

PROFESSIONAL CHALLENGES OF NURSES WORKING DURING THE SARS-COV-2 VIRUS PANDEMIC

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Abstract

Objectives: The diverse list of tasks and needs related to the SARS-CoV-2 pandemic may lead to different professional experiences in nurses working with patients infected with and not infected with SARS-CoV-2. The aim of the study was to measure the professional challenges of nurses working during the SARS-CoV-2 pandemic in Poland. **Material and Methods:** The study was conducted in 2021 in a group of 151 nurses. The following scales were used: the *Perceived Stress Scale* (PSS-10), the *General Self-Efficacy Scale* (GSES), the *Impact of Event Scale – Revised* (IES-R), the *Minnesota Satisfaction Questionnaire* (MSQ-SF), the *Areas of Worklife Survey* (AWS) and the *Maslach Burnout Inventory – Human Services Survey* (MBI-HSS). **Results:** Nurses working with patients infected with SARS-CoV-2 showed a positive correlation between workload and emotional exhaustion ($\rho = 0.26$, $p = 0.02$), as well as positive correlations among control, community and depersonalization ($\rho = 0.25$, $p = 0.02$; $\rho = 0.23$, $p = 0.04$). Among nurses working with uninfected patients, positive correlations were found among control, community, fairness and emotional exhaustion ($\rho = 0.40$, $p = 0.000$; $\rho = 0.41$, $p = 0.000$; $\rho = 0.25$, $p = 0.03$), as well as correlations between control and depersonalization ($\rho = 0.33$, $p = 0.01$), and among control, community and personal accomplishment ($\rho = 0.23$, $p = 0.05$; $\rho = 0.27$, $p = 0.02$). **Conclusions:** Nurses working during the SARS-CoV-2 pandemic with infected and uninfected patients both experienced a variety of psychosocial challenges in coping with the demands of their work, social relationships and personal life. *Int J Occup Med Environ Health*. 2023;36(1)

Key words:

nurses, work, COVID-19, SARS-CoV-2 pandemic, psychosocial challenges, professional challenges

INTRODUCTION

The SARS-CoV-2 pandemic, which causes COVID-19, is a major challenge for health care professionals, among whom nurses are the undisputed largest professional group both in Poland and around the world [1–5]. The health and wellbeing of nurses is essential not only to ensure the continuity and safety of care for those infected, but also to control infection rates. Nurses have a vital role in stopping the spread of infection, controlling it and providing support to patients in isolation, and

they also play a major role in public education about preventing and reducing the spread of COVID-19. They are the first to contact patients suffering from SARS-CoV-2 and the chronically ill, thus emerging as an essential professional group among health workers [3,5].

The SARS-CoV-2 pandemic led to an unexpected change in the nature of nursing practice, which was caused by the need to meet the sudden increase in the need for care [2]. Finding one's way in the new state of things, the speed of the spread of the virus, limited amount of

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time needed to get ready for a record number of severely ill patients, alarmingly high levels of mortality, the volatility in the development of events, sensation of losing control, feelings of being unable to cope as well as fear in performing one's duties – these are just some of the challenges which explain why the work of a nurse at the time of the SARS-CoV-2 pandemic is particularly difficult because of the physical and social effects it has [6–9]. The daily professional activity of nurses while wearing personal protective equipment (PPE) creates barriers to the effectiveness of nurse–patient communication [10]. This means that nurses are unable to provide patients with adequate care in the way they have been taught, which results in job dissatisfaction. On the other hand, patient care is a professional obligation that must be fulfilled. Consequently, carrying out their professional responsibilities gives nurses a sense of pride and achievement. At the same time, however, they experience a moral dilemma related to making decisions about providing care in the context of limited health protection resources [10,11]. In broader terms, the pandemic can be said to have brought many serious challenges to the performance of the nursing duties.

The World Health Organization (WHO) indicated that at the time of the SARS-CoV-2 pandemic, health care workers (HCW) faced many psychosocial risks, such as long and irregular working hours, heavy workloads that can lead to fatigue and burnout, increased mental stress and/or deterioration of mental health [12].

Research shows that nurses, compared with other health care professionals, experience greater mental and physical stress, with negative health effects, and are simultaneously exposed to occupational hazards and psychosocial pressure in the face of an excessive workload at the time of the SARS-CoV-2 virus pandemic [4,13,14]. During the SARS-CoV-2 pandemic, nurses, more often than other health care workers, had to deal with the occurrence of anxiety and sleep disorders [15,16], depression

and post-traumatic stress disorder (PTSD) [4,7,16]. These symptoms are often triggered by stressful, traumatic events and can have far-reaching consequences for physical and mental wellbeing, relationships and performance at work [17].

In the face of the prolonged SARS-CoV-2 pandemic, nurses have complained of fatigue as well as burnout due to constant labour shortages and insufficient salaries [16,18,19]. Burnout refers to the emotional exhaustion, depersonalization and decreased personal accomplishment that can occur in people whose work involves human contact [20]. The challenges faced by nurses in the SARS-CoV-2 pandemic are significant [6–9,21,22], and the diverse list of tasks and needs related to the pandemic [23] may lead to different professional experiences in nurses dealing with patients infected or uninfected with SARS-CoV-2. Understanding the mental state of nurses treating patients who were infected with SARS-CoV-2 or not is necessary for providing adequate support to this professional group, keeping the key workers operational and providing high-quality services in times of increased need for health care [13,24]. Therefore, the aim of the study was to measure the professional challenges of nurses working at the time of the SARS-CoV-2 pandemic in Poland.

MATERIAL AND METHODS

Data collection

The study was carried out in January–March 2021 at the time of the SARS-CoV-2 pandemic. In Poland, from January 13, there was a notable decline in the number of new cases of infection (the average number of daily infections over the previous 7 days was 8500), whereas in January 15–February 15, the mean daily number of infections was 5611 people. From February 17, there was a progressive surge in the number of daily infections. As reported by an analysis of the infections, the study was carried out during the flattening of the incidence curve

and at the start of the third wave of the COVID-19 pandemic in Poland [25].

The questionnaire was drawn up in Polish with the use of the Google Forms. The questionnaire and the introduction were both prepared in Polish with the use of Google Forms tools. Because of the epidemiological context present at that time, a link to the survey was posted on social media platforms (such as Facebook, Messenger, WhatsApp) and was made available exclusively to nurses who were working in the south of Poland. The survey was anonymous and voluntary. The participants were encouraged to send the link forward to their colleagues who met the study inclusion criteria. It is generally agreed that online surveys are an established method of gathering data in health care research. The data collection process was thus simplified and accelerated, which ensured greater comprehensiveness in the data [26–28]. The inclusion criteria for the study were being employed as a nurse in close contact with patients, seniority of at least 1 year as well as giving consent to take part in the study. The exclusion criteria were as follows: performing the duties of nonmedical personnel, remote work with patients, work experience of <1 year or not consenting to take part in the study. Each person who filled out the questionnaire was informed about the anonymity and about the possibility of withdrawing from the study at any moment without the need to provide any justification. At the beginning of the questionnaire, information was provided to explain that the answers would be analyzed statistically and used for scientific purposes.

Ethical procedures

The research procedure was carried out in accordance with the Helsinki Declaration of the World Medical Association and the principles of Good Scientific Practice, the Regulation (EU) 2016/679 of the European Parliament and of the Council of April 27, 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and

repealing Directive 95/46/EC (General Data Protection Regulation) [29], the Act of May 10, 2018 on personal data protection [30].

Participants

The questionnaires were filled out by 156 nurses. Because of incomplete data, 151 respondents were included in the survey. Among the participants 79 (52.3%) responded that they cared for a patient with SARS-CoV-2, and 72 (47.7%) cared for other patients.

Instruments

General characteristics

The study used a questionnaire that was comprised of questions about demographic and social data (gender, age, education and marital status), seniority in the profession of a nurse, number of working hours per month, place of employment at the time of the COVID-19 pandemic (due to the needs of the analysis, hospital wards were grouped according to 2 categories of providing for a patient with SARS-CoV-2: yes or no).

Scale of Experienced Stress (PSS-10)

The severity of stress associated with the situations in a person's life was assessed using the *Perceived Stress Scale* (PSS-10). This scale includes 10 items that concern subjective feelings associated with challenges, personal problems, behaviors and ways of coping with stress. The answers were obtained with the use of a 5-point scale of 0 – never, 1 – almost never, 2 – sometimes; 3 – quite often, 4 – very often. The total score was the sum of all points (0–40 pts). The higher the score, the greater the level of perceived stress [31].

General Self-Efficacy Scale (GSES)

The effectiveness in coping with difficult situations was assessed using the GSES. The global score of the scale for each respondent was the sum of all points obtained from

10 statements. The respondents answered the questions according to the following scale: 1 – no, 2 – somewhat not, 3 – somewhat yes, 4 – yes. The summed points gave a global score, which expressed the degree of satisfaction with one's life. The scoring range is 10–40 pts. The interpretation of the results is simple, as the greater the sense of self-efficacy, the higher the score: 10–24 pts is a low result, scores of 25–29 pts are average result, and 30–40 pts is a high result [32].

Impact of Event Scale-Revised (IES-R)

The IES-R was designed to measure PTSD by assessing the present subjective sense of discomfort in relation to the current SARS-CoV-2 virus situation. It consists of 22 statements that cover the 3 dimensions of PTSD: *Arousal* (6 statements), *Intrusion* (8 statements) and *Avoidance* (8 statements). Individual dimensions were assessed on a 5-point Likert scale (0 – not at all, 1 – slightly, 2 – moderately, 3 – quite, 4 – definitely yes) [33].

Minnesota Satisfaction Questionnaire (MSQ-SF)

The MSQ-SF is used to evaluate the level of job satisfaction and dissatisfaction. It assesses 20 job characteristics, including: achievement, independence, recognition and working conditions. For assessing the level of satisfaction on the MSQ-SF scale, a 5-point Likert scale was used (1 – very dissatisfied, 2 – dissatisfied, 3 – neither satisfied nor dissatisfied, 4 – satisfied, 5 – very satisfied). The scores ranged 20–100 pts. The higher the number of points, the higher the level of job satisfaction [34].

Areas of Worklife Survey (AWS)

A subjective assessment of the work environment and functioning in the work environment and an evaluation of whether there are any discrepancies between the capabilities, needs and aspirations of employees and the requirements of the organization were conducted with the use of the AWS. The questionnaire is comprised of 29 state-

ments which are separated into 6 scales: *Workload*, *Control of behavior at work*, *Satisfaction with rewards*, *Community support*, *Sense of fairness* and *Values*. The answers are scored with a 5-point Likert scale (1 – I strongly disagree, 2 – I somewhat disagree, 3 – it's hard to say, 4 – I somewhat agree, 5 – I strongly agree). The workload scale consists of 5 statements, the control scale – 4 statements, the reward scale – 4 statements, the community scale – 5 statements, the fairness scale – 6 statements, and the values scale – 4 statements. The results for each scale were scored by the weighted average of the individual statements [35].

Maslach Burnout Inventory – Human Services Survey (MBI-HSS)

The severity of occupational burnout was assessed using the Polish version of the MBI-HSS. This tool allows one to assess the level of occupational burnout in 3 aspects: *Emotional Exhaustion* (EE), *Depersonalization* (DP) and *Personal Accomplishment* (PA). In the EE and DP dimensions, higher scores indicated stronger burnout, whereas in the PA dimension, lower scores indicated more serious burnout. Scores of 19–26 or ≥ 27 for EE, 6–9 or ≥ 10 for DP, and 34–39 or ≤ 33 for PA indicated moderate and high burnout, respectively [36–38].

Statistical analysis

Qualitative data are presented as counts and percentages, whereas quantitative data are shown as means with standard deviation (SD) for normally distributed variables and age. The normality of quantitative variables was verified using the Kolmogorov–Smirnov test. Between-group comparisons of qualitative variables were analyzed by the χ^2 test. The exact χ^2 test was used when the expected frequencies in at least 20% of the cells were < 5 . Comparisons of quantitative variables between the 2 groups were conducted using Student's t-test for independent samples for normally distributed variables; the Mann-Whitney test was

used in the remaining cases. The strength of the relationship between 2 quantitative variables was measured with the use of ρ (Spearman's rank correlation). For all analyses, the criterion for statistical significance was set at $p < 0.05$ (2-tailed). The data were imported from Excel files into a statistical program (IBM SPSS Statistics 27 for Windows, released 2020, IBM Corp., Armonk, NY) for analysis.

RESULTS

Characteristics of the study group

Among 151 nurses (100% women) who were professionally active at the time of the SARS-CoV-2 pandemic, over half (52.3%) took care of patients who had come into contact with the virus, while the other 47.7% took care of uninfected patients. The mean age of nurses dealing with infected patients was significantly lower than that of nurses working with patients who were not affected by SARS-CoV-2 ($M \pm SD$ 32.03 \pm 8.9 vs. 41.04 \pm 11.6, $p < 0.001$). A financial situation assessed as "very good" was more frequent in the group of nurses who were caring for patients affected by SARS-CoV-2 virus compared with those who cared for uninfected patients (12.7% vs. 2.8%, $p = 0.03$). Nurses dealing with patients affected by SARS-CoV-2 virus were characterized by shorter work experience (≤ 5 years, 44.3% vs. 22.2%, $p < 0.001$). A higher percentage of nurses caring for patients suffering from SARS-CoV-2 reported working 160–200 h/month compared with those who worked with patients not affected by the virus (45.8% vs. 68.4%, $p = 0.01$).

The possibility of getting tested for the presence of SARS-CoV-2 virus (97.5% vs. 80.6%, $p = 0.001$), the opportunity to undergo training in the use of protective clothing (88.6% vs. 63.9%, $p < 0.001$), ensuring safe and hygienic working conditions (86.1% vs. 69.4%, $p = 0.01$) and a sense of security (80.1% vs. 73.6%, $p = 0.05$) were all significantly more often reported in the population of nurses dealing with patients suffering from SARS-CoV-2. Strong stress was significantly more often experienced

by nurses caring for patients affected by SARS-CoV-2 (39.2% vs. 20.8%, $p = 0.01$). More than half of all the surveyed nurses who did and did not care for patients suffering from SARS-CoV-2 (68.4% vs. 75.0%, p -NS) felt anxious about their relatives (Table 1).

The level of stress intensity was significantly greater in nurses dealing with infected patients than among those who worked with patients who were not affected by SARS-CoV-2 (total score: $M \pm SD$ 22.22 \pm 5.94 vs. 20.21 \pm 5.68, $p = 0.03$), as shown in Table 2.

The analysis of the ρ Spearman coefficient in the studied group of nurses working with patients infected with SARS-CoV-2 showed that arousal negatively correlates with the sense of self-efficacy. Among nurses working with patients not infected with SARS-CoV-2 virus, intrusion, arousal and avoidance negatively correlate with the sense of self-efficacy (Table 3).

In the study group of nurses working with patients infected with SARS-CoV-2 virus the analysis of the ρ Spearman coefficient showed that workload significantly positively correlates with emotional exhaustion and control, while relations with colleagues correlate with depersonalization. Among nurses working with patients who were not infected with SARS-CoV-2 virus, it was found that: control, relations with co-workers, and sense of fairness significantly positively correlate with emotional exhaustion, control with depersonalization, while relations with co-workers with personal commitment (Table 4).

The Spearman's ρ coefficient revealed a significantly positive correlation between age and self-efficacy (GSES, $\rho = 0.30$, $p = 0.006$) in nurses caring for patients affected by SARS-CoV-2. However, in the group of nurses looking after uninfected patients, a significant negative correlation was found between age and personal accomplishment ($\rho = -0.29$, $p = 0.01$) and the workload ($\rho = -0.28$, $p = 0.01$).

Among the demographic and social conditions, lower education was a significant variable determining a lower level of self-efficacy (GSES, 27.13 vs. 29.56, $p = 0.04$) and job

Table 1. Sociodemographic characteristics of the groups of nurses in the study conducted in January–March 2021, Poland

Variable	Participants (N = 151)		P
	caring for a patient with SARS-CoV-2 (N = 79, 52.3%)	not caring for a patient with SARS-CoV-2 (N = 72, 47.7%)	
Sociodemographic factor			
age [years]			<0.001***
M±SD	32.03±8.9	41.04±11.6	
min.–max	22–53	22–61	
education [n (%)]			0.2
medical high school/vocational school/bachelor's degree in nursing	32 (40.5)	32 (44.4)	
master's degree in nursing	47 (59.5)	40 (55.6)	
marital status [n (%)]			0.47
single/widowed/divorced	25 (31.6)	19 (26.4)	
married/casual relationship	54 (68.4)	53 (73.6)	
financial status [n (%)]			0.03*
average	10 (12.7)	16 (22.2)	
good	59 (74.7)	54 (75.0)	
very good	10 (12.7)	2 (2.8)	
work experience in the nursing profession [n (%)]			<0.001***
≤5 years	35 (44.3)	16 (22.2)	
6–10 years	20 (25.3)	9 (12.5)	
11–20 years	11 (13.9)	11 (15.3)	
>20 years	13 (16.5)	36 (50.0)	
working time [n (%)]			0.01*
<160 h/month	14 (17.7)	27 (37.5)	
160–200 h/month	54 (68.4)	33 (45.8)	
>200 h/month	11 (13.9)	12 (16.7)	
Working conditions [n (%)]			
infected with SARS-CoV-2 (yes)	41 (51.9)	31 (43.1)	0.10
possibility of testing for the presence of SARS-CoV-2 (yes)	77 (97.5)	58 (80.6)	0.001**
training on compliance with the epidemiological and sanitary guidelines (yes)	58 (73.4)	45 (62.5)	0.15
training on how to use protective clothing (yes)	70 (88.6)	46 (63.9)	<0.001***
provision of personal protective equipment (yes)	69 (87.3)	57 (79.2)	0.17
hygienic working conditions (yes)	68 (86.1)	50 (69.4)	0.01*
Emotions experienced [n (%)]			
sense of security at work (yes)	68 (86.1)	53 (73.6)	0.04*
anxiety about loved ones (yes)	54 (68.4)	54 (75.0)	0.36
anxiety about one's own health (yes)	29 (36.7)	34 (47.2)	0.19
severe stress (yes)	31 (39.2)	15 (20.8)	0.01*

* p < 0.05; ** p < 0.01; *** p < 0.001.

Table 2. Psychosocial aspects of the professional functioning of the groups of nurses in the study conducted in January–March 2021, Poland

Scale	Tool score (M±SD)		p
	participants caring for a patient with SARS-CoV-2 (N = 79, 52.3%)	participants not caring for a patient with SARS-CoV-2 (N = 72, 47.7%)	
<i>Perceived Stress Scale (PSS-10) (total score)</i>	22.22±5.9	20.21±5.7	0.03*
<i>General Self-Efficacy Scale (GSES) (total score)</i>	28.38±5.6	29.71±5.3	0.13
<i>Impact of Event Scale – Revised (IES-R)</i>			
<i>Intrusion</i>	1.93±0.8	2.02±1.0	0.56
<i>Arousal</i>	1.76±0.8	1.97±1.0	0.15
<i>Avoidance</i>	1.87±0.8	1.90±0.8	0.79
<i>Minnesota Satisfaction Questionnaire (MSQ-SF) (total score)</i>	62.22±11.7	64.88±14.8	0.22
<i>Maslach Burnout Inventory – Human Services Survey (MBI-HSS)</i>			
<i>Emotional Exhaustion</i>	21.32±3.9	21.81±4.2	0.46
<i>Depersonalization</i>	12.18±2.5	12.90±2.8	0.09
<i>Personal Accomplishment</i>	18.99±3.4	18.88±3.3	0.83
<i>Areas of Worklife Survey</i>			
<i>Workload</i>	2.93±0.6	3.05±0.6	0.22
<i>Control</i>	2.90±0.8	2.98±0.9	0.56
<i>Reward</i>	3.07±0.7	3.07±0.8	0.99
<i>Community</i>	3.48±0.7	3.49±0.7	0.93
<i>Fairness</i>	3.11±0.7	2.92±0.8	0.13
<i>Values</i>	3.34±0.8	3.24±0.7	0.41

* p < 0.05.

Table 3. Spearman's ρ correlation coefficient between the dimensions of the *Impact of Event Scale – Revised (IES-R)* and *General Self-Efficacy Scale (GSES)* in the groups of nurses in the study conducted in January–March 2021, Poland

IES-R dimension	GSES			
	participants caring for a patient with SARS-CoV-2 (N = 79, 52.3%)		participants not caring for a patient with SARS-CoV-2 (N = 72, 47.7%)	
	ρ	p	ρ	p
<i>Intrusion</i>	−0.22	0.051	−0.35	0.002**
<i>Arousal</i>	−0.34	0.002**	−0.37	0.001**
<i>Avoidance</i>	−0.22	0.04*	−0.28	0.01*

 ρ – Spearman's rho correlation coefficient.

* p < 0.05; ** p < 0.01.

Table 4. Spearman's ρ correlation coefficient between subjective assessments of the work environment and the level of occupational burnout of nurses working with patients infected or not infected with SARS-CoV-2

Areas of Worklife Survey (AWS)	Maslach Burnout Inventory – Human Services Survey (MBI-HSS)											
	Emotional Exhaustion				Depersonalization				Personal Accomplishment			
	participants caring for a patient with SARS-CoV-2 (N = 79, 52.3%)	participants not caring for a patient with SARS-CoV-2 (N = 72, 47.7%)	ρ	p	participants caring for a patient with SARS-CoV-2 (N = 79, 52.3%)	participants not caring for a patient with SARS-CoV-2 (N = 72, 47.7%)	ρ	p	participant caring for a patient with SARS-CoV-2 (N = 79, 52.3%)	participants not caring for a patient with SARS-CoV-2 (N = 72, 47.7%)	ρ	p
Workload	0.26	0.02*	0.08	0.50	0.04	0.69	-0.03	0.77	0.12	0.27	0.04	0.69
Control	0.14	0.19	0.40	0.000***	0.25	0.02*	0.33	0.01*	-0.05	0.64	0.23	0.05
Reward	0.07	0.52	0.15	0.20	0.05	0.65	0.15	0.19	-0.02	0.84	0.04	0.71
Community	0.11	0.31	0.41	0.000***	0.23	0.04*	0.21	0.08	-0.17	0.11	0.27	0.02*
Fairness	-0.07	0.54	0.25	0.03*	-0.09	0.43	0.12	0.28	-0.05	0.62	0.13	0.26
Values	0.11	0.33	0.17	0.15	0.07	0.49	0.10	0.38	-0.04	0.72	0.21	0.07

ρ – Spearman's rho correlation coefficient.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

satisfaction (MSQ-SF, 61.88 vs. 68.91, $p = 0.03$) in nurses caring for patients affected by SARS-CoV-2. A higher education level was a significant variable of a greater sense of fairness (3.22 vs. 2.82, $p = 0.01$) among nurses caring for patients affected by SARS-CoV-2 compared with those caring for uninfected patients. Nurses who were married or were in a relationship and were responsible for infected patients had a significantly higher sense of fairness in comparison with the nurses responsible for patients who were not affected by SARS-CoV-2 (3.08 vs. 2.79, $p = 0.04$). Shorter work experience in the profession (≤ 5 years) showed a significant relationship with a lower level of job satisfaction (61.17 vs. 71.00, $p = 0.02$) and workload (2.91 vs. 3.26, $p = 0.04$) among nurses dealing with patients suffering from SARS-CoV-2.

DISCUSSION

To the best knowledge of the authors, this is the very first study to assess the professional challenges of nurses working during a pandemic with patients infected and not infected with SARS-CoV-2 in Poland, using numerous reliable scales. The study showed that the surveyed nurses were all women. This is in accordance with the fact that a large part of the medical staff in general are women [6]. According to the literature, women are exposed to the risk of psychosocial problems more often than men [39]. In the study group – nurses working with patients infected with SARS-CoV-2 virus were younger and had shorter work experience than nurses working with patients not infected with SARS-CoV-2 virus. Nurses looking after infected patients more often assessed their financial situation as “very good” than nurses dealing with patients who were not affected by SARS-CoV-2. Proper training in the use of personal protective equipment is critical to lowering the risk of COVID-19 infection in health care professionals. The present study confirmed that the vast majority of nurses working at the time of the pandemic had the opportunity to test for the presence of SARS-

CoV-2, received appropriate training in the use of personal protective equipment and were provided with appropriate working conditions that gave them a sense of security.

The work of nurses at the time of the SARS-CoV-2 pandemic is a particularly challenging task. While performing daily work duties, health workers are particularly exposed to adverse health effects, which leads to intense stress [17]. This was indeed confirmed in our study. In the analysis, the level of perceived stress was greater in nurses who attended infected patients than among those who attended patients who were not affected by SARS-CoV-2. Similar results were obtained in studies carried out in the United States: nurses who cared for patients affected by SARS-CoV-2 were characterized by a higher level of perceived stress than nurses looking after uninfected patients [16]. Numerous studies have also confirmed a higher level of perceived stress [4,13,14,17,40,41], greater insomnia and chronic fatigue, and post-traumatic stress disorder (PTSD) among nurses attending patients affected by SARS-CoV-2 [4,16,17]. This syndrome found in the American study was mainly associated with the increased number of working hours per week (>40 h/week) that were taken on by nurses caring for patients affected by SARS-CoV-2 [16]. The present study also showed that staff shortages at the time of the SARS-CoV-2 pandemic significantly contributed to the workload of nurses, which exceeded regular working hours. Nurses who attended patients affected by the SARS-CoV-2 virus reported more hours of work (per month) than nurses dealing with uninfected patients.

The present study showed that nurses caring for patients affected by SARS-CoV-2 showed a negative correlation between a sense of self-efficacy and arousal manifested as increased alertness, anxiety, impatience, difficulty concentrating, avoiding or trying to suppress thoughts and emotions related to trauma, or refraining from talking about it. In contrast, nurses caring for patients who were not affected by SARS-CoV-2 showed a negative correla-

tion between intrusion, arousal and avoidance, and self-efficacy.

As shown in a study conducted on nurses caring for patients affected by SARS-CoV-2 in Spain, their sense of self-efficacy was influenced by stress, which reduced the quality of life [41]. Lack of job satisfaction, a high level of fatigue, and signs of depression, feelings of anxiety and insomnia in nurses dealing with patients affected by SARS-CoV-2 [19,40], especially among women [42] and increasing with age [43], were also confirmed in other studies [44]. The relationship between age and concentration and the sense of general efficacy was demonstrated in the present study among nurses caring for patients affected by SARS-CoV-2.

Changes such as the increasing demands placed on health care workers and the increasing pace of work at the time of the SARS-CoV-2 pandemic make nurses vulnerable not only to stress but also to burnout. Research has confirmed that burnout occurred more often in the group of nurses who attended the infected patients than in those who looked after patients who were not affected by SARS-CoV-2 [16,18,19]. Although the present research does not confirm these data, it was the first study in Poland conducted at the time of the pandemic which aimed to describe the risk of occupational burnout, controlled by demographic and social variables among nurses and the risk related to the area of professional life.

The present study showed an increase in emotional exhaustion caused by a growing workload and an increase in the sense of depersonalization caused by an inability to control of behavior at work, i.e., the lack of the possibility to make independent decisions or make choices, and the perceived quality of relationships with colleagues (support and cooperation in the group of nurses caring for patients affected by SARS-CoV-2).

A study of health workers in South Korea also found that workload was strongly associated with emotional exhaustion. According to this analysis, they were influenced by

fear of infection with SARS-CoV-2, anxiety and depression, as well as female gender and marital status [44]. Anxiety and depression, and a lack of expression of appreciation and respect from colleagues were predictors of DP in a Wuhan study. In turn, the predictors of PA were a workload consisting of close contact with patients suffering from COVID-19, socioeconomic status and stress at work [5]. Much research has only focused on burnout and areas of the working life of nurses working closely with COVID-19 patients. This is because of the higher overall risk of such work and the great difficulty in treating this type of patient [45]. However, our study also revealed an increase in nurses' emotional exhaustion caused by deficits in areas such as: control of behavior at work (i.e., the lack of the ability to make independent decisions), relationships with colleagues (i.e., mutual support) and the sense of fairness (i.e., a sense of clear rules at work). These deficits were all found among nurses dealing with patients who were not affected by SARS-CoV-2. Control of behavior at work was also a factor causing a sense of depersonalization, and the support received and cooperation in the workplace (relationships with colleagues) influenced the personal accomplishment among nurses caring for patients who were not affected by SARS-CoV-2 virus.

Limitations and strengths

It should be indicated that the present study has a number of limitations. Firstly, it was cross-sectional, and the relatively modest size of the studied group does not make it possible to analyze the professional challenges of nurses more precisely, depending not only on the demographic and social variables, but also on their professional experience. Secondly, it was a short-term study that was carried out in January–March 2021 at the time when the next (third) wave of the SARS-CoV-2 virus pandemic in Poland began, i.e., when all health care workers intensified their care for COVID-19 patients. Moreover, due to the nature

of snowball sampling, the study was conducted only among people who use information and communication technologies and were inclined to take part in the study carried out with these methods (Computer Assisted Web Interview – CAWI), which precluded having direct contact with the surveyed person and left little control over who completes the survey by means of social media. One of the strengths of the study is that it is one of the first analyses exploring the psychosocial problems of nurses working at the very start of the third wave of the SARS-CoV-2 pandemic in Poland, using numerous reliable and validated scales, and analyzing a large number of variables. Our findings uphold the great importance of conducting more research into identifying the predictors of differences in stress, chronic fatigue, effectiveness in coping with difficult situations, PTSD, level of job satisfaction and dissatisfaction, and the associated risk of burnout of among the groups of nurses caring for patients who are infected or uninfected with SARS-CoV-2.

Implications for nursing and health policy

Seeing that the future of the SARS-CoV-2 virus pandemic is unpredictable and the epidemic continues, health-care professionals face a global challenge. In order to ensure health and safety at work it is necessary to ensure clear and comprehensive communication as well as psychological and social support of nurses. Support that can alleviate psychosocial problems should be available not only to nurses working directly with COVID-19 patients, but also to those who work with uninfected patients, which may further impact the outcomes and effectiveness of nursing care.

CONCLUSIONS

Nurses working at the time of the SARS-CoV-2 pandemic with both infected and uninfected patients experienced a variety of psychosocial challenges in coping with the demands of work, social relationships and per-

sonal life. The workload of nurses working with patients infected with SARS-CoV-2 virus significantly positively correlates with emotional exhaustion and control, while relations with colleagues correlate with depersonalization. Among nurses working with patients not infected with SARS-CoV-2 virus, it was found that: control, relations with co-workers, sense of fairness significantly positively correlate with emotional exhaustion, control with depersonalization, while relations with co-workers with personal commitment. The results indicate the need for increased psychosocial support for nurses dealing with patients infected with SARS-CoV-2 and with uninfected patients. Such support can significantly help them manage stress and maintain mental wellbeing, which can then benefit the standard of nursing care.

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REFERENCES

1. World Health Organization [Internet]. Geneva: The Organization; 2020 [cited 2020 Apr 14]. State of the World's Nursing 2020: Investing in education, jobs and leadership. Available from: <https://www.who.int/publications/i/item/9789240003279>.
2. Schroeder K, Norful AA, Travers J, et al. Nursing perspectives on care delivery during the early stages of the covid-19 pandemic: a qualitative study. *Int J Nurs Stud Adv*. 2020;2:100006. <https://doi.org/10.1016/j.ijnsa.2020.100006>.
3. Gesesew HA, Koye DN, Fetene DM, et al. Risk factors for COVID-19 infection, disease severity and related deaths in Africa: a systematic review. *BMJ Open*. 2021;11(2):e044618. <https://doi.org/10.1136/bmjopen-2020-044618>.
4. Xu H, Stjernswärd S, Glasdam S. Psychosocial experiences of frontline nurses working in hospital-based settings during the COVID-19 pandemic – A qualitative systematic review. *Int J Nurs Stud Adv*. 2021;3:100037. <https://doi.org/10.1016/j.ijnsa.2021.100037>.
5. Hu D, Kong Y, Li W, et al. Frontline nurses' burnout, anxiety, depression, and fear statuses and their associated factors during the COVID-19 outbreak in Wuhan, China: a large-scale cross-sectional study. *E Clinical Medicine*. 2020;24:100424. <https://doi.org/10.1016/j.eclinm.2020.100424>.
6. Mo Y, Deng L, Zhang L, et al. Work stress among Chinese nurses to support Wuhan in fighting against COVID-19 epidemic. *J Nurs Manag*. 2020;28(5):1002–1009. <https://doi.org/10.1111/jonm.13014>.
7. Kisely S, Warren N, McMahon L, et al. Occurrence, prevention, and management of the psychological effects of emerging virus outbreaks on healthcare workers: Rapid review and meta-analysis. *BMJ*. 2020;369:m1642. <https://doi.org/10.1136/bmj.m1642>.
8. Nowicki GJ, Ślusarska B, Tucholska K, et al. The Severity of Traumatic Stress Associated with COVID-19 Pandemic, Perception of Support, Sense of Security, and Sense of Meaning in Life among Nurses: Research Protocol and Preliminary Results from Poland. *Int J Environ Res Public Health*. 2020;17(18):6491. <https://doi.org/10.3390/ijerph17186491>.
9. Chandler-Jeanville S, Nohra RG, Loizeau V, et al. Perceptions and Experiences of the COVID-19 Pandemic amongst Frontline Nurses and Their Relatives in France in Six Paradoxes: A Qualitative Study. *Int J Environ Res Public Health*. 2021;18(13):6977. <https://doi.org/10.3390/ijerph18136977>.
10. The Exigent Group [Internet]. London: Exigent Limited Company; 2020 [cited 2020 Oct 28]. COVID-19: Changing the Face of the Nurse-Patient Relationship. Available from: <https://www.exigent-group.com/blog/covid-19-changing-the-nurse-patient-relationship>.
11. Silverman HJ, Kheirbek RE, Moscou-Jackson G, et al. Moral distress in nurses caring for patients with Covid-19. *Nurs Ethics*. 2021;28(7–8):1137–1164. <https://doi.org/10.1177/09697330211003217>.
12. World Health Organization [Internet]. Geneva: The Organization; 2020 [cited 2020 Oct 14]. WHO Calls for healthy,

- Safe and Decent Working Conditions for All Health Workers, Amidst COVID-19 Pandemic. Available from: <https://www.who.int/news-room/detail/28-04-2020-who-calls-for-healthy-safe-and-decent-working-conditions-for-all-health-workers-amidst-covid-19-pandemic>.
13. Fernandez R, Lord H, Halcomb E, et al. Implications for COVID-19: a systematic review of nurses' experiences of working in acute care hospital settings during a respiratory pandemic. *Int J Nurs Stud*. 2020;111:103637. <https://doi.org/10.1016/j.ijnurstu.2020.103637>.
 14. Que J, Shi L, Deng J, et al. Psychological impact of the COVID-19 pandemic on healthcare workers: a cross-sectional study in China. *Gen Psychiatr*. 2020;33(3):e100259. <https://doi.org/10.1136/gpsych-2020-100259>.
 15. Stewart NH, Koza A, Dhaon, S, et al. Sleep Disturbances in Frontline Health Care Workers During the COVID-19 Pandemic: Social Media Survey Study. *J Med Internet Res*. 2021;23(5):e27331. <https://doi.org/10.2196/27331>.
 16. Sagherian K, Steege LM, Cobb SJ, et al. Insomnia, fatigue and psychosocial well-being during COVID-19 pandemic: A cross-sectional survey of hospital nursing staff in the United States. *J Clin Nurs*. 2020;10.1111/jocn.15566. <https://doi.org/10.1111/jocn.15566>.
 17. Cai H, Tu B, Ma J, et al. Psychological Impact and Coping Strategies of Frontline Medical Staff in Hunan Between January and March 2020 During the Outbreak of Coronavirus Disease 2019 (COVID 19) in Hubei, China. *Med Sci Monit*. 2020;26:e924171. <https://doi.org/10.12659/MSM.924171>.
 18. Gago-Valiente FJ, Mendoza-Sierra MI, Moreno-Sánchez E, et al. Emotional Exhaustion, Depersonalization, and Mental Health in Nurses from Huelva: A Cross-Cutting Study during the SARS-CoV-2 Pandemic. *Int J Environ Res Public Health*. 2021;18:7860:1. <https://doi.org/10.3390/ijerph18157860>.
 19. Trumello C, Bramanti SM, Ballarotto G, et al. Psychological adjustment of healthcare workers in Italy during the COVID-19 pandemic: Differences in stress, anxiety, depression, burnout, secondary trauma, and compassion satisfaction between Frontline and Non-Frontline Professionals. *Int J Environ Res Public Health*. 2020;17(22):8358. <https://doi.org/10.3390/ijerph17228358>.
 20. Maslach C, Jackson SE, Leiter MP. Maslach Burnout Inventory. In: Zalaquett CP, Wood RJ, editors. *Evaluating Stress: A Book of Resources*, 3rd ed. Lanham, Md.: Scarecrow Education; 1997. p. 191–218.
 21. Cox CL. Healthcare Heroes': problems with media focus on heroism from healthcare workers during the COVID-19 pandemic. *J Med Ethics*. 2020;46(8):510–513. <https://doi.org/10.1136/medethics-2020-106398>.
 22. Kang L, Li Y, Hu S, et al. The mental health of medical workers in Wuhan, China dealing with the 2019 novel coronavirus. *Lancet Psychiatry*. 2020;7(3):e14. [https://doi.org/10.1016/S2215-0366\(20\)30047-X](https://doi.org/10.1016/S2215-0366(20)30047-X).
 23. Wound Source [Internet]. Holly Hovan's blog; 2020 [cited 2020 Oct 4]. Specialty nursing in a pandemic: adapting to change. Available from: <https://www.woundsource.com/blog/specialty-nursing-in-pandemic-adapting-change>.
 24. Fry CV, Cai X, Zhang Y, et al. Consolidation in a crisis: patterns of international collaboration in early COVID-19 research. *PLoS One*. 2020;15(7):e0236307. <https://doi.org/10.1371/journal.pone.0236307>.
 25. Serwis Rzeczypospolitej Polskiej [Internet]. Warszawa: Ministerstwo Zdrowia; 2022 [cited 2021 May 26]. Raport zakażeń koronawirusem (SARS-CoV-2). Available from: <https://www.gov.pl/web/koronawirus/wykaz-zarazen-koronawirus-sem-sars-cov-2>. Polish.
 26. Ebert JF, Huibers L, Christensen B, et al. Paper- or Web-Based Questionnaire Invitations as a Method for Data Collection: Cross-Sectional Comparative Study of Differences in Response Rate, Completeness of Data, and Financial Cost. *J Med Internet Res*. 2018;20(1):e24. <https://doi.org/10.2196/jmir.8353>.
 27. Uhlig CE, Seitz B, Eter N, et al. Efficiencies of Internet-based digital and paper-based scientific surveys and the estimated costs and time for different-sized cohorts. *PLoS One*. 2014;9(10):e108441. <https://doi.org/10.1371/journal.pone.0108441>.

28. Arafa AE, Anzengruber F, Mostafa AM, et al. Perspectives of online surveys in dermatology. *J Eur Acad Dermatol Venereol.* 2019;33(3):511–520. <https://doi.org/10.1111/jdv.15283>.
29. [Regulation of the European Parliament and of the Council (EU) 2016/679 of 27th April 2016 on the Protection of Individuals with Regard to the Processing of Personal Data and on the Free Movement of Such Data and the Repeal of Directive 95/46/EC (General Data Protection Regulation)]. *Official Journal of the European Union L 119/1.* Polish.
30. [The Act of 10th May 2018 on the Protection of Personal Data]. *J Laws 2018,* item 1000. Polish.
31. Juczyński Z, Ogińska-Bulik N. *Narzędzia Pomiaru Stresu i Radzenia Sobie ze Stresem.* Warszawa: Pracownia Testów Psychologicznych Polskiego Towarzystwa Psychologicznego; 2012.
32. Juczyński Z. *NPPPPZ – Narzędzia Pomiaru w Promocji i Psychologii Zdrowia.* Warszawa: Pracownia Testów Psychologicznych Polskiego Towarzystwa Psychologicznego; 2012.
33. Juczyński Z, Ogińska-Bulik N. Pomiar zaburzeń po stresie traumatycznym – polska wersja Zrewidowanej Skali Wpływu Zdarzeń. *Psychiatria.* 2009;6(1):15–25.
34. Ingram T, Głód W. Wykorzystanie MSQ Jako Narzędzia Badania Satysfakcji z Pracy w Wybranej Jednostce Ochrony Zdrowia. *Nauki o Zarządzaniu.* 2014;3(20):31–43. <https://doi.org/10.15611/noz.2014.3.03>.
35. Terelak JF, Izwantowska A. Adaptacja Kwestionariusza Obszary Życia Zawodowego (Areas of Worklife Survey) Christiny Maslach i Michaela Leitiera. *Studia Psychologica: Theoria et praxis.* 2009;9:223–232.
36. Pasikowski T. Polska adaptacja kwestionariusza Maslach Burnout Inventory. In: Sęk H, editor. *Wypalenie zawodowe: przyczyny i zapobieganie.* 2nd ed. Warszawa: Wyd. Naukowe PWN; 2009. p. 135–148.
37. Choi YG, Choi BJ, Park TH, et al. A study on the characteristics of Maslach Burnout Inventory-General Survey (MBI-GS) of workers in one electronics company. *Ann Occup Environ Med.* 2019;31:e29. <https://doi.org/10.35371/aodem.2019.31.e29>.
38. Poghosyan L, Aiken LH, Sloane DM. Factor structure of the Maslach burnout inventory: an analysis of data from large scale cross-sectional surveys of nurses from eight countries. *Int J Nurs Stud.* 2009;46(7):894–902. <https://doi.org/10.1016/j.ijnurstu.2009.03.004>.
39. World Health Organization [Internet]. Geneva: The Organization; 2002 [cited 2020 Aug 5]. Gender and women's mental health. Available from: <https://apps.who.int/iris/handle/10665/68884>.
40. Rossi R, Socci V, Pacitti F, et al. Mental Health Outcomes Among Frontline and Second-Line Health Care Workers During the Coronavirus Disease 2019 (COVID-19) Pandemic in Italy. *JAMA Netw Open.* 2020;3(5):e2010185. <https://doi.org/10.1001/jamanetworkopen.2020.10185>.
41. Peñacoba C, Catala P, Velasco L, et al. Stress and quality of life of intensive care nurses during the COVID-19 pandemic: Self-efficacy and resilience as resources. *Nurs Crit Care.* 2021;26(6):493–500. <https://doi.org/10.1111/nicc.12690>.
42. Lai J, Ma S, Wang Y, et al. Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. *JAMA Netw Open.* 2020;3(3):e203976. <https://doi.org/10.1001/jamanetworkopen.2020.3976>.
43. Otgonbaatar D, Ts L, Ariunaa D, et al. Occupational stress in nurse sAA – the study provided during the urged pandemic COVID-19 quarantine period. *Psychology.* 2020;11(5):704–712. <https://doi.org/10.4236/psych.2020.115048>.
44. Jihn CH, Kim B, Kim KS. Predictors of Burnout in Hospital Health Workers during the COVID-19 Outbreak in South Korea. *Int J Environ Res Public Health.* 2021;18(21):11720. <https://doi.org/10.3390/ijerph182111720>.
45. Sharifi M, Asadi-Pooya AA, Mousavi-Roknabadi RS. Burnout among healthcare providers of COVID-19; a systematic review of epidemiology and recommendations. *Arch Acad Emerg Med.* 2021;9(1):e7. <https://doi.org/10.22037/aaem.v9i1.1004>.