

**Willingness and preparedness to work during the first wave of the COVID-19 pandemic: A cross-sectional survey among registered nurses in a Danish university hospital**

Kusk, Kathrine Hoffmann; Laugesen, Britt; Jørgensen, Lone; Albrechtsen, Maja Thomsen; Grøtkjær, Mette; Cusack, Lynette; Pedersen, Birgith; Lerbæk, Birgitte; Haslund-Thomsen, Helle; Thorup, Charlotte Brun; Jacobsen, Sara; Bundgaard, Karin; Voldbjerg, Siri Lygum; Nielsen, Marie Germund

*Published in:*  
Nordic Journal of Nursing Research

*DOI (link to publication from Publisher):*  
[10.1177/20571585221150225](https://doi.org/10.1177/20571585221150225)

*Creative Commons License*  
CC BY-NC 4.0

*Publication date:*  
2023

*Document Version*  
Publisher's PDF, also known as Version of record

[Link to publication from Aalborg University](#)

*Citation for published version (APA):*  
Kusk, K. H., Laugesen, B., Jørgensen, L., Albrechtsen, M. T., Grøtkjær, M., Cusack, L., Pedersen, B., Lerbæk, B., Haslund-Thomsen, H., Thorup, C. B., Jacobsen, S., Bundgaard, K., Voldbjerg, S. L., & Nielsen, M. G. (2023). Willingness and preparedness to work during the first wave of the COVID-19 pandemic: A cross-sectional survey among registered nurses in a Danish university hospital. *Nordic Journal of Nursing Research*, 43(1), 1-9. <https://doi.org/10.1177/20571585221150225>

**General rights**

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal -

**Take down policy**

If you believe that this document breaches copyright please contact us at [vbn@aub.aau.dk](mailto:vbn@aub.aau.dk) providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from [vbn.aau.dk](http://vbn.aau.dk) on: December 04, 2025

# Willingness and preparedness to work during the first wave of the COVID-19 pandemic: A cross-sectional survey among registered nurses in a Danish university hospital

Nordic Journal of Nursing Research  
2023, Vol. 43(1) 1–9  
© The Author(s) 2023  
Article reuse guidelines:  
sagepub.com/journals-permissions  
DOI: 10.1177/20571585221150225  
journals.sagepub.com/home/njn



Kathrine Hoffmann Kusk<sup>1</sup> , Britt Laugesen<sup>2</sup>, Lone Jørgensen<sup>3</sup> ,  
Maja Thomsen Albrechtsen<sup>1</sup>, Mette Grøtkjær<sup>4</sup>, Lynette Cusack<sup>5</sup>,  
Birgith Pedersen<sup>1,6,7</sup>, Birgitte Lerbæk<sup>1,8</sup> , Helle Haslund-Thomsen<sup>9</sup>,  
Charlotte Brun Thorup<sup>9</sup>, Sara Jacobsen<sup>1</sup>, Karin Bundgaard<sup>1,10,11</sup> ,  
Siri Lygum Voldbjerg<sup>1,12</sup> and Marie Germund Nielsen<sup>13</sup>

## Abstract

Nurses are imperative for healthcare systems' ability to effectively function during pandemics, yet multiple factors may affect their willingness and preparedness to work. The aim of the present cross-sectional survey was to identify factors associated with registered nurses' (RN) willingness and preparedness to work during the novel coronavirus disease (COVID-19) pandemic. The study was reported following the STROBE guidelines. A total of 358 nurses completed a self-administered online questionnaire. The participants were a part of a COVID-19 task force at a Danish university hospital during spring 2020. The results showed that the majority of RNs felt a professional obligation to engage in clinical work during the pandemic; however, their willingness and preparedness to work were affected by multiple factors, such as being relocated voluntarily, being prepared for the task and feeling safe. This study highlights that these factors are essential for the hospital management and nurse leaders to take responsibility for.

## Keywords

COVID-19, management, nursing, preparedness, survey, willingness

Accepted: 22 December 2022

## Introduction

The novel coronavirus disease (COVID-19) pandemic is a major and acute global public health concern.<sup>1</sup> Due to the COVID-19 pandemic, healthcare professionals (HCPs) across the globe are in an unprecedented situation where they work under extreme pressure due to an increase in the number of critically ill patients being hospitalised.<sup>2</sup> Although the rates of

infection and death have been low in Denmark compared to other countries,<sup>3</sup> HCPs have experienced significant work changes. As a result of the establishment of COVID-19 task forces at Danish hospitals, some registered nurses (RN) were relocated to pandemic units or clinical areas outside their fields of expertise, while others were ready to work in case of a drastic increase in cases of COVID-19. During such

<sup>1</sup>Clinical Nursing Research Unit, Aalborg University Hospital, Aalborg, Denmark

<sup>2</sup>Clinical Nursing Research Unit, Aalborg University Hospital & Center for Clinical Guidelines, Department of Clinical Medicine, Aalborg University, Aalborg, Denmark

<sup>3</sup>Clinic for Surgery and Cancer Treatment & Clinical Nursing Research Unit, Aalborg University Hospital & Department of Clinical Medicine, Aalborg University, Aalborg, Denmark

<sup>4</sup>Clinical Nursing Research Unit, Aalborg University Hospital & Department of Clinical Medicine, Aalborg University, Aalborg, Denmark

<sup>5</sup>School of Nursing, University of Adelaide, Adelaide, Australia

<sup>6</sup>Department of Oncology, Clinic for Surgery and Cancer treatment, Aalborg University Hospital, Aalborg, Denmark

<sup>7</sup>Clinical Cancer Research Centre, Aalborg University Hospital, Aalborg, Denmark

<sup>8</sup>Clinic for Internal and Emergency Medicine, Aalborg University Hospital, Aalborg, Denmark

<sup>9</sup>Clinic for Anesthesiology, Children, Circulation and Women, Aalborg University Hospital & Department of Clinical Medicine, Aalborg University, Aalborg, Denmark

<sup>10</sup>Clinic for Neuro-, Head and Orthopaedic Diseases, Aalborg University Hospital, Aalborg, Denmark

<sup>11</sup>Department of Clinical Medicine, Aalborg University, Aalborg, Denmark

<sup>12</sup>Department of Clinical Medicine, Aalborg University & Department of Nursing Education, University College North Denmark, Aalborg, Denmark

<sup>13</sup>Clinical Nursing Research Unit, Aalborg University Hospital & Department of Health Science and Technology, Aalborg University, Aalborg, Denmark

## Corresponding author:

Kathrine Hoffmann Kusk, Clinical Nursing Research Unit, Aalborg University Hospital, Sønder Skovvej 15, 9000 Aalborg, Denmark.  
Email: k.kusk@rn.dk



rapid reorganisation, it seems essential to address the current challenges and ensure the best outcomes for all patients as such changes may cause distress and uncertainty among the HCPs involved, especially among frontline workers who are at increased risk of being infected with COVID-19.<sup>4</sup>

Globally, nurses constitute the largest group of HCPs and play a pivotal role in any coordinated response to public health emergencies and disasters.<sup>5,6</sup> Although nurses feel professionally committed to work during a pandemic,<sup>7</sup> they have concerns about taking part in frontline work.<sup>8</sup> Studies reveal that most nurses feel unprepared to respond to disasters, including infectious disease outbreaks.<sup>6,9,10</sup> This is further illustrated in a study that showed low confidence among frontline nurses regarding their ability to manage infected patients.<sup>11</sup> In addition, nurses express concerns over inadequate training with regard to caring for patients with infectious diseases.<sup>11,12</sup> In addition, safety concerns related to their families, lack of control and uncertainty seem to hamper their willingness to work.<sup>7,12,13</sup> According to the literature, job satisfaction,<sup>14</sup> family support,<sup>15</sup> colleagues' preparedness,<sup>13</sup> work intensity and respiratory protection training<sup>16</sup> were positively associated with nurses' willingness to work. Training, education and prior experiences of outbreaks appear to increase nurses' preparedness<sup>9,17</sup> and willingness to work under such circumstances.<sup>18</sup>

A healthcare system's ability to respond effectively to a pandemic such as COVID-19 is dependent on the healthcare workers who work within the system.<sup>19</sup> RNs' willingness (refers to the voluntary and active intention to provide nursing care) and preparedness (refers to being ready/prepared for such a pandemic) to work have a significant impact on the healthcare system's capacity to effectively function and meet the demands of its patients. Due to the urgent demand for frontline HCPs, several RNs in Denmark were appointed to leave their usual wards in order to take part in COVID-19 task forces, while others were relocated voluntarily. The experience of being mandatorily and urgently transferred to a ward outside their usual scope of practice may aggravate the sense of unpreparedness experienced by nurses.<sup>20</sup> Working in a new clinical setting requires nurses to make clinical decisions within an unfamiliar field regarding unknown tasks, which can affect the psychological health of some nurses and cause high levels of stress.<sup>12,21,22</sup> Feelings of unpreparedness and high levels of stress can be critical to nurses' clinical decision making<sup>23,24</sup> and affect nursing care, patient safety and patient outcomes.<sup>25</sup>

Even though previous studies report how the COVID-19 situation influenced nurses and their work situation, only few studies have studied the willingness and preparedness aspects of handling a pandemic. Understanding the factors affecting RNs' willingness and preparedness to work during the COVID-19 pandemic may help identify strategies to recruit nurses voluntarily, prevent stress and burnout, and sick leave as well as ensure the provision of high-quality and safe patient care. Factors that influence RNs' preparedness and willingness to work during a pandemic have not been investigated in a Danish context. The results are expected to enhance knowledge on and provide suggestions on how to improve the nursing workforce deployment and employee motivation

during future pandemics and situations that require drastic and acute changes to the organisation of healthcare. Thus, the aim of the present study was to identify the factors associated with RNs' preparedness and willingness to work during the COVID-19 pandemic.

## Methods

We conducted a cross-sectional survey to investigate a descriptive analysis of the nurse's perception of willingness and preparedness to work during the COVID-19 pandemic and data were collected via an online survey. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement was used as a guide in reporting this study (see Appendix 1 in the online supplementary material).<sup>26</sup>

## Setting and participants

The study setting was a university hospital with 749 beds, 274 nurse assistants and 2415 RNs in Denmark serving a population of approximately 300,000 citizens.<sup>27</sup> The sampling frame (N = 510) consisted of all RNs who were part of the hospital's COVID-19 task force. This included frontline RNs (RN working on pandemic wards), relocated RNs (RN who were relocated to clinical areas outside their usual specialties) and 'on call' RNs (RN available to work if the number of patients with COVID-19 escalated). Some of the RNs were relocated voluntarily to pandemic units, emergency units or units with shortage of staff. Others were appointed by their nurse leader or asked to be prepared for a potential relocation as it was difficult to recruit RNs voluntarily to the pandemic units, emergency units and other units due to shortage of staff. The hospital managers could relocate RNs to other units from other hospitals inside the region where the RNs were employed. The RNs were given a few days' or up to a week's notice before being relocated, and if the time frame permitted, they were given a preparatory two-day course on how to care for severely ill patients with COVID-19. During the first wave, RNs in the COVID-19 task force did not receive additional salary.

## Questionnaire

The survey is based on a cross-cultural adaption of the 'Willingness of Emergency Nurses to Respond to a Disaster' questionnaire including 40 items and developed in Australia.<sup>19</sup> The survey was developed based on the professional expertise of the Australian research team and relevant literature. Content and face validity was established after a review of the survey by a panel of experts in emergency healthcare and disaster response. To adapt the survey to a Danish context, a cross-cultural adaption process was conducted inspired by the guidelines by Beaton et al.<sup>28</sup> The process was performed by five researchers, of whom three had in-depth experience of adapting and validating questionnaires. As part of the cross-cultural adaption and to increase content validity in a Danish context, 10 items were adapted due to contextual differences such as natural disasters, volunteering, qualifications within military

training and disaster management. A section on working conditions during the COVID-19 pandemic was added to the questionnaire before pilot testing. In total, nine items were added to the existing questionnaire. The items concern participation in preparatory courses, relocation to other wards, received training or introduction, whether protection equipment was available, and to what extent RNs felt safe and prepared when working during COVID-19.

Two research assistants pilot tested the questionnaire to identify questions that were incomprehensible or misleading. This was followed by 10 cognitive interviews with RNs using the retrospective probing approach to identify potential uncertainties in the interpretation of the questions and increase face validity.<sup>29</sup> The interviews contributed to identifying misunderstandings and omissions in the questionnaire. The cross-culturally adapted questionnaire resulted in five sections consisting of 44 items and fields for additional comments. The sections included the following: 1) demographic information (10 items); 2) working conditions under COVID-19 (8 items); 3) willingness to participate in the hospital's COVID-19 task force (14 items); 4) preparedness to work during the COVID-19 pandemic (6 items); and 5) employment characteristics (6 items). A 5-point Likert scale was used, with the following ratings: 1) to a great extent; 2) to some extent; 3) neither/nor; 4) to a little extent; and 5) not at all.

### Data collection

The questionnaire was self-reported and administered via REDCap (Research Electronic Data Capture).<sup>30</sup> On 1 September 2020, the questionnaire was distributed by email to 510 RNs who were a part of the university hospital's COVID-19 task force. Each questionnaire was linked to a personal key-number, which prevented duplicative responses or redistributions. To increase the response rate, it was possible to return to the questionnaire if the nurses were too busy to complete the questionnaire at once. The response period was prolonged by two weeks and two reminders were sent by email.

### Statistical analysis

A statistical analysis was performed using STATA version 17.<sup>31</sup> Descriptive data were presented as means and standard deviations (SDs) for normally distributed continuous data, while categorical data were described using frequencies and percentages. Throughout the analysis, the main outcome variables were the dependent variables willingness and preparedness. Chi-square tests were used to examine associations between the characteristics and working conditions of the study population and the RNs' willingness and preparedness to work during the COVID-19 pandemic. The association between willingness to work and support from family and leader, feeling that nursing colleagues, interdisciplinary colleagues and leaders were prepared to handle the pandemic was analysed. Logistic regression analysis was conducted to investigate the associations between the dependent variables (willingness and preparedness) and the independent variable (feeling safe). Both crude and adjusted odds ratios (ORs) are presented in the results. The level of significance was set at

$p < 0.05$  for all the analyses. Missing data were excluded from the analyses.

### Ethical considerations

The study was approved by the North Denmark Region Committee on Health Research Ethics (approval no. 2021–17) and complies with all the ethical principles for medical research described in the Helsinki Declaration.<sup>32</sup> The questionnaire was sent with information about the study, which also stated that participation in the study was voluntary, and that the data would be handled anonymously. Answering the questionnaire was taken to indicate a participant's informed consent to be included in the study.

## Results

### Demographic information

Out of the 510 eligible participants, 358 returned a complete questionnaire (response rate 70%). The mean age of the participants was  $43.4 \pm 10.5$  years (Table 1). The majority of the RNs (84.5%) were living with a partner, and 218 (60.9%) had children living at home. The mean length of the RNs employment was  $16.9 \pm 10.2$  years, and 168 (46.9%) had a specialist postgraduate qualification, such as intensive care nurse or nurse anaesthetist.

### Working conditions during COVID-19

Almost half of the RNs (49%) stated that a RN has an obligation to work under any circumstances, and 272 (75.8%) indicated that they were willing to work during the COVID-19 pandemic. Of the RNs, 70 (19.5%) had been relocated voluntarily to another unit during the COVID-19 pandemic, while 132 (36.9%) had been appointed by their nurse leaders (Table 1). A total of 141 (69.8%) RNs had been relocated to a COVID-19 pandemic ward. Approximately half of the RNs ( $n = 182$ , 50.8%) had participated in a preparatory course on COVID-19 care, offered by the university hospital, while 104 (52%) had received between half a day and five days of introduction in connection with their relocations. A total of 213 (59.5%) RNs felt safe when going to work during the COVID-19 pandemic; however, 30 (8.4%) reported that they felt prepared to handle the work, and 110 (30.7%) reported that the required COVID-19 protective equipment was unavailable.

### Willingness to work during COVID-19

The highest degree of willingness to work during the COVID-19 pandemic was seen in RNs with 0–5 years of clinical experience, followed by RNs with more than 15 years of clinical experience. No statistically significant difference was found between the designation of the occupation and willingness to work (Table 2). Factors that could contribute to an increase in RNs' willingness to work during the COVID-19 pandemic were as follows: a higher salary ( $n = 281$ , 78.5%); better working conditions ( $n = 258$ , 72.1%); sufficient

**Table 1.** Participant characteristics.

Population	Mean $\pm$ SD	n (%)
Demographic characteristics		358 (100)
Sex ( <i>n</i> = 356)		
Men		12 (3.4)
Women		344 (96.6)
Age range (years) ( <i>n</i> = 354)	43.4 $\pm$ 10.5	
22–29		39 (11)
30–39		103 (29)
40–49		111 (31)
50–59		75 (21)
60–66		26 (7.3)
Living arrangement		
Single		33 (9.2)
Cohabitant/married		304 (84.5)
With a child/children		218 (60.9)
With friends/a roommate		3 (0.8)
With other family members		3 (0.8)
Age of children living at home (years)		
<1–4		84 (18.2)
5–9		139 (30.2)
10–17		180 (39.3)
$\geq 18$		58 (12.6)
Employment characteristics		
Years of experience (range 0–42 years) ( <i>n</i> = 344)	16.9 $\pm$ 10.17	
0–5		46 (13.4)
6–15		128 (37.2)
>15		170 (49.4)
Designation of occupation ( <i>n</i> = 351)		
RN with a basic function		157 (43.8)
RN with a special function (development or education)		12 (3.4)
RN with specialist postgraduate education (anaesthesia nurse or intensive nurse)		168 (46.9)
Nurse leader (responsible for nursing care in each unit)		5 (1.4)
Other		9 (2.6)
Working conditions		
Moved to a different department		
Yes, relocated voluntarily		70 (19.5)
Yes, been appointed to move		132 (36.9)
No		152 (42.5)
Other		4 (1.1)
Moved to a pandemic ward ( <i>n</i> = 202)		
Yes		141 (69.8)
No		61 (30.2)
Participated in a course in connection with relocation ( <i>n</i> = 200)		
Yes		104 (52)
No		96 (48)
Willingness		
To what extent are you willing to attend your work if there is a pandemic outbreak (COVID-19)?		
To a great extent		140 (39)
To some extent		132 (36.9)
Neither nor		20 (5.6)
To a little extent		53 (14.8)
Not at all		13 (3.6)
To what extent have you felt prepared going to work?		
To a great extent		30 (8.4)
To some extent		177 (49.4)
To a little extent		123 (34.4)
Not at all		28 (7.8)
To what extent have you felt safe going to work?		
To a great extent		62 (17.3)
To some extent		151 (42.2)
To a little extent		122 (34)
Not at all		23 (6.4)

(continued)

**Table 1. (continued)**

Population	Mean $\pm$ SD	n (%)
Preparedness to work during the COVID-19 pandemic		
<i>My family understood that I had to work (n = 352)</i>		
Strongly agree/agree		297 (84.4)
Neither agree nor disagree		33 (9.4)
Disagree/or		22 (6.3)
<i>My leader supported me (n = 348)</i>		
Strongly agree/agree		214 (61.5)
Neither agree nor disagree		61 (17.5)
Disagree/strongly disagree		73 (20.9)
<i>My nursing colleagues were prepared (n = 349)</i>		
Strongly agree/agree		115 (33)
Neither agree nor disagree		88 (25.2)
Disagree/strongly disagree		146 (41.8)
<i>My interdisciplinary colleagues were prepared (n = 347)</i>		
Strongly agree/agree		114 (32.9)
Neither agree nor disagree		100 (28.8)
Disagree/strongly disagree		133 (38.3)
<i>My leader was prepared to handle the pandemic (n = 348)</i>		
Strongly agree/agree		168 (48.3)
Neither agree nor disagree		76 (21.8)
Disagree/strongly disagree		104 (29.9)

Note. RN = registered nurse.

protective equipment (n = 230, 54.3%); and further education/courses (n = 222, 62%).

Feeling safe was associated with RNs' willingness to work during the pandemic. Respondents who reported feeling safe were 5.4 times more likely (OR = 5.4, 95% confidence interval [CI] = 2.96–9.66) to report their willingness to work during the pandemic (Table 3). The odds of being willing to work were higher if the RNs perceived that their leaders were supportive (OR = 7.33, 95% CI = 3.75–14.3), that they had family support (OR = 6.4, 95% CI = 2.45–16.3) or that their nursing colleagues (OR = 5.17, 95% CI = 2.39–11.19), interdisciplinary collaborators (OR = 8.32, 95% CI = 3.25–19.92) and nurse leaders (OR = 6.5, 95% CI = 3.24–13.17) were prepared to handle the COVID-19 pandemic (data not presented in a table).

### Preparedness to work during COVID-19

Only half of the RNs (n = 168, 48.3%) experienced that their nurse leader was prepared to handle the COVID-19 pandemic. In addition, 115 (33%) felt that their nursing colleagues were prepared (Table 1). RNs who felt safe going to work were more likely (OR = 6.5, 95% CI = 4.09–10.25) to report feeling prepared to work during the COVID-19 pandemic (Table 4). RNs who were relocated voluntarily to a different clinical specialty from their usual field were more likely (n = 57, 79.2%; chi-squared =  $p = 0.000$ ) to report being prepared to work during the COVID-19 pandemic compared to RNs who had been appointed (n = 69, 50.4%;  $p = 0.000$ ) (Table 2).

### Discussion

The aim of this study was to identify the factors associated with RNs' preparedness and willingness to work during the

COVID-19 pandemic. Overall, the results show that the majority of RNs were willing to work during the pandemic. Factors that were associated with RNs' willingness were related to working conditions, supportive leaders, prepared nursing colleagues and interdisciplinary collaborators, and family support.

In this study, RNs' willingness mainly arose from their commitment to the nursing profession. Two-thirds of the RNs reported their willingness to work during the COVID-19 pandemic, and approximately half (49.2%) of the RNs felt a professional obligation to work, which is in line with previous studies.<sup>7,12,33</sup> As indicated in the literature, many nurses have concerns about how their work impacts their families' well-being.<sup>12</sup> Emergency personnel often describe difficulties in terms of finding a balance between their need to be safe and their duty of care, due to conflicting thoughts about job responsibilities and the risk of injury.<sup>34</sup> This study found that feeling safe significantly increased RNs' willingness to work during the COVID-19 pandemic, which is in line with previous studies showing that safety was one of the most important predictors of willingness to work.<sup>13,35</sup> Thus, there seems to be a schism between being willing to work and the feeling of safety. Hence, it is of great importance that nurse leaders acknowledge and consider RNs' concerns about their own and their families' safety when delegating nurses to work in the frontline. Besides safety, support from family was an influencing factor. The importance of family support is highlighted in recent studies where nurses' willingness and commitment to work during COVID-19 increased with a strong family support.<sup>14,18</sup>

Organisational factors involved the RNs' belief in their colleagues' and hospitals' preparedness to cope with COVID-19, comprising higher salary, sufficient protective equipment, the degree of voluntariness associated with relocations and a

**Table 2.** Association between RNs' characteristics and their willingness and preparedness to work during COVID-19.

	Willingness		Chi-square (p)	Preparedness		Chi-square (p)
	Willing n (%)	Not willing n (%)		Prepared n (%)	Not prepared n (%)	
<i>Age range (years)</i>			5.8289 (0.212)			2.1271 (0.712)
20–29	35 (94.6)	2 (5.4)		22 (53.6)	19 (46.3)	
30–39	79 (79.8)	20 (20.2)		61 (57.6)	45 (42.5)	
40–49	78 (76.5)	24 (25.5)		66 (57.9)	48 (42.1)	
50–59	58 (80.6)	14 (19.4)		50 (62.5)	30 (37.5)	
60–69	22 (78.6)	6 (21.4)		15 (48.4)	16 (51.6)	
<i>Living arrangement</i>			0.6124 (0.343)			1.5933 (0.207)
Cohabitant/married	233 (88.2)	54 (18.8)		185 (58.9)	129 (41.1)	
Single	39 (76.5)	12 (25.5)		29 (50)	29 (50)	
<i>Living with kids</i>			0.2076 (0.649)			0.0949 (0.758)
Yes	169 (81.3)	39 (18.8)		86 (58.9)	61 (41.5)	
No	103 (79.2)	27 (20.8)		128 (56.9)	97 (43.1)	
<i>Years of experience (years)</i>			5.5499 (0.062)			1.1867 (0.552)
0–5 years	42 (93.3)	3 (6.7)		24 (53.3)	21 (46.7)	
6–15 years	94 (77.7)	27 (22.3)		76 (61.8)	47 (38.2)	
>15 years	136 (79.1)	36 (20.9)		105 (57.1)	79 (42.9)	
<i>Designation of occupation</i>			9.1538 (0.057)			1.7166 (0.788)
RN with a basic function	123 (83.1)	25 (16.9)		83 (55.3)	67 (44.7)	
RN with a special function <sup>a</sup>	12 (100)	0 (0)		8 (66.7)	4 (33.3)	
RN with specialist postgraduate education <sup>b</sup>	120 (76)	38 (24.1)		99 (61.9)	61 (38.1)	
Nurse leader <sup>c</sup>	5 (100)	0 (0)		3 (60)	2 (40)	
Other	9 (100)	0 (0)		5 (55.6)	4 (44.4)	
<i>Moved to a different department</i>			10.0311 (0.018)			17.5808 (0.000)
Yes, relocated voluntarily	61 (88.4)	8 (11.6)		57 (79.2)	15 (20.8)	
Yes, been appointed to move	92 (75.4)	30 (24.6)		69 (50.4)	68 (49.6)	
No	119 (80.9)	28 (19)		88 (54)	75 (46)	
<i>Moved to a pandemic ward</i>			7.4573 (0.006)			9.2394 (0.002)
Yes	115 (85.2)	20 (14.8)		99 (66.9)	49 (33.1)	
No	38 (67.9)	18 (32.1)		27 (44.5)	34 (55.7)	
<i>Participated in a course</i>			0.5862 (0.444)			1.0664 (0.302)
Yes	82 (82)	18 (18)		60 (57.7)	44 (42.3)	
No	69 (77.5)	20 (22.5)	66 (64.7)	36 (35.3)		

Note. <sup>a</sup>RN with a special function (development or education). <sup>b</sup>RN with specialist postgraduate education (anaesthesia nurse or intensive nurse). <sup>c</sup>A nurse leader is responsible for nursing care in each unit. RN = registered nurse.

**Table 3.** The association of feeling safe with willingness to work.

	Crude OR	Adjusted OR <sup>a</sup>	Adjusted OR <sup>b</sup>	Adjusted OR <sup>c</sup>
Feeling safe	5.35 (2.96–9.66) <i>p</i> = 0.000	5.54 (3.03–10.14) <i>p</i> = 0.000	5.58 (3.03–10.29) <i>p</i> = 0.000	5.44 (2.94–10.04) <i>p</i> = 0.000

Note. <sup>a</sup>Adjusted for age. <sup>b</sup>Adjusted for age, years since completing education. <sup>c</sup>Adjusted for age, years since completing education and living with children. OR = odds ratio.

**Table 4.** The association of feeling safe with feeling prepared to handle work.

	Crude OR	Adjusted OR <sup>a</sup>	Adjusted OR <sup>b</sup>	Adjusted OR <sup>c</sup>
Feeling safe	6.47 (4.09–10.25) <i>p</i> = 0.000	6.67 (4.18–10.62) <i>p</i> = 0.000	6.64 (4.16–10.6) <i>p</i> = 0.000	7.05 (4.37–11.36) <i>p</i> = 0.000

Note. <sup>a</sup>Adjusted for age. <sup>b</sup>Adjusted for age, years since completing education. <sup>c</sup>Adjusted for age, years since completing education and living with children. OR = odds ratio.

supportive working environment, especially support from the immediate leader. These findings are congruent with other studies, in which willingness is influenced by the perceived level of hospital preparedness.<sup>13,14</sup> As such, healthcare organisations and leaders should focus on enhancing hospital

preparedness by providing adequate protective equipment, training as well as emotional and social support to address RNs' safety concerns, and family responsibilities.

The years that have passed since the RNs' graduation seems to be an influencing factor for their willingness to work during the



COVID-19 pandemic, as our study showed that RNs with less experience were more likely to report willingness to work during the pandemic compared to RNs with more than five years of experience. This contrasts with previous studies that revealed that years of experience were the main positive factor influencing willingness.<sup>15</sup> In addition, no association between willingness and designation of the occupation was found in the present study. This may be due to the relocation to new clinical settings where nurses, regardless of their previous experience and capabilities, find transitioning both personally and professionally challenging.<sup>36</sup> Being relocated to a new clinical specialty without preparation negatively contributes to nurses' sense of adequacy and preparedness.<sup>9,20</sup> Moreover, Denning et al.<sup>37</sup> identified redeployment as a predictor of burnout. This is essential for workforce planners and nurse leaders to acknowledge when considering relocating nurses to wards outside their fields of expertise. This highlights that nurse leaders should consider ways to increase RNs' willingness to volunteer during a pandemic. Establishing supportive working environments and clear leadership has been identified in previous literature as a key factor that can increase nurses' willingness to work and reduce their concerns and fears.<sup>17,38–40</sup>

During a pandemic, relocation to another clinical context can be a strategy for dealing with capacity concerns, but the lack of training provided for relocated staff and the failure to consider the skills of the redeployed and how these match with the skills needed in the new clinical context have been identified as problematic.<sup>38</sup> In this study, 91.6% of the RNs reported being unprepared for work with various levels of unpreparedness, which may be due to the absence of appropriate preparation for a new clinical context and, for some RNs, lack of insight into an unknown patient group. The feeling of unpreparedness contributes to insecurity. Therefore, obligatory preparedness training would be beneficial for enhancing nurses' specific knowledge and increasing their self-confidence.<sup>41</sup> Furthermore, it may be important to have a continuous focus on how to support the individual nurse in developing knowledge and feeling prepared by establishing a culture of knowledge sharing and professional sparring.<sup>42</sup> The results from this study must be seen in light of the data being collected after the first wave of the pandemic, where the Danish healthcare system was unprepared for such a crisis. As the pandemic progressed, knowledge of the disease improved, and healthcare systems as well as leaders were more experienced and aware of how to support task force nurses in feeling prepared. In general, nurse leaders play a key role in actively supporting nurses who are relocated to areas outside their fields of expertise during the outbreak of a pandemic.

## Strength and limitations

A strength of this study is the high response rate (70%), as the potential for differences between respondents and non-respondents are lower increasing the likelihood that the results can be generalised to the population sampled, and reducing the likelihood of response bias.<sup>43</sup> This survey was conducted in September 2020, before the second wave of COVID-19 brought an increase in the confirmed number of cases. The timing of the survey may limit its generalisation to all task force RNs who were working during other periods of the COVID-19 pandemic when the situation was more

severe. Furthermore, the target hospital was restricted to only one university hospital, which also limits generalisation of the results. The cross-sectional design prevented investigation of the causal relationship between related factors and willingness and preparedness, and further research is recommended.

## Conclusion

The study demonstrates that RNs feel a professional obligation to engage in clinical work during the COVID-19 pandemic. However, their willingness and preparedness to work are associated with multiple factors related to family support, support from their immediate leaders, and personal and family safety. Furthermore, this study highlights that being relocated voluntarily or involuntarily influences RNs' willingness to work. Such factors are important to consider when hospitals and nurse leaders prepare and organise pandemic responses.

## Implications for nursing management

This study identified that there is a need to address RNs' concerns when being asked to work in an unknown situation. The influencing factors on RNs' preparedness and willingness to respond to a pandemic must be taken into consideration when planning future pandemic task force strategies. Hospital management and nurse leaders have substantial roles and responsibilities in this context. Considering the findings from this study, nurse leaders should focus on an individual approach to improve preparedness and prevent the risk of causing distress and uncertainty among RNs and thereby improve well-being and job satisfaction. An individual approach will take the individual RN's situation, experiences and competencies into consideration, and may improve the potential for increasing voluntariness to take part in the COVID-19 task force.

## Acknowledgements

We would like to thank our colleagues at the University of Adelaide, Australia, for discussing the study at the early stages of the research design development and for sharing their knowledge on nursing care in situations of disaster management.

## Author contributions

The study was designed in collaboration with all authors who are researchers employed at the Clinical Nursing Research Unit or in clinical specialties at Aalborg University Hospital, Denmark. KHK and MGN conducted the questionnaire and performed the analysis and drafted the paper in collaboration with MTA, BL, SLV and MG. All authors contributed to the revision and approval of the paper that presents the original results of the research.

## Conflict of interest


The authors declare that there is no conflict of interest.

## Funding


The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The


project is supported by Aalborg University Hospital and received no external funding.

## ORCID iDs

Kathrine Hoffmann Kusk  <https://orcid.org/0000-0002-7695-3639>

Lone Jørgensen  <https://orcid.org/0000-0002-4197-3066>

Birgitte Lerbæk  <https://orcid.org/0000-0002-9196-5881>

Karin Bundgaard  <https://orcid.org/0000-0002-8411-1837>

## References

- WHO. Timeline COVID-19, <https://www.who.int/news-room/detail/27-04-2020-who-timeline-covid-19> (2020, accessed 12 August 2020).
- Nyashanu M, Pfende F and Ekpenyong M. Exploring the challenges faced by frontline workers in health and social care amid the COVID-19 pandemic: experiences of frontline workers in the English Midlands region, UK. *J Interprof Care* 2020; 34(5): 655–661.
- WHO. WHO coronavirus dashboard. <https://covid19.who.int/> (2020, accessed 12 August 2020).
- Nguyen LH, Drew DA, Joshi AD, et al. Risk of COVID-19 among frontline healthcare workers and the general community: a prospective cohort study. *medRxiv Prepr Serv Heal Sci* 2020; 5(9): 475–483.
- Johnstone MJ and Turale S. Nurses' experiences of ethical preparedness for public health emergencies and healthcare disasters: a systematic review of qualitative evidence. *Nurs Heal Sci* 2014; 16: 67–77.
- Said NB and Chiang VCL. The knowledge, skill competencies, and psychological preparedness of nurses for disasters: a systematic review. *Int Emerg Nurs* 2020; 48: 100806.
- Deying H, Yue K, Wengang L, 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. *EClinicalMedicine* 2020; 24: 100424.
- Lord H, Loveday C, Moxham L, et al. Effective communication is key to intensive care nurses' willingness to provide nursing care amidst the COVID-19 pandemic. *Intensive Crit Care Nurs* 2021; 62: 102946.
- Labrague LJ, Hammad K, Gloe DS, et al. Disaster preparedness among nurses: a systematic review of literature. *Int Nurs Rev* 2018; 65: 41–53.
- Baack S and Alfred D. Nurses' preparedness and perceived competence in managing disasters. *J Nurs Scholarsh* 2013; 45: 281–287.
- Elhadi M, Msherghi A, Alkeelani M, et al. Assessment of healthcare workers' levels of preparedness and awareness regarding COVID-19 infection in low-resource settings. *Am J Trop Med Hyg* 2020; 103(2): 828–833.
- 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.
- Ke Q, Chan SW chi, Kong Y, et al. Frontline nurses' willingness to work during the COVID-19 pandemic: a mixed-methods study. *J Adv Nurs* 2021; 77: 3880–3893.
- Duran S, Celik I, Ertugrul B, et al. Factors affecting nurses' professional commitment during the COVID-19 pandemic: a cross-sectional study. *J Nurs Manag* 2021; 29: 1906–1915.
- Luo Y, Feng X, Zheng M, et al. Willingness to participate in front-line work during the COVID-19 pandemic: a cross-sectional study of nurses from a province in South-West China. *J Nurs Manag* 2021; 29: 1356–1365.
- Li J, Li P, Chen J, et al. Intention to response, emergency preparedness and intention to leave among nurses during COVID-19. *Nurs Open* 2020; 7: 1867–1875.
- Lam SKK, Kwong EWY, Hung MSY, et al. Nurses' preparedness for infectious disease outbreaks: a literature review and narrative synthesis of qualitative evidence. *J Clin Nurs* 2018; 27: e1244–e1255.
- Gan X, Shi Z, Chair S, et al. Willingness of Chinese nurses to practice in Hubei combating the coronavirus disease 2019 epidemic: A cross-sectional study. *J Adv Nurs* 2020; 76(8): 2137–2150.
- Arbon P, Ranse J, Cusack L, et al. Australasian emergency nurses' willingness to attend work in a disaster: a survey. *Australas Emerg Nurs J* 2013; 16: 52–57.
- Danielis M, Peressoni L, Piani T, et al. Nurses' experiences of being recruited and transferred to a new sub-intensive care unit devoted to COVID-19 patients. *J Nurs Manag* 2021; 29(5): 1149–1158.
- Leng M, Wei L, Shi X, et al. Mental distress and influencing factors in nurses caring for patients with COVID-19. *Nurs Crit Care* 2021; 26(2): 94–101.
- Preti E, Di Mattei V, Perego G, et al. The psychological impact of epidemic and pandemic outbreaks on healthcare workers: rapid review of the evidence. *Curr Psychiatry Rep* 2020; 22: 43.
- Nibbelink CW and Carrington JM. Nurse decision making in acute care. *Comput Inform Nurs* 2019; 37: 151–160.
- Wu M, Yang J, Liu L, et al. An investigation of factors influencing nurses' clinical decision-making skills. *West J Nurs Res* 2016; 38: 974–991.
- Tanner CA. Thinking like a nurse: a research-based model of clinical judgment in nursing. *J Nurs Educ* 2006; 45: 204–211.
- Von Elm E, Altman DG, Egger M, et al. The strengthening the reporting of observational studies in epidemiology (STROBE) statement: guidelines for reporting observational studies. *Bull World Health Organ* 2007; 85: 867–872.
- Aalborg University Hospital. Key figures (Nøgletal). <https://aalborguh.rm.dk/genveje/om-aalborg-universitetshospital/noegletal> (2021, accessed 7 April 2021).
- Beaton DE, Bombardier C, Guillemin F, et al. Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine (Phila Pa 1976)* 2000; 25: 3186–3191.
- Miller K, Willis G and Conrad FG. Cognitive interviewing. In: *Question evaluation methods: contributing to the science of data quality*. Hoboken, NJ: WILEY, 2011, pp. 49–75.
- REDCap. Research Electronic Data Capture. <https://redcap.rm.dk/> (2021).
- Stata Corp. Stata statistical software: release 16.
- World Medical Association. World Medical Association Declaration of Helsinki: ethical principles for medical research involving human subjects. *JAMA* 2013; 310: 2191–2194.
- 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–e924171.
- Connor SB. When and why health care personnel respond to a disaster: the state of the science. *Prehosp Disaster Med* 2014; 29: 270–274.
- Rebmann T, Charney RL, Loux TM, et al. Emergency medical services personnel's pandemic influenza training received and willingness to work during a future pandemic. *Prehospital Emerg Care* 2020; 24: 601–609.

36. Kinghorn GR, Halcomb EJ, Froggatt T, et al. Transitioning into new clinical areas of practice: an integrative review of the literature. *J Clin Nurs* 2017; 26: 4223–4233.
37. Denning M, Goh ET, Tan B, et al. Determinants of burnout and other aspects of psychological well-being in healthcare workers during the COVID-19 pandemic: a multinational cross-sectional study. *PLoS One* 2021; 16: e0238666.
38. Vindrola-Padros C, Andrews L, Dowrick A, et al. Perceptions and experiences of healthcare workers during the COVID-19 pandemic in the UK. *BMJ Open* 2020; 10: 1–8.
39. Khalid I, Khalid TJ, Qabajah MR, et al. Healthcare workers emotions, perceived stressors and coping strategies during a MERS-CoV outbreak. *Clin Med Res* 2016; 14: 7–14.
40. Poortaghi S, Shahmari M and Ghobadi A. Exploring nursing managers' perceptions of nursing workforce management during the outbreak of COVID-19: a content analysis study. *BMC Nurs* 2021; 20: 27.
41. Sultan MAS, Sørensen JL, Carlström E, et al. Emergency healthcare providers' perceptions of preparedness and willingness to work during disasters and public health emergencies. *Healthcare (Basel)* 2020; 8: 442.
42. Laugesen B, Albrechtsen MT, Grønkjær M, et al. Nurses' clinical decision-making in a changed COVID-19 work environment : A focus group study. *Glob Qual Nurs Res* 2022; 9: 23333936221109876.
43. Johnson T and Wislar J. Response rates and nonresponse errors in surveys. *JAMA* 2012; 307: 1805–1806.