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Research manuscript

Personnel well-being in the Helsinki University Hospital during the COVID-19 pandemic – a prospective cohort study

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Abstract:

On March 2020 strict measures took place in Finland to limit the COVID -19 pandemic. A majority of the Finnish COVID -19 –patients have been located in the southern Finland and consequently cared for in the HUS Helsinki University Hospital. During the ongoing pandemic, HUS personnel's psychological symptoms are followed via an electronic survey, which also delivers information on psychosocial support services. The baseline survey in June 2020 was sent to 25494 HUS employees out of whom 4804 (19%) answered; altogether 62.4% of the respondents were nursing staff and 8.9% medical doctors. While the follow-up continues for a year and a half, this report shares the sociodemographic characteristics of the respondents and the first results of psychological symptoms from the baseline survey. Out of those who were directly involved in pandemic patients` care, 43.4% reported potentially traumatic COVID-19 pandemic-related experiences vs. 21.8% among the other ($p < 0.001$). While over a half of the personnel was symptomless, a group of respondents reported pandemic work –related traumatic events and concurrent depressive, insomnia and anxiety symptoms. This highlights the need to ensure appropriate psychosocial support services to all traumatized personnel and PTEs were present especially among nursing staff.

Keywords: COVID-19 Pandemic, Finland, health care personnel, psychological distress, post-traumatic stress disorder

1. Introduction

COVID-19 (severe acute respiratory syndrome coronavirus 2, SARS-CoV-2) outbreak began in December 2019 in Wuhan, China and has caused a pandemic with over a 27.9 million confirmed infections and over 0.9 million deaths by September 10, 2020 [1]. In most cases, the virus only causes a mild disease. The severe possibly life-threatening complications of the infection include acute lung injury, acute respiratory distress syndrome and multiorgan failure [2-3]. In Finland as globally, strict restrictions have taken place to slow down the pandemic by preventing physical contact between people. This is of utmost importance to secure intensive care (IC) capacity to those with severe

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symptoms who can benefit from it. A majority of COVID-19 pandemic patients in Finland have been cared for in the HUS Helsinki University Hospital since March 2020. By September 14, 2020 there is detailed information on 336 deaths caused by COVID-19 pandemic in Finland, of them 48% were male and 52% female with a median age of 84 years. Before they died of COVID-19 pandemic 35% were cared for in the primary health care, 20% in special medical care, 43% in social welfare services and 2% at home or elsewhere (www.thl.fi/en).

Health care personnel face unique challenges during pandemic. In China, Wuhan area, frontline nurses and doctors caring for COVID-19 patients reported increase in symptoms of depression, insomnia, anxiety and psychological distress as compared to other health care personnel [4,5]. First general population studies from the Wuhan area report similar findings with somewhat lower symptom intensities [6,7]. In Europe, a study from Germany of 110 nurses and doctors reported that that especially nurses working in COVID-19 wards are affected psychologically [8]. Work-related stress, long work-shifts and contagion were a concern in Italy [9]. Research on this field is limited and to our knowledge, only a few studies from Europe are currently available [8,10-11].

The basic principles of high-quality psychosocial support [12-19] emerge from several international reports assessing the immediate needs of health care personnel caring for COVID-19 patients can shortly be summarized as follows; Listen, Supply, Prepare, Support and if needed - Care for us and our close ones [14-19]. Timing is of importance in assessing stress -related symptoms, assessment before one-month duration from a potentially traumatic event is prone to wrong positive findings [20]. COVID-19 pandemic increases the risk of exposure to potentially traumatic events among health care personnel in professional and private life, while pandemic in itself is not always a traumatic event to everyone exposed to it [12-13].

In this study, personnel well-being in the HUS Helsinki University Hospital during COVID-19 pandemic is followed via an electronic survey. We report baseline results from June 2020 from the prospective cohort study on HUS personnel's psychological symptoms.

2. Materials and Methods

This report shares first baseline results of an ongoing prospective cohort HUS personnel well-being study (HUS HEHY COVID-19) in the southern Finland district. This study was approved by the HUS Ethical Committee (HUS/1488/2020) and permission to conduct the study was obtained from the Joint Authority of the Helsinki and Uusimaa Hospital District (HUS/157/2020). An electronic survey was created to assess the well-being of the HUS personnel. It consists of sociodemographic background questions and five symptom-rating scales: Mental Health Index (MHI-5), Insomnia Severity Index (ISI), Patient Health Questionnaire -2 (PHQ-2 also referred as PRIME -MD), Primary Care Post-traumatic Stress Disorder Scale (PC-PTSD -5) and Overall Anxiety and Impairment Scale (OASIS). These scales assess psychological distress, insomnia, depressive symptoms, traumatic experiences (with questions focused on work-related experiences with COVID-19 patients), trauma-related psychological symptoms and anxiety [21-27]. In addition, the survey include questions about potential changes in respondents' daily work and their adjustment to the changes, respondents' attitudes towards COVID-19 patients, and a few open questions. The survey was delivered in Finnish and Swedish (major languages of the HUS personnel). The survey took about 10-15 minutes to answer. Initially, all employees with a functional HUS email address (N=25494) were invited to participate to the baseline survey. Due to possible personnel work changes and turnover an open

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access link is also available in the HUS personnel's internal website (HUS Intra). A majority of answers was received through email survey when launching the study during June 4-26, 2020 but we included also results from the open access link from the same time frame and also compared the answerers and report possible differences.

SPSS and R version 4.0.2 (2020-06-22) were used in the statistical analyses. We examined 2-way tables and Chi-squared tests in the former, and multivariate (multiple) logistic regression models in the latter to evaluate interaction effects of COVID-19 contact, potentially traumatic work -related events (PTEs), and nursing-staff membership on the psychological outcomes, as well as to adjust the main effects for each other.

3. Results

Table 1 describes sociodemographic background of 4804 HUS employees (19% of HUS personnel) who participated in the June electronic survey. Pandemic related changes in work different potentially traumatic work related events (PTEs) and MHI-5, ISI, PHQ-2 and PC-PTSD -5 results are reported in Table 2 from the whole sample. PTEs at work were also more common among nursing staff as compared to other respondents (34.6%;n=1011 vs. 16.5% n=284).

Table 3 describes differences between personnel directly caring for COVID19 pandemic patients vs. other personnel. Briefly, there was a statistically significant difference between first-line and other personnel in psychological distress (MHI-5), insomnia (ISI) and depressive symptoms (PRIME-MD). Potentially traumatic events related to COVID-19 pandemic were more common among personnel directly in contact with pandemic patients. PC-PTSD-5 scale recognized almost equal proportion of respondents in both groups, 23-4% having a high risk of PTSD.

In addition, we evaluated whether the different rating scales recognized the same respondents in higher risk of psychiatric comorbidity. Four groups emerged, while 54.3% had no self-reported symptoms (N=2463), 17.9% had psychological symptoms without pandemic work –related traumatic events (N=811). 14.6% (N=664) reported pandemic work related traumatic events and also depressive and insomnia and anxiety symptoms. Eventually 13.2% (N=598) had pandemic work – related traumatic events without depressive symptoms but with some symptoms of anxiety or stress.

Table 4 reveals that potentially traumatic COVID-19 pandemic related events strongly predicted psychological distress indexed by MHI-5. Age, gender, or working as nurse did not predict who of the respondents with PTEs developed PTSD symptoms (data not shown). Respondents via email (N = 4614) were compared with HUS Intra open access link respondents (N=190) and they answered five days later (8.6 vs. 13.6 days) The open link answerers were also slightly younger 44.3 vs 41.9 years.

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Table 1. Sociodemographic background information of HUS personnel participants of the well-being survey

Sociodemographic variable	Whole sample N = 4804[1] Percentage	
Age, n = 4494, Median = 45, Mean (SD)	44.2	(11.4)
Gender, n (%)		
male	538	(11.4)
female	4130	(87.5)
other or prefer not no answer	51	(1.1)
Highest education, n (%)		
primary and lower secondary education	75	(1.6)
upper secondary education	773	(16.3)
Bachelor's or equivalent	2605	(54.9)
Master's or equivalent	797	(16.8)
Doctoral or equivalent	488	(10.3)
other	5	(0.1)
Personnel group, n (%)		
nursing staff	2989	(62.4)
medical doctors	425	(8.9)
special personnel (including psychologists and social workers)	377	(7.9)
other (non-healthcare) personnel	1001	(20.9)

1. Initially 4840, 36 duplicate answers removed.

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Table 2. Potentially traumatic events related to work with COVID-19 pandemic patients, work changes and psychological symptoms among HUS respondents in the electronic survey on June 4-26, 2020 (N=Number)

Self-reported changes in work and psychological distress symptoms on June 2020 survey	Whole sample N = 4804	Percentage (%)
Changes in work due to COVID-19, n (%)		
yes	3943	(82.4)
no	844	(17.6)
Have you been in contact with COVID-19 patients or suspected patients last week? n (%)		
directly cared for	1227	(25.6)
other answers	3560	(74.4)
Have you felt **a need for psychological support** last month? n (%)		
yes	774	(16.3)
no	3966	(83.7)
Have you **received support** through wellbeing project for the personnel, from occupational healthcare or otherwise through HUS employer organization last month?		
yes	397	(8.4)
no	4332	(91.6)
Mental Health Index, MHI-5		
> 52	797	(16.7)
≤ 52	3975	(83.3)
Insomnia Severity Index, ISI,		
no insomnia	2647	(57.0)
mild insomnia	1528	(32.9)
moderate or severe insomnia	469	(10.1)
PHQ-2 two screening questions for depression, n (%)		
screen positive	1534	(32.2)
screen negative	3227	(67.8)
Has your work with COVID-19 patients or suspected patients included exceptionally disturbing or distressing assignments? n (%)		
yes	609	(13.0)
no	4080	(87.0)
Have you had strong anxiety due to your own or close one's risk of contracting serious illness for your work with COVID-19 patients or suspected patients? n (%)		
yes	934	(19.9)
no	3768	(80.1)
Have you or your close one contracted a hospital care requiring serious COVID-19? n (%)		
yes	134	(2.8)
no	4580	(97.2)
Has a close one to you died of COVID-19? n (%)		

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yes	39	(0.8)
no	4687	(99.2)
Potentially traumatic experiences, PTEs, concerning working with COVID-19 patients, suspected patients, or contracting serious illness, n (%)		
at least one	1296	(**27.5**)
none	3358	(71.2)

Table 3. Self-reported emotional distress and psychological symptoms among first line and other HUS personnel in June 2020

	Have you been in contact with COVID-19 patients or suspected patients last week?				p
	Directly cared		Other answers		
MHI-5	n	%	n	%	< 0.001
> 52	966	79.0	2997	84.8	
≤ 52	257	21.0	538	15.2	
ISI					< 0.001
no insomnia	623	51.5	2016	58.9	
mild insomnia	438	36.2	1085	31.7	
moderate or severe insomnia	149	12.3	320	9.4	
PHQ-2					0.030
screen negative	796	65.3	2422	68.7	
screen positive	423	34.7	1105	31.3	
PTE total (COVID-19 related)					< 0.001
at least one reported yes	532	43.4	760	21.8	
none	693	56.6	2719	78.2	
PC-PTSD-5 (of those reporting at least one PTE)					0.832
screen negative, < 3	406	76.9	579	76.4	
screen positive, ≥ 3	122	23.1	179	23.6	
OASIS (of those reporting at least one PTE)					0.410
screen negative, < 8	386	72.6	534	70.4	
screen positive, ≥ 8	146	27.4	224	29.6	
	Have you felt a need for psychological support last month?				p
	Yes		No		
MHI-5	n	%	n	%	< 0.001
> 52	362	47.0	3567	90.5	
≤ 52	408	53.0	373	9.5	
ISI					< 0.001
no insomnia	223	29.3	2391	62.5	
mild insomnia	331	43.6	1176	30.8	
moderate or severe insomnia	206	27.1	256	6.7	
PHQ-2					< 0.001
screen negative	179	23.3	3013	76.6	
screen positive	590	76.7	919	23.4	
PTE total (COVID-19 related)					< 0.001
at least one reported yes	404	53.8	873	22.3	
none	347	46.2	3036	77.7	
PC-PTSD-5 (of those reporting at least one PTE)					< 0.001
screen negative, < 3	229	56.8	742	85.4	
screen positive, ≥ 3	174	43.2	127	14.6	

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OASIS (of those reporting at least one PTE)					< 0.001
screen negative, < 8	188	46.5	720	82.8	
screen positive, ≥ 8	216	53.5	150	17.2	

Table 4. Logistic regression models on the relation of gender, age, COVID-19 contact, potentially traumatic events (PTEs) and working as nurse for MHI-5 screen positive (nModels 1 & 3 = 4672, nModel 2 = 4531). (OR = odds ratio; CI = 95% confidence interval)[1].

Predictor	Model 1		Model 2		Model 3	
	OR	CI	OR	CI	OR	CI
(Intercept)	0.12	0.09–0.16	0.08	0.06–0.11	0.13	0.09–0.17
sex (woman)	1.60	1.20–2.13	1.49	1.10–2.02	1.59	1.19–2.11
age (40,50]	0.83	0.68–1.01	0.91	0.74–1.12	0.83	0.68–1.01
age (50,70]	0.62	0.51–0.76	0.69	0.56–0.85	0.62	0.51–0.76
age unknown	0.95	0.69–1.30	0.96	0.69–1.35	0.95	0.69–1.30
COVID-19_contact	1.23	1.03–1.47	0.93	0.77–1.13	0.70	0.39–1.27
nurse	1.40	1.17–1.67	1.14	0.94–1.38	1.30	1.08–1.58
PTE	–	–	5.05	4.26–6.00	–	–
contact*nurse	–	–	–	–	1.88	1.01–3.50

1The covariates (predictor variables) were binary valued (0 or 1, reference age 15–40).

4. Discussion

HUS personnel in direct contact with COVID-19 patient care reported more psychological distress than other personnel in the June 2020 baseline survey. Potentially traumatic experiences related to COVID-19 pandemic were of significance among all personnel. However, it is important to note that this data consists of self-reported symptoms and respondents represent a selected group of HUS

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personnel (19%). Those who took time to respond may have been more involved with COVID-19 pandemic.

Clinically significant psychological distress in the Finnish population, measured with the MHI-5 using the same cut-off score as in the current study, is monitored in the The FinSote National survey of health, well-being and service use (see https://thl.fi/en/web/thlfi-en/research-and-expertwork/population-studies/national-finsote-survey). In the most recent survey, conducted in years 2017-2018, the prevalence of psychological distress in the age group 20-54 years was 13.3 % in men and 14.8 % in women, and in the age group 55-74 years the prevalence was 8.4 % in men and 7.9 in women (data available online at http://www.terveytemme.fi/finsote/alueet2018/terveys.html). Compared to these figures, the prevalence of psychological distress was higher in the current study, particularly among women. High level of psychological distress is consistent with the results from the other mental health scales. Of note, there is no universally accepted MHI-5 cut-off score for clinically significant psychological distress. The cut-off score used in this study indicates a symptom severity where some mood or anxiety disorder is quite likely [28].
The prevalence of insomnia symptoms in working age population in Finland is 9.2-9.6% [29] corresponding to insomnia rates in non-exposed employees of our sample (9.4%). The employees with an assumed exposure to COVID-19 instead, showed a significantly higher rate (12.3%) of clinical insomnia symptoms. Among Finnish employees, insomnia symptoms are associated with subsequent risk of sickness absence [30].
According to DSM-5, etiological traumatic event for post-traumatic stress disorder is defined as follows; the person is exposed to: death, threatened death, actual or threatened serious injury, or actual or threatened sexual violence by direct exposure, witnessing the trauma, learning that a relative or close friend was exposed to a trauma or indirect exposure to aversive details of the trauma in the course of professional duties [20]. Most people (2/3) recover from traumatic events with social support from close ones [12-13]. Prolonged exposure and earlier individual vulnerability including earlier trauma exposure, especially to several traumas are risk factors to later stress -related symptoms, which after prolonged exposure such as a pandemic, may affect 25-30 % of those at risk [13]. In this study, 23% of respondents with pandemic -related PTEs reported PTSD –symptoms and exposure to pandemic related PTEs predicted psychological distress.

Studies from China have found that first line health care personnel, especially nursing staff, caring for patients with COVID-19 are at risk for anxiety and mental health problems [4, 31]. Similar results have been described in studies from Germany [8], Israel [32] Portugal [33] and Turkey [34]. Moreover, it has been identified that perceived threat of COVID-19 enhances turnover intentions among nurses [35]. Also in this study especially nurses appeared to suffer a heavier psychological load from treating COVID-19 patients than the other professionals.

Studies regarding the well-being of health care personnel during the COVID-19 pandemic have emphasized the need to provide psychosocial support for the first-line personnel [31,34,36]. Caring for children and young ones that remind of one`s own children or incidentally caring for close ones or older relatives may cause distress even to experienced health care personnel, who otherwise may be more challenged by the amount of work during pandemic than from psychological exposure to

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disease and death. To conclude, also in Finland in addition to first-line personnel, especially nursing staff all personnel who report potentially traumatic events related to COVID-19 pandemic require attention and support.

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