



# Coronavirus anxiety as a predictor of burnout, depressive symptoms and insomnia among professionally active nurses: a preliminary report

## Łęk przed koronawirusem jako predyktor wypalenia, objawów depresyjnych i bezsenności wśród aktywnych zawodowo pielęgniarek: doniesienie wstępne

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### Abstract

**Purpose:** A preliminary assessment of the direct association between coronavirus anxiety and burnout syndrome, depressive symptoms and insomnia among nurses in the context of selected work-related factors.

**Methods:** This is a cross-sectional study. Fifty professionally active nurses were recruited from various psychiatric facilities and asked to fill out a set of questionnaires: the authors' survey on sociodemographic data, the Coronavirus Anxiety Scale (CAS), the Maslach Burnout Inventory – General Survey (MBI-GS), the revised version of the Center for Epidemiologic Studies Depression Scale (CESD-R), and the Athens Insomnia Scale (AIS). Linear regression models were constructed to predict the AIS, CESD-R and MBI-GS dimensions scores, with the CAS score as a predictor. The models were adjusted for sex, marital status, place of residence, length of service and working hours per week.

**Results:** A rise in the CAS score was associated with rises in the CESD-R, MBI Exhaustion and MBI Cynicism scores. The effects were of similar size regardless of whether models were adjusted or unadjusted. Unadjusted and adjusted models predicting AIS total scores and MBI-Efficacy score were not fit to empirical data. In these models, the CAS score was not found to be significantly associated with the AIS and MBI-Efficacy scores.

**Conclusions:** The severity of coronavirus anxiety contributed to the severity of depressive symptoms, cynicism and exhaustion among nurses. The ability to cope effectively with fear of being infected with SARS-CoV-2 may be crucial in preventing and mitigating other mental health sequelae.

**Key words:** exhaustion, COVID-19, mental health, cynicism.

### Streszczenie

**Cel:** Wstępna ocena bezpośredniego związku między lękiem przed koronawirusem i objawami zespołu wypalenia, objawami depresyjnymi i bezsennością wśród pielęgniarek w kontekście wybranych czynników związanych z pracą zawodową.

**Metody:** W niniejszym badaniu przekrojowym poproszono 50 pielęgniarek pracujących na oddziałach psychiatrycznych o wypełnienie zestawu kwestionariuszy: autorskiej ankiety, Skali Łęku Przed Koronawirusem (CAS), Inwentarza Wypalenia Maslach w wersji ogólnej (MBI-GS), skali depresji *Center for Epidemiologic Studies* w wersji zrewidowanej (CESD-R) oraz Ateńskiej Skali Bezsenności (AIS). Skonstruowano modele regresji liniowej predykcji wyników AIS, CESD-R oraz wymiarów MBI-GS, za każdym razem

z wynikiem w skali CAS jako predyktorem. Modele zostały skorygowane o płeć, stan cywilny, miejsce zamieszkania, czas stażu zawodowego i liczbę godzin pracy w tygodniu.

**Wyniki:** Wzrost wyniku na skali CAS był związany ze wzrostem wyników CESD-R oraz Wyczerpania i Cynizmu na skali MBI-GS. Siła efektu była zbliżona niezależnie od tego, czy modele były skorygowane czy nie. Modele predykcji wyników AIS i Efektywności na skali MBI nie były dopasowane do danych empirycznych. W tych modelach wynik CAS nie stanowił istotnego statystycznie predyktora wyników AIS i Efektywności.

**Wnioski:** Nasilenie lęku przed koronawirusem przyczyniało się do nasilenia objawów depresyjnych, cynizmu i wyczerpania wśród pielęgniarek. Wydaje się, że umiejętność skutecznego radzenia sobie ze strachem przed zakażeniem SARS-CoV-2 może być kluczem w zapobieganiu i łagodzeniu innych negatywnych skutków dotyczących zdrowia psychicznego.

**Słowa kluczowe:** wyczerpanie, COVID-19, zdrowie psychiczne, cynizm.

## INTRODUCTION

The novel coronavirus (SARS-CoV-2) was first identified in Wuhan, China at the turn of 2019/2020. The disease is caused by the coronavirus (COVID-19) and its clinical phenotype has been described [1, 2]. The transmission of the virus has at the time of writing spread worldwide, proving to be a challenge on various levels for the economies and healthcare systems of all countries [3].

On the individual level, psychological consequences, in both the short- and long-term perspectives, have been observed with regards to the direct and indirect effects of COVID-19. The former mainly concerns two groups: the relatives of patients who have suffered from the disease and healthcare workers who are constantly exposed to increased risk of infection with SARS-CoV-2 in the course of their jobs [4-6]. In the meta-analysis by Pappa *et al.*, it was demonstrated that as a consequence of the pandemic 23% of healthcare workers suffer from clinically significant anxiety, 23% from depression, and 38% from insomnia [7]. However, the chronicity and widely dispersed character of the pandemic poses a threat to global mental health, particularly since that direct contact with SARS-CoV-2 appears not to be an essential factor in the development of coronavirus anxiety [8]. A term coronaphobia was coined to describe the fear and anxiety specific to the COVID-19 pandemic, yet its clinical significance is to be further determined. So far, it has been found to additionally explain the variance of the severity of depressive symptoms, generalized anxiety and fear of death, independently of selected well-recognized psychosocial factors [9]. A recent meta-analysis by Şimşir *et al.*, which included 33 studies conducted among general populations, revealed that fear of COVID-19 was strongly related to anxiety, traumatic stress and distress, moderately related to stress and depression, and modestly correlated with insomnia [10].

Mental health sequelae of the SARS-CoV-2 have also been discussed in terms of risk of burnout. Professional burnout is defined as a set of psychological and somatic symptoms that may appear due to ineffective coping with chronic stress at work. Those symptoms comprise emo-

tional exhaustion, depersonalization (or cynicism) and reduced personal accomplishment (or professional efficacy), according to Maslach *et al.* [11]. The phenomenon was first described in the context of the so-called helping professions (e.g. physicians, nurses, psychologists) but it has also been delineated in other vocations based on everyday direct contact with clients or customers [12, 13]. Adriaenssens *et al.* found significant burnout in 26% of emergency nurses [14]. Salazar de Pablo *et al.* found an incidence of 34% for burnout as an outcome of the coronavirus pandemic among healthcare workers [15]. The prevalence of burnout syndrome has been reported to be up to 80%, depending on the criteria adopted and the population investigated [16]. Thus, the search for risk factors, efficient prevention and adequate help for burned-out healthcare workers might be of particular importance during the COVID-19 outbreak.

In the light of the above, the aim of this study was a preliminary assessment of the direct associations between coronavirus anxiety and burnout syndrome, depressive symptoms and insomnia among nurses, in the context of selected work-related factors. It was hypothesized that stronger coronaphobia would be related to more severe burnout, depressive symptoms and insomnia.

## METHODS

### Study group and design

The study was of a cross-sectional design. A convenience sample of 50 nurses was recruited between October and December 2020 from various psychiatric facilities of the Institute of Psychiatry and Neurology (Instytut Psychiatrii i Neurologii [IPiN]) in Warsaw. The socio-demographic and job-related characteristics of the respondents are presented in Table 1.

### Questionnaires

The Coronavirus Anxiety Scale (CAS) was utilized to measure dysfunctional, anxiety-related somatic symptoms linked to the current novel coro-

**Table 1.** Sociodemographic and job-related characteristics of the group of nurses studied

Age, M ± SD	46.40 ± 6.91	
	Min-max	23-60
Duration of service (years), M ± SD	23.80 ± 9.25	
	Min-max	1.08-40.25
Working hours per week, M ± SD	49.44 ± 22.59	
	Min-max	30.20-170.00
Sex, n (%)	Men	10 (20)
	Women	40 (80)
Marital status, n (%)	Single	9 (18)
	Married	33 (66)
	Divorced	7 (14)
	Widowed	1 (2)
Place of residence, n (%)	Village	9 (18)
	City < 100 000 inhabitants	12 (24)
	City 100 000-500 000 inhabitants	3 (6)
	City > 500 000 inhabitants	26 (52)
Place of work, n (%)	ED	3 (6)
	Hospital ward	42 (84)
	Other	1 (2)
	Other + hospital ward	4 (8)

Min – minimal value, Max – maximal value, M – mean, SD – standard deviation, n – number of observations, ED – Emergency Department and Admissions

**Table 2.** Descriptive statistics of the questionnaire-based variables in the group of nurses studied

	Min	Max	M	SD
MBI: Exhaustion	0.60	6.00	2.07	1.12
MBI: Cynicism	0.20	4.60	1.99	1.16
MBI: Professional Efficacy	1.20	5.60	3.90	1.02
CESD-R	0.00	43.00	11.64	10.80
AIS	1.00	22.00	7.66	4.39
CAS	0.00	19.00	2.76	4.18

Min – minimal value, Max – maximal value, M – mean, SD – standard deviation, MBI – Maslach Burnout Inventory, CESD-R – Center for Epidemiologic Studies Depression Scale-Revised, CAS – Coronavirus Anxiety Scale, AIS – Athens Insomnia Scale

navirus outbreak in the two weeks before the study commenced. The questionnaire was developed by Lee *et al.* [17], translated into Polish by a team of experienced mental health professionals using a rigorous forward- and backward-translation procedure, and tested on a Polish sample of healthcare workers [18]. It comprises five items, scored from 0 to 4. An increase in the score means a surge in coronavirus-related anxiety.

Professional burnout was assessed with the Maslach Burnout Inventory – General Survey (MBI-GS), devised

by Schaufelli *et al.* and validated for use in Polish language research by Chirkowska-Smolak and Kleka [19, 20]. The questionnaire comprises sixteen items, scored from 0 to 6, divided into three subscales: Exhaustion, Cynicism (understood as an indifference towards one's job) and sense of Professional Efficacy. Each subscale is interpreted separately. High indices of Exhaustion and Cynicism and low Professional Efficacy indicate burn-out syndrome.

The severity of depressive symptoms was measured with the revised version of the Center for Epidemiologic Studies Depression Scale (CESD-R) by Eaton *et al.*, translated and adapted to Polish by Świtaj *et al.* [21, 22]. This psychometric tool consists of twenty items, scored from 0 to 4 on a Likert scale, inquiring about the frequency of depressive symptoms within the preceding two weeks. A rise in the score is interpreted as an increase in the intensity of the depressive symptoms experienced.

The Athens Insomnia Scale (AIS) was used to evaluate the severity of insomnia symptoms. The tool was developed by Soldatos *et al.* and validated in Polish by Fornal-Pawłowska *et al.* [23, 24]. This eight-item questionnaire taps into symptoms of insomnia and their effect on daily functioning. An increase in the score indicates an increase in the severity of insomnia symptoms.

Descriptive statistics for the instruments utilized in the study are displayed in Table 2.

## Procedures

Ethical approval for the study was obtained from the Bioethical Committee of the IPiN. All participants provided their informed consent. Data was collected and checked for completeness by one of the research team members (J.J.). The questionnaires were filled out by the respondents in private and then anonymized.

## Statistical analysis

The STATISTICA 13 (Dell, USA) software was used for statistical analysis. Continuous variables were characterized by means of standard deviations and categorical variables – as number of observations with percentage of total sample. Due to the sample size ( $N = 50$ ), the central limit theorem was used and no attempt was made to confirm the normality of the continuous variables. The Pearson's correlation quotients were calculated to assess the relationship between two continuous variables. The Benjamini-Hochberg correction, with an assumed false discovery rate of 0.25, was applied to the  $p$ -values of correlation quotients to avoid type 1 error. Linear regression models were constructed to predict the scores of the the AIS, CESD-R and MBI-GS dimensions. Two kinds of models were devised for each of the predicted variables: unadjusted and adjusted for sex, marital status, place of residence, duration

of service and working hours per week. An analysis of residuals was performed to assess the validity of assumptions of normality, homoscedasticity, and independence between observations (with the Durbin-Watson test). Variance inflation factors were analyzed to track possible multicollinearities. The tolerance indices were analyzed to track possible multicollinearities. Effect sizes were assessed in two ways: for each model as a whole (coefficient of determination  $R^2$ ) and for the parameter (CAS score) in each model (semi-partial correlation  $sR$ ). The level of significance was assumed as  $\alpha = 0.05$ .

## RESULTS

### Correlations

There was a moderate, positive and statistically significant correlation between the CAS and CESD-R scores. A similar association was observed between the CAS and

MBI Exhaustion subscale scores. No other correlation between the CAS score and the remainder of the variables of interest were found to be statistically significant after application of the Benjamini-Hochberg correction.

Additionally, MBI Exhaustion subscale scores correlated moderately, positively and significantly with MBI Cynicism scores and with the CESD-R scores. A slightly weaker correlation was also observed between the MBI Exhaustion and AIS scores. There was a moderate and significant correlation between the MBI Cynicism and CESD-R scores.

Table 3 comprises a detailed matrix of calculated correlation coefficients.

### Linear regression models

A rise in CAS score was associated with a rise in CESD-R score, a rise in MBI Exhaustion score and a rise in MBI Cynicism score. The effects were of similar size in both the adjusted or unadjusted models. The adjusted models for

**Table 3.** Matrix of Pearson correlation quotients between the continuous variables of interest in the group of nurses studied

	Variables	Age	1	2	3	4	5	6	7
1.	Duration of service (years)	0.900*							
2.	Working hours per week	-0.022	0.023						
3.	MBI-EX	0.240	0.331	0.065					
4.	MBI-CY	0.085	0.134	0.049	0.526*				
5.	MBI-EF	0.031	-0.002	-0.026	-0.058	-0.263			
6.	CESD-R	0.092	0.124	-0.073	0.536*	0.445*	-0.166		
7.	AIS	0.054	0.125	0.135	0.421*	0.291	-0.035	0.346	
8.	CAS	0.063	0.149	-0.090	0.435*	0.410	-0.144	0.465*	0.253

MBI – Maslach Burnout Inventory, EX – Exhaustion, CY – Cynicism, EF – Professional Efficacy, CESD-R – Center for Epidemiologic Studies Depression Scale-Revised, CAS – Coronavirus Anxiety Scale, AIS – Athens Insomnia Scale. \* $p < 0.05$  (two-tailed after Benjamini-Hochberg correction)

**Table 4.** Parameters of linear regression models of coronavirus anxiety (measured with the Coronavirus Anxiety Scale – CAS), predicting depressive symptoms, insomnia severity and burnout in its three dimensions (exhaustion, cynicism and professional efficacy) in the group of nurses studied

Predicted variable	Model version	$R^2$	F	df	p (for F)	sR	t	p (for t)
CESD-R	Unadjusted	0.200	13.237	1	0.001	0.465	3.638	0.001
	Adjusted	0.172	2.021	10	0.057	0.403	3.104	0.004
AIS	Unadjusted	0.045	3.289	1	0.076	0.253	1.813	0.076
	Adjusted	-0.068	0.689	10	0.728	0.241	1.634	0.110
MBI-EX	Unadjusted	0.172	11.181	1	0.002	0.435	3.344	0.002
	Adjusted	0.217	2.362	10	0.027	0.390	3.087	0.004
MBI-CY	Unadjusted	0.150	9.674	1	0.003	0.410	3.110	0.003
	Adjusted	0.101	1.548	10	0.159	0.340	2.509	0.016
MBI-EF	Unadjusted	0.000	1.013	1	0.319	-0.144	-1.007	0.319
	Adjusted	-0.011	0.946	10	0.504	-0.087	-0.602	0.551

The results are presented for models both unadjusted and adjusted for selected sociodemographic variables: sex, marital status, place of residence, duration of service and working hours per week.  $R^2$  – coefficient of determination of the model, F – F-Snedecor test result for the model, df – degrees of freedom, p – probability in the test, sR – semipartial correlation coefficient, t – t-test result for the parameter (CAS score), MBI – Maslach Burnout Inventory, EX – Exhaustion, CY – Cynicism, EF – Professional Efficacy, CESD-R – Center for Epidemiologic Studies Depression Scale-Revised, AIS – Athens Insomnia Scale

prediction of the CESD-R and MBI Cynicism scores did not fulfil the criterion of fitness to empirical data.

Unadjusted and adjusted models predicting AIS total score and MBI Professional Efficacy score were not fit to empirical data. Also, in those models CAS score was not found to be significantly associated AIS and MBI Professional Efficacy scores (Table 4).

## DISCUSSION

An increased incidence and severity of mental health sequelae during the COVID-19 pandemic appears to be evident, yet less is known about the direct relationship between coronaphobia and other psychopathological symptoms.

In this study, the severity of depressive symptoms was predicted by the intensity of the coronavirus anxiety experienced among the nurses. It should be noted that the effect kept its relatively strong size after adjustment for sex, marital status, place of residence, duration of service and working hours per week. In the adjusted model, CAS score as the predictor of depressive symptoms appeared to be at the verge of clinical significance – thus, the model requires further validation. The literature on this association is scarce, yet the results appear to be congruent. Lee *et al.* reported that coronavirus anxiety predicted depression among non-healthcare workers [9]. In a Brazilian validation of the Coronavirus Anxiety Scale, the questionnaire's score correlated with the measures of depression in use [25]. Sakib *et al.* found fear of COVID-19 to be linked to depression in a sample from the Bangladeshi population, including healthcare workers [26]. It should be noted that despite the utilization of different measures of depressive symptoms, the association with coronaphobia in the above-mentioned studies appeared to be of similar effect size and independent of selected sociodemographic factors. Those results indicate the significance of the coronavirus anxiety construct as a current and important risk factor of depression [9].

The severity of insomnia was found to have a weak, positive and statistically insignificant relationship with coronavirus anxiety. Little is known on the relationship tested. The positive link between the severity of insomnia and any kind of anxiety is evident, as common psychopathological mechanisms can be delineated, including emotional overactivity [27]. Contemporary psychiatric diagnostic classifications include insomnia as one of the symptoms of generalized anxiety disorder [28]. Regarding the fear of COVID-19, Ahorsu *et al.* found it to be associated with insomnia on a weak-to-moderate spectrum in a representative sample of older adults [29]. Şimşir *et al.* also found fear of coronavirus to be positively, yet modestly, correlated with insomnia, and moderately with depression [10]. Thus it might be concluded that coronaphobia may probably predict insomnia in a weaker sense than depression and burnout among professionally active nurses.

Importantly, an increase in the severity of coronavirus anxiety was found to predict an increment in the intensity of exhaustion and cynicism as dimensions of professional burnout in the group of nurses studied. The effects mentioned were of moderate size, regardless of being controlled for sociodemographic factors. The increased risk of vocational burnout among healthcare workers has been widely studied in the context of the COVID-19 pandemic.

Once again, a link between coronaphobia and burnout may be considered self-evident, but no study has investigated this link directly. However, it should be noted that several works have implied such a relationship. Barello *et al.* investigated the indices of burnout and somatic symptoms among so-called frontline healthcare workers at the peak of the COVID-19 outbreak in Italy, i.e. before the development of the concept of coronaphobia and the CAS questionnaire. They found a particularly high prevalence of emotional exhaustion and depersonalization – around 33% and 25%. At the same time, 45% of the respondents reported somatic symptoms, including increased muscle tension and trouble with falling asleep – i.e. symptoms included in the items of the CAS questionnaire [30]. Hu *et al.* reported an incidence of 60% of moderate-to-high emotional exhaustion and 42% of moderate-to-high depersonalization [31]. The authors emphasised that there was a negative correlation between those indices and frontline work willingness, resilience and social support. These associations indicate factors which may present additional risk but may also be the consequences of burnout syndrome among healthcare workers [31]. Additional recognized risk factors of burnout among nurses during the COVID-19 outbreak include personal dispositions (job experience, self-perceived health status, safety attitudes) and job conditions (high perceived workload, shifts lasting more than 8 hours, shortage of personal protective equipment and other hospital resources, type of hospital unit, working hours, insufficient training for work with COVID-19 patients, being redeployed) [32-36]. A multivariate model indicated that perceived stress at work could be a particularly strong predictor of burnout [32]. These conclusions are in line with the findings presented, considering the negative impact of burnout on both personal mental health and the quality of care provided by healthcare workers [37].

This study has produced certain important findings on the possible significance of coronavirus anxiety as a predictor of depressive symptoms and burnout among professionally active nurses. They underline the need for the active screening for signs of coronaphobia, particularly among healthcare workers, to avoid the dire consequences of it [38]. Recognition of clinically significant coronaphobia, or other psychological distress related to the COVID-19 outbreak, may produce a number of specific therapeutic interventions. Some targeted frameworks of crisis intervention or social support for healthcare work-

ers during the current pandemic have been introduced, but their efficacy is still to be determined [39-41].

## LIMITATIONS AND FUTURE DIRECTIONS

It might be argued that the employment of the MBI Health Services Survey version of the questionnaire would have been perhaps more fitting to the study in hand, rather than the MBI General Survey used. Thus, it should be explained that the choice was dictated by the fact that the analyses would have included non-health-care workers. The adjusted models for the prediction of the CESD-R and MBI Cynicism scores did not meet the criterion of goodness of fit. This may be attributed either to a relatively small effect size or the associations being dependent on the confounders considered (sociodemographic variables). Either way, it may be expected that a better goodness of fit of the models may be reached in a study on a larger sample, with the possibility of employing a higher number of confounders. An increase in the number of observations may also allow for the inclusion of certain personal dispositions as additional factors, and consideration of coronavirus anxiety in a setting of path analyses. It should be considered that coronaphobia may be merely a mediator between personality traits and other mental health sequelae [38]. Also, the current analysis does not provide any rationale for conclusions about

causality. For the sake of this study, it was hypothesized that coronavirus anxiety was a predictor of depression, insomnia and burnout. It should be noted, however, that an association in the opposite direction cannot be ruled out. Subjects with initially increased indices of burnout, depression and insomnia might be at greater risk of suffering from coronavirus anxiety or other mental health sequelae during the pandemic, yet the data from longitudinal studies is scarce [42]. It needs to be noted as well that the levels of burnout among nurses could have been high before the COVID-19 outbreak, as shown in previous studies [12, 14]. As stated in the introduction, this analysis has a preliminary character, although it should be noted that the current, significant results are in accordance with previously published findings.

## CONCLUSIONS

The severity of coronavirus anxiety contributed to the severity of depressive symptoms, cynicism and exhaustion (as burnout dimensions) among nurses. There might be a relationship between insomnia and coronavirus anxiety in the investigated group. Thus, efficient coping with the fear of being infected with SARS-CoV-2 may be crucial in preventing and mitigating other mental health sequelae among professionally active nurses.

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### Conflict of interest

Absent.

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