 8.

DISCUSSION

Our results indicate the presence of insomnia among professionally active novice nurses who are simultaneously enrolled in an MDP. Negative consequences of inadequate quality and amount of sleep, such as psychophysiological health disturbances, emotional problems, decreasing quality of care provided, and patient safety, have been reported in earlier studies.^{3-6 17} Therefore, solutions to improve nurses' amount and quality of sleep appear to yield additional benefits for more complex aspects of human health.

We also confirmed the negative impact of occupational stress on quality of sleep, which could be exacerbated by pursuing second cycle education concurrently with active employment. However, our study revealed that when certain strategies are enacted, stress is not related to insomnia; thus, certain coping strategies can be considered a kind of buffer against insomnia for nurses who experience workplace stress. Our analysis revealed the mediating role of using both emotional and instrumental support—when nurses use these strategies to cope with stress, the relationship between stress and insomnia weakens. Furthermore, our results are in line with the results showed by Tsai *et al*³³ who suggested that appropriate relaxation could facilitate stress relief and improve the quality of sleep among nurses. Moreover, Chang and Chang indicated that creating a pleasant workplace environment could improve nurses' job satisfaction and sleep quality.¹⁹

Burnout resulting from staffing shortages could be an additional stressor and increase job strain and consequent insomnia.⁷ Therefore, active counteracting of stress should be undertaken, especially by healthcare management. Although these measures should take various forms, supporting the self-development of nurses and nursing students by increasing their ability to cope with stress—regardless of external factors—is imperative and could help minimise the incidence and severity of insomnia and its sequelae. It has been shown that nursing students' unmanaged stress can lead to negative emotional states such as sadness, anxiety, anger and low self-esteem.³⁴ However, a 2016 meta-analysis revealed that certain coping strategies can decrease nurses' work-related burnout.³⁵

Data collection for our analysis coincided with the announcement of the COVID-19 epidemic in Poland. Previous studies have shown that both the epidemic situation and distance-learning are additional predictors of stress.^{36 37} Therefore, in our analysis, we divided the collected sample into two groups (collected before the epidemic and during the epidemic), in order to compare the results of the level of workplace stress and insomnia in these groups. There were no statistically significant differences in the level of workplace stress and insomnia in analysed groups what may be a result from the fact that changes in functioning and education conditions have already begun. Therefore, our further analysis was performed without dividing into groups according to the time of data collection, but this issue should be investigated in the future studies.

Our study focused on coping strategies. The most commonly chosen coping strategies by novice nurses who are employed in their field and studying concurrently are problem-oriented strategies such as active coping, use of instrumental support, planning and emotion-oriented strategies such as use of emotional support, which all rely on reducing negative emotions elicited by perceived harm or threat.²⁴ These strategies have been found to be effective at reducing negative emotions.³⁸ Problem-oriented strategies are the most commonly used by nursing students to cope with the stress.³⁹ Studies conducted among nurses revealed that they use both problem-oriented and emotion-oriented strategies, and even mixtures of these coping strategies.^{40 41}

Active coping has been indicated as a protective factor against occupational stress during nurses' initial employment period in the oncology department.⁴² Another study revealed that nursing students should be educated in preparing themselves for academic and clinical demands by providing easy access for social support and encouraging effective methods of coping, such as creating a problem-solving plan.³⁸ According to Folkman and Lazarus,⁴³ seeking social support could be considered either a problem-oriented or emotion-oriented coping strategy, depending on contextual factors. Social support has been identified as the most commonly used coping strategy among nurses and their managers.³⁸

Using problem-oriented coping strategies is associated with good mental health and well-being outcomes among nurses, whereas emotion-oriented coping strategies are generally associated with poorer mental health and well-being.^{40 44} Moreover, problem-oriented strategies for dealing with workplace stress among nurses are associated with positive feelings of self-fulfilment and well-being.⁴⁵ Despite this fact, our study has shown that the most effective coping strategies for decreasing the insomnia for novice nurses who are concurrently employed and continuing their education with an MDP were the use of emotional support and venting.

As previously mentioned, lower utilisation of the emotion-focused coping style is associated with better mental health.^{40 44} Venting, especially, is described as a less effective coping strategy,³⁸ but its wide use among nurses seems to result from a work overload and the desire for immediate relief.

On the other hand, using acceptance, denial and self-blame as coping strategies increased the insomnia among our respondents; therefore, these strategies are not advised. The use of denial and self-blame as coping strategies for stress among stroke caregivers were associated with increased risk of depression.⁴⁶ Our mediation analysis indicated that using behavioural disengagement and self-blame strategies remove significance of the relationship between the workplace stress and insomnia. Reducing effort in difficult situation and denial strategies could be using as a temporary method to not face the problem. Furthermore, self-blame may be associated with increases in perceived control and the psychological

benefits.^{47 48} Despite the illusory effectiveness and short-term of reducing the stress level and removes its correlation with insomnia it means persons' poor ability to accept stressful accident and tend to be a risk factor for emotional problems in longer time perspectives. It is in line with the results of a study conducted among Polish nursing students, strategies such as denial, behavioural disengagement, and blaming oneself in stressful situations were associated with a lower sense of self-efficacy,⁴⁹ which may already be an emotional reflection of the use of seemingly effective strategies.

Different strategies were found to be effective at reducing insomnia in the group of part-time novice nursing students. These strategies included problem-oriented strategies such as active coping and self-distracting. Self-distracting may be of particular importance due to the conscious choice of combining further part-time education with full-time employment. Attending weekend classes at the university and focusing on personal development can provide a counterbalance to week-long work, which leads to decrease insomnia. We could hypothesise that taking courses part-time on weekends and engaging in self-education may be associated with a particular personal attitude oriented towards overcoming difficulties; however, further research is needed on this topic.

Everyday routine such as combining professional practice and full-time MDP could result in the effectiveness of the coping strategy of turning religion at reducing stress-induced insomnia; although this result was not statistically significant, a trend was obvious. The high effectiveness of using religion as a coping strategy for stress has been confirmed in contexts wherein the individual has no control over the stressful circumstances; however, the use of coping strategies orientated towards confronting the problem or planning is not effective in these contexts.⁵⁰ Previous studies revealed that religious faith may buffer against stress-related sleep disturbances by helping individuals avoid symptoms of depression.⁵¹ Indeed, spiritual well-being has been reported as one of the most important factors mediating physiological health and a healthy lifestyle.⁵² High spiritual well-being has been associated with a holistic, open-minded, and flexible approach to life,⁵³ which appears to be integral approach in nursing.

Limitations

Our study has some limitations. Part of the data were collected during the SARS-CoV-2 pandemic, which could have affected the level of stress experienced by nurses, both professionally and personally. COVID-19 pandemic has been recognised as a stressful phenomenon due to its effects on human life in various ways.³⁵ It could also have translated into a higher percentage of respondents who reported insomnia. In March 2020, the COVID-19 pandemic began to seriously disrupt educational systems and change it mainly into distance-learning which has been found as an additional stress predictor.³⁶ Therefore,

the presentation of the results also includes the time division due to the dynamics of changes of the epidemic in Poland. Another limitation of this study is that only age, sex, seniority working hours per months and type of Master course variables are taken in the sample group. We have not collected sociodemographic data, such as smoking, alcohol consumption, medications, which could also affect the relationship between stress and insomnia. Moreover, our study was cross-sectional in design; thus, a longitudinal study with more sociodemographic variables could provide further insight.

CONCLUSION

Insomnia is significant phenomena among novice nurses and are exacerbated by increased levels of workplace stress. Selecting appropriate coping strategies for stress that are dependent on the individuals' daily activities such as studying can significantly decrease severity of insomnia caused by workplace-induced stress. For nurses burdened with the additional stressor, such as pursuing education while working, the most effective coping strategies that reduce insomnia are the use of emotional support, use of instrumental support and venting. The most effective method of coping with stress for nurses in a full-time master's programme may be religion, while for part-time students, they may be active coping and self-distraction. Therefore, promotion of sleep hygiene among nurses is encouraged, and effective interventions should be implemented to identify unique stressors and identify contextually appropriate coping strategies to improve nurses' sleep, health and well-being.

Contributors Made substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data (LS, MF, DZ, JO and BC-P); Involved in drafting the manuscript or revising it critically for important intellectual content (LS, MF, DZ, JO and BC-P); Given final approval of the version to be published. Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content (LS, MF, DZ, JO and BC-P); Agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved (LS, MF, DZ, JO and BC-P). LS is the guarantor of this study.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Not applicable.

Ethics approval The study was approved by the Ethical Board at the Medical University of Warsaw (reference number AKBE/285/2019).

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement All data relevant to the study are included in the article or uploaded as online supplemental information.

Supplemental material This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

ORCID iD

Lena Izabela Serafin <http://orcid.org/0000-0003-1364-5767>

REFERENCES

- 1 Sateia MJ. International classification of sleep Disorders-Third edition. *Chest* 2014;146:1387–94.
- 2 American Psychological Association. Why sleep is important. Available: <https://www.apa.org/topics/sleep/why> [Accessed 3 Nov 2020].
- 3 Kang W, Jang K-H, Lim H-M, et al. The menstrual cycle associated with insomnia in newly employed nurses performing shift work: a 12-month follow-up study. *Int Arch Occup Environ Health* 2019;92:227–35.
- 4 Korsiak J, Tranmer J, Day A, et al. Sleep duration as a mediator between an alternating day and night shift work schedule and metabolic syndrome among female hospital employees. *Occup Environ Med* 2018;75:132–8.
- 5 Lee C-Y, Chen H-C, Meg Tseng M-C, et al. The relationships among sleep quality and Chronotype, emotional disturbance, and insomnia vulnerability in shift nurses. *J Nurs Res* 2015;23:225–35.
- 6 Hughes RG, Rogers AE. Are you tired? Sleep deprivation compromises nurses' health—and jeopardizes patients. *Am J Nurs* 2004;104:36–8.
- 7 Portela LF, Kröning Luna C, Rotenberg L, et al. Job strain and self-reported insomnia symptoms among nurses: what about the influence of emotional demands and social support? *Biomed Res Int* 2015;2015:820610.
- 8 Huang CL-C, Wu M-P, Ho C-H, et al. Risks of treated anxiety, depression, and insomnia among nurses: a nationwide longitudinal cohort study. *PLoS One* 2008;13:e0204224.
- 9 Benner P. From novice to expert. *Am J Nurs* 1982;82:402–7.
- 10 Rudman A, Arborelius L, Dahlgren A, et al. Consequences of early career nurse burnout: a prospective long-term follow-up on cognitive functions, depressive symptoms, and insomnia. *EClinicalMedicine* 2020;27:100565.
- 11 Jiang X-I, Zheng X-y, Yang J, et al. A systematic review of studies on the prevalence of insomnia in university students. *Public Health* 2015;129:1579–84.
- 12 D'Ettorre G, Pellicani V, Caroli A, et al. Shift work sleep disorder and job stress in shift nurses: implications for preventive interventions. *Med Lav* 2020;111:195–202.
- 13 Jafari Roodbandi A, Choobineh A, Daneshvar S. Relationship between circadian rhythm amplitude and stability with sleep quality and sleepiness among shift nurses and health care workers. *Int J Occup Saf Ergon* 2015;21:312–7.
- 14 Haile KK, Asnakew S, Waja T, et al. Shift work sleep disorders and associated factors among nurses at federal government hospitals in Ethiopia: a cross-sectional study. *BMJ Open* 2019;9:e029802.
- 15 Han Y, Yuan Y, Zhang L, et al. Sleep disorder status of nurses in general hospitals and its influencing factors. *Psychiatr Danub* 2016;28:176–83.
- 16 Caruso CC. Negative impacts of shiftwork and long work hours. *Rehabil Nurs* 2014;39:16–25.
- 17 Ramadan MZ, Al-Saleh KS. The association of sleep deprivation on the occurrence of errors by nurses who work the night shift. *Curr Health Sci J* 2014;40:97–103.
- 18 Johnson AL, Jung L, Song Y, et al. Sleep deprivation and error in nurses who work the night shift. *J Nurs Adm* 2014;44:17–22.
- 19 Chang W-P, Chang Y-P. Relationship between job satisfaction and sleep quality of female shift-working nurses: using shift type as moderator variable. *Ind Health* 2019;57:732–40.
- 20 Gillet N, Huyghebaert-Zouaghi T, Réveillère C, et al. The effects of job demands on nurses' burnout and presenteeism through sleep quality and relaxation. *J Clin Nurs* 2020;29:583–92.
- 21 Gao Y-Q, Pan B-C, Sun W, et al. Depressive symptoms among Chinese nurses: prevalence and the associated factors. *J Adv Nurs* 2012;68:1166–75.
- 22 Ferreira LRC, de Martino MMF. [Sleep patterns and fatigue of nursing students who work]. *Rev Esc Enferm USP* 2012;46:1176–81.
- 23 Wolf L, Stidham AW, Ross R. Predictors of stress and coping strategies of US accelerated vs. generic Baccalaureate nursing students: an embedded mixed methods study. *Nurse Educ Today* 2015;35:201–5.
- 24 Lazarus R, Folkman S. *Stress, appraisal, & coping*. New York, NY: Springer Publishing Company, 1984.
- 25 Carver CS. You want to measure coping but your protocol's too long: consider the brief COPE. *Int J Behav Med* 1997;4:92e100.
- 26 Bulmer Smith K, Profetto-McGrath J, Cummings GG. Emotional intelligence and nursing: an integrative literature review. *Int J Nurs Stud* 2009;46:1624–36.
- 27 Bartlett J. Introduction to power analysis. A guide to G*Power, jamovi, and Superpower. Available: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwiw96yqwu3xAhUll4sKHdIBcQFjADegQlJxAD&url=https%3A%2F%2Fosf.io%2Fzqphw%2Fdownload&usq=AOvVaw196Jge9JYwY6HoDTA_R05T
- 28 Fornal-Pawłowska M, Wołyńczyk-Gmaj D, Szelenberger W. [Validation of the polish version of the Athens insomnia scale]. *Psychiatr Pol* 2011;45:211–21.
- 29 Soldatos CR, Dikeos DG, Paparrigopoulos TJ. Athens insomnia scale: validation of an instrument based on ICD-10 criteria. *J Psychosom Res* 2000;48:555–60.
- 30 Chirkowska-Smolak T, Grobelny J. The design and preliminary psychometric analysis of the perceived stress at work questionnaire. *Psychological Journal* 2016;22:131–9.
- 31 Cohen S, Williamson G. Perceived stress in a probability sample of the United States. In: Spacapan S, Oskamp S, eds. *The social psychology of health: Claremont Symposium on applied social psychology*. Newbury Park, CA: Sage, 1989.
- 32 Hayes AF. *Introduction to mediation moderation and conditional process analysis: a regression-based approach*. Guilford Publications, 2017.
- 33 Tsai K, Lee T-Y, Chung M-H. Insomnia in female nurses: a nationwide retrospective study. *Int J Occup Saf Ergon* 2017;23:127–32.
- 34 Labrague LJ, McEnroe-Petitte DM, Al Amri M, et al. An integrative review on coping skills in nursing students: implications for policymaking. *Int Nurs Rev* 2018;65:279–91.
- 35 Lee H-F, Kuo C-C, Chien T-W, et al. A meta-analysis of the effects of coping strategies on reducing nurse burnout. *Appl Nurs Res* 2016;31:100–10.
- 36 Buheji M, Jahrami H, Sabah Dhahi A. Minimising stress exposure during pandemics similar to COVID-19. *Int J Psychol Behav Sci* 2020;10:9–16.
- 37 Hamaideh SH, Al-Modallal H, Tanash Mu'ath, et al. Depression, anxiety and stress among undergraduate students during COVID-19 outbreak and "home-quarantine". *Nurs Open* 2021 doi:10.1002/nop.2.918
- 38 Juczyński Z, Ogińska-Bulik N. Narzędzia do pomiaru stresu i radzenia sobie ze stresem. In: *Pracowania Testów Psychologicznych Polskiego Towarzystwa Psychologicznego*. Warszawa, 2012.
- 39 Bhurtun HD, Azimrad M, Saaranen T, et al. Stress and coping among nursing students during clinical training: an integrative review. *J Nurs Educ* 2019;58:266–72.
- 40 Lim J, Bogossian F, Ahern K. Stress and coping in Australian nurses: a systematic review. *Int Nurs Rev* 2010;57:22–31.
- 41 Huang L, Lei W, Xu F, et al. Emotional responses and coping strategies in nurses and nursing students during Covid-19 outbreak: a comparative study. *PLoS One* 2020;15:e0237303.
- 42 Mazzella Epstein AM, Sanzero Eller L, Tan KS, et al. The relationships between coping, occupational stress, and emotional intelligence in newly hired oncology nurses. *Psychooncology* 2019;28:278–83.
- 43 Folkman S, Lazarus RS. An analysis of coping in a middle-aged community sample. *J Health Soc Behav* 1980;21:219–39.
- 44 Rodríguez-Rey R, Palacios A, Alonso-Tapia J, et al. Burnout and posttraumatic stress in paediatric critical care personnel: prediction from resilience and coping styles. *Aust Crit Care* 2019;32:46–53.
- 45 Parikh P, Taukari A, Bhattacharya T. Occupational stress and coping among nurses. *J Health Manag* 2004;6:115–27.
- 46 Qiu Y, Li S. Stroke: coping strategies and depression among Chinese caregivers of survivors during hospitalisation. *J Clin Nurs* 2008;17:1563–73.
- 47 Janoff-Bulman R. Characterological versus behavioral self-blame: inquiries into depression and rape. *J Pers Soc Psychol* 1979;37:1798–809.
- 48 Miller DT, Porter CA. Self-blame in victims of violence. *J Soc Issues* 1983;39:139–52.
- 49 Bodys-Cupak I, Majda A, Zalewska-Puchała J, et al. The impact of a sense of self-efficacy on the level of stress and the ways of coping with difficult situations in Polish nursing students. *Nurse Educ Today* 2016;45:102–7.
- 50 Borkowska A. Religijne radzenie sobie ze stresem a psychologiczny dobrostan i zdrowie. In: *Ickiewicz-Sawicka (red), Kultura a religia – obrzędy, rytuały, konflikty. Stowarzyszenie Miłośników Kultury Ludowej. Czeremcha*, 2017.

- 51 ChG E, Deangelis RT, Hill TD. Sleep quality and the stress-buffering role of religious involvement: a mediated moderation analysis. *J Sci Study Religion* 2019;58:251–68.
- 52 Azarsa T, Davoodi A, Khorami Markani A, *et al*. Spiritual wellbeing, attitude toward spiritual care and its relationship with spiritual care competence among critical care nurses. *J Caring Sci* 2015;4:309–20.
- 53 Burkhardt M, Jacobson MN. *Spirituality: living our connectedness*. 1st edn. New York: Delmar Thomson Learning, 2002.