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Experience and views of nurses on nursing services and personal protective equipment in Covid-19 pandemic the case of Turkey: A cross-sectional study

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Abstract

Background: During the COVID-19 pandemic, there were difficulties in planning the nursing workforce and personal protective equipment.

Aim: The purpose of this study was to identify the experiences and views of nurses on personal protective equipment use and nursing workforce planning in Turkey.

Methods: This descriptive and cross-sectional study was conducted between 23 December 2020 and 3 May 2021, among 362 nurses who agreed to participate in this study voluntarily.

Results: The findings showed that the satisfaction scores were significantly higher for those nurses who worked in 8-h shifts, were not assigned to different clinics, were notified by an official letter and 1 week or month in advance before assignment compared with nurses in other categories.

Conclusions: The problems that have arisen in the COVID-19 pandemic process have made it clear that there is a need for a nursing services management model in the event of an epidemic.

Implications for Nursing Management: This study reveals the need for the 'Nursing Services Management Model in the Event of an Epidemic' by discussing the problems of nurse workforce planning and protective personal equipment management from the perspective of nurses who experienced these problems at first hand.

KEYWORDS
COVID-19, nurses, nursing management, personal protective equipment

1 | INTRODUCTION

The Coronavirus-disease 2019 (COVID-19), which has resulted in more than 5.5 million deaths worldwide as a global epidemic, has become a major health crisis for countries since the day it began (Cascella et al., 2021; WHO, 2022). Although rapid management of COVID-19 has been achieved with the advancement of technology and scientific research, preventing the spread of new variants is a major burden on health systems. Most countries are experiencing consecutive epidemic waves due to the emergence of new variants of the virus (Islam et al., 2021; Vasireddy et al., 2021).

The organization efforts of health professionals, who are in an important position in achieving success during the pandemic—namely, reorganization of health professionals in intensive care units and

inpatient rooms—have been left to health institutions (Ardebili et al., 2020; Liu et al., 2020; Stucky et al., 2020). However, proceedings all over the world and in Turkey during the COVID-19 pandemic have shown that there are shortages especially in quality and quantity to meet the increasing demand in the supply of health workers and necessary personal protective equipment (PPE) (Akkus et al., 2021; Cengiz et al., 2021; Kackin et al., 2021).

Nurses have been at the forefront of this struggle during the COVID-19 pandemic process and have been needed at every stage of health care, from family health centers to emergency rooms and intensive care units (Celik et al., 2020; Chen et al., 2020; Stucky et al., 2020). At the same time, there have been major problems regarding shortage of nursing workforce, insufficient PPE/medical supplies, inadequate management and organization of pandemic processes in Turkey (Celik et al., 2020; Cengiz et al., 2021). In addition, nurses have witnessed some problems including the fear and anxiety, violence, long working hours with more patients, not having appropriate nurse/patient ratios, taking care of their families and children and other problems regarding personnel rights and compensation, transmitting COVID-19 to loved ones and members of the public. Nurses have continued to do their jobs under difficult and stressful conditions so as to maintain the highest level of safe and quality nursing care despite the insufficient number of nurses and the problems witnessed (Celik et al., 2020; Şenol, 2020).

The difficulties experienced with the nursing workforce and PPE/medical supplies planning in the COVID-19 pandemic have emphasized the need for 'Nursing Services Management for Pandemics' (Galanis et al., 2021; Halcomb et al., 2020). Obtaining the experiences and views of nurses providing care for COVID-19 patients with the use of PPE and planning of the nursing workforce are essential in order to find solutions for the experienced problems.

The purpose of this descriptive and cross-sectional study is to identify the experiences and views of nurses providing care for COVID-19 patients on the management of nursing services and PPE. This study also investigates the relationship between satisfaction levels of nurses with the management of nursing services and PPE and nurses' demographic, work-related characteristics and the practices of health care facilities during COVID-19 pandemic.

What is already known about the topic?

It is an obvious fact that lower level of satisfaction among nurses and lack of PPE are common problems caused by inadequate management of nursing services during the pandemic process.

What this paper adds

The findings of this study reveal that:

- Better management of nursing services plays a significant role in increasing the motivation of nurses that is needed more in providing high-quality patient care during unexpected crises such as COVID-19
- Protecting nurses from infection as forefront warriors during COVID-19 is an essential management duty, and their services should be guaranteed by meeting their essential needs such as PPE and by practicing better management functions.

2 | METHODS

2.1 | Study design

This is a descriptive and cross-sectional study.

2.2 | Sample and setting

The sample of study was composed of 362 nurses who agreed to participate in this study and were the members of national nurse's associations in Turkey. Those nurses whose contact information was available were contacted via e-mail and WhatsApp, and they were asked to fill out the data collection tools.

2.3 | Data collection tool

Data were collected through an online questionnaire. The online questionnaire was developed by conducting a literature review on the COVID-19 pandemic and the statements of health professional organizations related to the subject in pandemic process. The developed online questionnaire consisted of total 35 close-ended questions under two main sections. The first section aimed to collect data on nurses' demographic characteristics (10 questions) such as gender, age, education level, working time, job position, working unit and working shift, while the second section (25 questions) collected data on the views and experiences of nurses on hospital/nursing management practices, trainings, PPE use and the meeting nurses' expectations from nursing services management. In addition, two questions were included to measure the satisfaction levels of participating nurses with the management of nursing services and the management of PPE during the pandemic on a 10-point scale (1: very bad; 10: excellent). The data were collected between 23 December 2020 and 3 May 2021.

2.4 | Data analysis

IBM SPSS Statistics for Windows, Version [23] (Armonk, NY: IBM Corp. IBM Corp.) statistical program was used to analyse the data. Percentile, frequency, minimum-maximum values, mean and standard deviation statistics were used in describing the collected data. Chi-

square analysis was used to examine the relationships between categorical independent and dependent variables. Fisher's exact test was used for 2 × 2 tables to estimate odds ratios (OR) to show the association between the status of being infected/contacted and implementations of hospitals or nursing services. In cases where the compared groups were more than two, the associations were estimated by using Pearson's chi-square value with two-way probability values. Student's *t*-test and one-way ANOVA analysis were used in order to determine whether the satisfaction levels of nurses with nursing services and PPE management were different by the demographic characteristics of nurses and hospital/nursing services. Levene's test was used to examine whether the variances were homogeneous or not in order to determine appropriate *t*/*F* values that should be used in comparisons. Pearson's correlation analysis was used to examine the relationship between normally distributed continuous variables, while the independent predictors of nurses' satisfaction levels with nursing services and PPE management were estimated by using multiple regression analysis.

3 | RESULTS

The mean age of the nurses was 31.83 ± 7.54 (range 20–54) years, and their professional experience was 9.83 ± 8.36 (range 1–35) years. Of nurses, 84.5% were women, 69.9% were in hospitals affiliated to the Ministry of Health, 39.0% were in intensive care units and 40.6% were on 24-h duty. In addition, the average number of patients cared for by a nurse in the unit was 12.22 ± 30.63 people and their average weekly working hours were 50.50 ± 11.00 h on average. The data on being infected by COVID-19 according to demographic and work-related characteristics of nurses were illustrated in Table 1. The rate of being infected among male nurses (78.6%) was higher than that of female nurses (65.4%), and male nurses were more likely to be infected (OR = 1943) compared with female nurses. The rate of being infected was higher among nurses assigned to COVID-19 intensive care units (74.20%), those who were not trained in PPE (76.80%) and those who had difficulties in accessing disposable gowns/overalls (71.1%) compared with their counterparts. The probability of being infected among nurses assigned to intensive care units (OR = 1.814), nurses who were not trained in PPE (OR = 0.71) and who have difficulties in accessing to disposable gowns/overalls (OR = 1.52) was higher compared with their counterparts. Although it was not expressed with OR, a significant relationship was found between the work schedule and the state of being infected ($p < 0.05$). It was found that working in hospitals for longer periods of time without resting significantly increased the probability of being infected.

The relationship between demographic and work-related characteristics of nurses and their status of contacting a COVID-19 patient

TABLE 1 COVID-19 infection status, by the demographic and job characteristics of nurses

Demographics and work-related variables[a]	The state of being infected				Total	Chi-square (*p*-value)	Odds ratio (95% CI)
	Not infected	%	Infected	%			
Gender							
Female	106	34.60%	202	65.40%	306	**3.761 (0.034)**	1.943 (0.948–3.837)
Male	12	21.40%	44	78.60%	56		
Mode of working							
8-h shift	45	44.10%	57	55.90%	102	**10.159 (0.017)**	-
12-h shift	12	29.30%	29	70.70%	41		
16-h shift	16	22.20%	56	77.80%	72		
24-h shift	45	30.60%	102	69.40%	147		
COVID-19 intensive care unit assignment status							
Yes	42	25.80%	121	74.20%	163	**6.295 (0.008)**	1.814 (1.027–3.202)
No	76	38.20%	123	61.80%	199		
The status of training on PPE							
Yes	99	35.40%	181	64.60%	280	**4.287 (0.025)**	0.710 (0.331–1.524)
No	19	23.20%	63	76.80%	83		
Difficulty in accessing disposable gown/overalls and so forth							
I have never experienced	55	38.2%	89	61.8%	144	**3.410 (0.042)**	1.520 (0.974–2.375)
I have experienced (occasionally, rarely)	63	28.9%	155	71.1%	218		
Total	118	32.60%	244	67.40%	362		

Note: Bold values denote statistical significance at the $p < 0.05$ level.
Abbreviation: PPE, personal protective equipment.
[a]All demographic and work-related variables were examined to see if they were significant in terms of being infected, but only those variables that were found to be statistically significant were presented in this table.

was presented in Table 2. Having a close contact with a COVID-19 patient was significantly affected by the type of working-unit and work schedule ($p < 0.01$). The rate of having close contact with a COVID-19 patient was significantly higher among the nurses who work in intensive care units and those who work uninterruptedly for longer hours. Also, the rate of having close contact with a COVID-19 patient was significantly higher among the nurses who did not receive training on PPE (91.5%; OR = 0.44), those who were not informed about the working conditions and new schedules (91.2%; OR = 0.422), those who work in intensive care units (90.8%; OR = 0.71), those who have difficulty in accessing N95 masks and their variants (87.4%; OR = 2.037) and those who have difficulty in accessing disposable aprons/work wear (88.1%; OR = 1.943) compared with their counterparts.

Mean satisfaction score with the management of nursing services and PPEs by demographic and work-related characteristics of nurses was compared by using *t*-test and ANOVA test, and the results were presented in Table 3. A statistically significant difference was found between the satisfaction with the management of nursing services and the management of PPE and the work schedule, being assigned to different units, the way and the time of the notification before assignment to different units ($p < 0.05$).

The findings showed that the satisfaction scores of the nurses who worked in 8-h shifts, who were not assigned to different clinics, who were notified by an official letter and 1 week or 1 month in advance before assignment were significantly higher than that of the other nurses. A statistically significant difference was also found between the state of having close contact with a COVID-19 patient

TABLE 2 The rate of having close contact with a COVID-19 patient by demographic and work-related characteristics of nurses

	Having close contact with a COVID-19 patient						
Demographic and work-related variables[a]	**Not in contact**	**%**	**Contact**	**%**	**Total**	**Chi-square (*p*-value)**	**Odds ratio (95% CI)**
The assigned unit							
Intensive care unit	12	8.5%	129	91.5%	141	**14.879 (0.002)**	-
COVID-19 inpatient service	7	13.7%	44	86.3%	51		
Other inpatient services	11	15.1%	62	84.9%	73		
Other[b]	26	26.8%	71	73.2%	97		
Mode of working							
8-h shift	28	27.5%	74	72.5%	102	**20.335 (0.000)**	-
12-h shift	9	22.0%	32	78.0%	41		
16-h shift	7	9.7%	65	90.3%	72		
24-h shift	12	8.2%	135	91.8%	147		
The status of training on PPE							
Yes	49	17.5%	231	82.5%	280	**3.897 (0.031)**	0.440 (0.191-1.013)
No	7	8.5%	75	91.5%	83		
Informed about changes in schedules and working conditions							
Yes	46	18.5%	202	81.5%	248	**5.708 (0.011)**	0.422 (0.205-0.871)
No	10	8.8%	104	91.2%	114		
Assignment to COVID-19 intensive care unit							
Yes	15	9.2%	158	90.8%	199	**8.906 (0.002)**	0.710 (0.331-1.524)
No	41	20.6%	148	79.4%	163		
Difficulty in accessing N95 and derivative masks							
I have never experienced	23	22.8%	78	77.2%	101	**5.713 (0.015)**	2.037 (1.128-3.680)
I've had (occasionally, rarely)	33	12.6%	228	87.4%	261		
Difficulty in accessing disposable gown/overalls							
I have never experienced	30	20.8%	114	79.2%	144	**5.261 (0.018)**	1.943 (1.095–3.450)
I have experienced (occasionally, rarely)	26	11.9%	192	88.1%	218		
Total	56	15.5%	306	84.5%	362		

Note: Bold values denote statistical significance at $p < 0.05$ level.

Abbreviation: PPE, personal protective equipment.

[a]All demographic and work-related variables were examined to see if they were significant in terms of being infected, but only those variables that were found to be statistically significant were presented in this table.

[b]Family health center, community mental health center, alcohol and substance treatment center.

TABLE 3 Satisfaction level with the management of nursing services and PPE by demographic and work-related characteristics of nurses

	Satisfaction with management of nursing services			Satisfaction with management of PPE	
Demographic and work-related variables[a]	*n*	Mean (SD)	*t/F* (*p*-value)	Mean (SD)	*t/F* (*p*-value)
Mode of working					
8-h shift	102	6.81 (2.59)	**11.888 (0.000) Difference: a-(b,c,d)**	7.13 (2.47)	**8.144 (0.000) Difference: a-(b,c,d)**
12-h shift	41	5.41 (2.26)		6.34 (2.57)	
16-h shift	72	5.08 (2.55)		5.50 (2.28)	
24-h shift	147	4.90 (2.71)		5.84 (2.38)	
The state of being infected					
Not infected	118	5.59 (2.89)	**3.666 (0.027) Difference: b-(a,c)**	6.42 (2.59)	2.080 (0.126)
Infected and went to work	91	4.90 (2.34)		5.75 (2.26)	
Infected and took a leave	153	5.86 (2.74)		6.28 (2.50)	
The assigned unit					
Intensive care unit	141	5.26 (2.74)	2.279 (0.079)	5.90 (2.38)	**3.135 (0.026) Difference: a-d**
Covid-19 inpatient service	51	5.20 (2.31)		6.16 (2.37)	
Other inpatient services	73	5.51 (2.76)		5.93 (2.50)	
Other[b]	97	6.12 (2.78)		6.84 (2.58)	
Assignment to different units					
I was assigned to a different unit each week	13	3.54 (2.02)	**7.679 (0.000) Difference: d-(a,b,c)**	5.15 (2.60)	**3.874 (0.000) Difference: d-(a,b,c)**
I was assigned to a different unit every month	78	4.64 (2.96)		5.59 (2.39)	
I was assigned to a different unit almost every day	9	3.33 (1.58)		4.67 (3.12)	
I was not assigned to a different unit	160	6.06 (2.57)		6.62 (2.30)	
Other	102	5.83 (2.55)		6.25 (2.62)	
Way of notification of the assignment					
Face to face	81	5.41 (2.83)	**5.511 (0.001) Difference: d-(a,b,c)**	6.09 (2.77)	**3.849 (0.010) Difference: d-(a,b,c)**
By a phone call	60	5.30 (2.54)		5.72 (2.45)	
By a WhatsApp message	52	4.23 (2.67)		5.48 (2.45)	
By a written official document	39	6.59 (2.98)		7.21 (2.38)	
Time of notification of the new assignment					
A few days before the scheduled time	104	4.76 (2.51)	**7.893 (0.000) Difference: a,d-(b,c)**	5.65 (2.32)	**6.533 (0.000) Difference: a,d-(b,c)**
1 week before the scheduled time	44	6.91 (2.71)		6.93 (2.51)	
1 month before the scheduled time	9	7.78 (2.22)		9.00 (1.50)	
The same day of the scheduled time	65	4.85 (2.84)		5.51 (2.65)	
Other	35	5.80 (2.57)		6.63 (2.64)	

Note: Bold values denote statistical significance at $p < 0.05$ level.

Abbreviation: PPE, personal protective equipment.

[a]All demographic and work-related variables were examined to see if they were significant in terms of being infected, but only those variables that were found to be statistically significant were presented in this table.

[b]Day care surgery and outpatient clinic.

and satisfaction with the management of nursing services ($F = 3.666$, $p < 0.05$). It was observed that the satisfaction level with the management of nursing services was found to be lower among the nurses who were infected and had to go to work compared with those who were not infected and those who were infected but took a leave. There was also a statistically significant difference between the assigned unit and satisfaction with the management of PPE ($F = 3.135$, $p < 0.05$). Nurses working in the intensive care unit were less satisfied with the management of PPE than nurses working in outpatient clinics.

There have been so many different measures taken by health care facilities in managing COVID-19 pandemics in protecting health care employees and patients as well as managing crisis effectively. The appropriateness of these measures is assumed to increase satisfaction level of nurses with the management of nursing services and PPE. For this reason, the satisfaction level with the management of nursing services and PPE was compared according to taken measures by health care facilities during crisis. The satisfaction levels of nurses with the implementations of hospitals/nursing services and PPE were significantly higher ($p < 0.05$) among the nurses who received training on

TABLE 4 Satisfaction level with management of nursing services and PPE according to measures taken by health care facilities during COVID-19 crisis

	Satisfaction with management of nursing services			Satisfaction with management of PPE	
Taken measures and their adequacy[a]	***n***	**Mean (SD)**	***t/F* (*p*-value)**	**Mean (SD)**	***t/F* (*p*-value)**
Status of receiving training on ways of protection					
No	83	4.31 (2.94)	**−4.428**	5.52 (2.54)	**−2.777**
Yes	279	5.90 (2.54)	**(0.000)**	6.39 (2.43)	**(0.006)**
Status of receiving training on PPE					
No	82	3.72 (2.50)	**−7.435**	5.05 (2.41)	**−4.878**
Yes	280	6.06 (2.54)	**(0.000)**	6.53 (2.40)	**(0.000)**
Adequacy of medical equipment					
Inadequate	81	4.51 (2.65)	**−3.951**	4.63 (2.31)	**−6.887**
Adequate	281	5.83 (2.67)	**(0.000)**	6.64 (2.35)	**(0.000)**
Adequacy of PPE provision					
Inadequate	93	4.51 (2.62)	**−4.360**	4.14 (2.08)	**−10.844**
Adequate	269	5.89 (2.66)	**0.000**	6.90 (2.20)	**(0.000)**
Information about changes to be made in the working environment					
No	114	3.84 (2.48)	**−8.802**	4.72 (2.25)	**−8.398**
Yes	248	6.31 (2.45)	**(0.000)**	6.87 (2.29)	**(0.000)**
Information about changes in working conditions and work organization					
No	114	3.87 (2.55)	**−8.527**	4.52 (2.08)	**−10.084**
Yes	248	6.30 (2.43)	**(0.000)**	6.96 (2.27)	**(0.000)**
Having problems in accessing gloves					
I have never experienced	204	5.89 (2.77)	**2.869**	7.00 (2.32)	**7.547**
I have experienced (occasionally, rarely)	158	5.08 (2.58)	**(0.004)**	5.15 (2.30)	**(0.000)**
Having problems in accessing medical masks					
I have never experienced	165	6.39 (2.57)	**5.720**	7.57 (2.08)	**11.227**
I have experienced (occasionally, rarely)	197	4.82 (2.63)	**(0.000)**	5.04 (2.19)	**(0.000)**
Having problems in accessing N95 and derivative masks					
I have never experienced	101	6.99 (2.52)	**6.788**	8.20 (1.83)	**12.09**
I have experienced (occasionally, rarely)	261	4.97 (2.58)	**(0.000)**	5.42 (2.26)	**(0.000)**
Having problems in accessing visors or safety glasses					
I have never experienced	169	6.36 (2.74)	**5.611**	7.50 (2.09)	**10.817**
I have experienced (occasionally, rarely)	193	4.81 (2.48)	**(0.000)**	5.05 (2.22)	**(0.000)**
Having problems in accessing disposable gown/overalls					
I have never experienced	144	6.55 (2.68)	**5.983**	7.87 (1.94)	**12.727**
I have experienced (occasionally, rarely)	218	4.86 (2.53)	**(0.000)**	5.09 (2.16)	**(0.000)**
Having problems in accessing regular aprons/overalls					
I have never experienced	168	6.32 (2.61)	**5.326**	7.60 (2.00)	**11.804**
I have experienced (occasionally, rarely)	194	4.85 (2.62)	**(0.000)**	4.98 (2.21)	**(0.000)**
The situation of making physical rearrangements due to the pandemic					
No	55	3.47 (2.47)	**−6.436**	4.62 (2.34)	**−5.387**
Yes	307	5.90 (2.59)	**(0.000)**	6.48 (2.40)	**(0.000)**
Total	**362**	**5.53 (2.71)**		**6.19 (2.48)**	

Note: Bold values denote statistical significance at $p < 0.05$ level.

Abbreviation: PPE, personal protective equipment.

[a]All reported measures were analysed, but only those having a statistically significant difference were presented.

protection methods against COVID-19 and PPE use, had adequate medical supplies and PPE, were informed about changes in their schedules and had no problems in accessing PPE compared with their counterparts (Table 4).

A weak positive relationship was found between the age of nurses and their satisfaction with the management of nursing services and the management of PPE ($r = 0.194$; $r = 0.211$, $p < 0.05$). This finding indicated that relatively more aged nurses were more satisfied with management of nursing services and PPE. In addition, there was a negative and weak, but statistically significant correlation between weekly working hours and the satisfaction with management of nursing services and PPE ($r = -0.143$; $r = -0.152$, $p < 0.05$). This situation is interpreted as an increase in the weekly working hours decreased in the level of satisfaction level (Table 5).

A multiple regression analysis was conducted to estimate the effects of all demographic and job-related characteristics of the nurses on the satisfaction level with nursing services and PPE management (Table 6). It was found that having a close contact with a COVID-19 patient, having problems in accessing a medical and N95 mask, negatively affected the satisfaction of nurses with management of nursing services and PPE. The findings showed that being a male nurse and infected by COVID-19 had positively affected satisfaction level with the management of nursing services, while all other variables had a negative effect on satisfaction level. In addition, the adequacy of PPE provision was found to be a statistically significant predictor increasing satisfaction level with PPE management while other variables were more likely to decrease.

4 | DISCUSSION

As the second year of the COVID-19 pandemic approaches, its burden on health institutions and health professionals has increased. Some of the problems have been solved and but some have become worse. In this 2-year period, millions of people and thousands of health care professionals have been infected with and lost their lives (WHO, 2021; WHO, 2022). It is clear that health systems have not met the needs of the majority of people in this pandemic, and nurses could have played more crucial role in managing COVID-19 pandemic successfully. The ICN 2021 report clearly states that it will not be possible to achieve the United Nations Sustainable Development Goals unless significant adjustments are made to health policies, practices,

TABLE 5 The correlation analysis between continuous demographic variables and job characteristics of nurses and their satisfaction with management of nursing services and management of PPE

	Satisfaction with management of nursing services		Satisfaction with management of PPE	
Continuous demographic and work-related variables[a]	Mean (SD)	*r* (*p*-value)	Mean (SD)	*r* (*p*-value)
Age	31.8 (7.5)	**0.194 (0.001)**	31.8 (7.5)	**0.211 (0.001)**
Weekly working hours	50.5 (11.0)	**−0.143 (0.001)**	50.5 (11.0)	**−0.152 (0.001)**
Satisfaction with management of PPEs	6.19 (2.48)	**0.620 (0.001)**	5.53 (2.71)	**0.620 (0.001)**

Note: Bold values denote statistical significance at the $p < 0.05$ level. Abbreviation: PPE, personal protective equipment.
[a]All variables were analysed, but only the variables with significant relationships were presented.

TABLE 6 The effect of demographic and job characteristics on the satisfaction level with nursing services management and management of PPEs

	Satisfaction with management of nursing services		Satisfaction with management of PPE	
Variables	Unstandardized coefficients (SE)	*t* (*p*-value)	Unstandardized coefficients (SE)	*t* (*p*-value)
Constant	6.68 (2.23)	**2.99 (0.003)**	6.24 (1.74)	**3.60 (0.000)**
Gender (male)	1.30 (0.50)	**2.63 (0.009)**	0.21 (0.39)	0.54 (0.592)
Having problems with accessing medical masks (yes)	−1.10 (0.54)	**−2.02 (0.046)**	−1.12 (0.55)	**−3.03 (0.003)**
Having problems with accessing N95 and derivative masks (yes)	−1.68 (0.55)	**−3.03 (0.003)**	−0.89 (0.42)	**−2.06 (0.041)**
Contact status (close contact)	−1.66 (0.54)	**−3.10 (0.002)**	−0.89 (0.42)	**−2.14 (0.034)**
Infected status (infected)	1.11 (0.45)	**2.47 (0.015)**	0.14 (0.35)	0.40 (0.692)
Adequacy in PPE provision (adequate)	−0.48 (0.59)	−0.82 (0.414)	1.42 (0.44)	**3.21 (0.002)**
Model statistics	R: 0.655; R^2: 0.429; F: 3.782 (p:0.000)		R: 0.770; R^2: 0.593; F: 7.345 (p:0.000)	

Note: Bold values denote statistical significance at the $p < 0.05$ level.
Abbreviation: PPE, personal protective equipment.

and facilities. The employment of nurses in effective and competent positions in emergency situations such as the pandemic (nurse manpower planning) will increase positive health outcomes for societies (ICN, 2021).

This study revealed that the nurses were not satisfied with the management of the nursing services and had some difficulties due to being employed in different working schedules, frequent changes in their working-units, the way of notification and timing before likely changes, training for PPE use and accessing PPE. These problems increased the dissatisfaction level with the management of the nursing services and contributed to increasing infection rates. Although the working hours of nurses, which is a dynamic process, vary according to institutions and units, in any case, especially, the intervals of shift periods have been extended and nurses have had to take more 24-h shifts during the pandemic. For instance, almost 50% of nurses in this study reported they had worked in 24-h shifts. Of the nurses, 91.8% had come into close contact with COVID-19 patients and 69.40% were infected. The similar difficulty has also been observed in other countries, and each country is able to develop its own solution to manage the crisis. Raurell-Torrede et al. have reported that 74% of nurses preferred a work schedule of 24-h shifts but with a subschedule of working for 4 h and resting 8 h (Raurell-Torredà, 2020). Gao et al. also reported that due to the shortage of nurses, they work in an 8- to 12-h shift pattern (Gao et al., 2020).

The fact that working longer than 12 h reduces the quality of life of nurses also threatens the safety of patients and employees (Griffiths et al., 2014). As a matter of fact, it is reported in the literature that nurses who work together with PPE for long periods of time experience physical and emotional burnout (Cengiz et al., 2021; Gao et al., 2020; Liu et al., 2020). In this study, similar to the literature, it is observed that as nurses' weekly working hours increase, their satisfaction rates with nursing services decrease. In this context, it may be suggested that the number of nurses should be considered when organizing the working hours of nurses, and shifts not exceeding 12 h should be organized for an optimal performance. Kluger et al. have reported that the infection rate of nurses can be reduced with working in 12-h shifts and at least 3 days apart (Kluger et al., 2020). It has also been reported that staff numbers should be reorganized in accordance with the requirements, and the workforce problem may be solved with transferring nurses from general clinics to intensive care units and working under the supervision of an experienced nurse (Poortaghi et al., 2021).

The limited number of nurses, unavailability of PPE and its proper management and inadequacies of the emergency/disaster plan have led to significant problems in the provision of health services during the pandemic process (Ardebili et al., 2020; González-Gil et al., 2021). In order to deal with the increasing number of cases, especially in intensive care units, arrangements have been made for nurse workforce planning. In this context, operation room nurses, anaesthesia nurses or inpatient service nurses were assigned to intensive care units (Chen et al., 2020; Crowe et al., 2020; Stucky et al., 2020). It has been reported that 100 (27.6%) of the nurses in this study sample were assigned to different units rather than the units they worked before the pandemic. Of these, 13 were assigned to different units every week, 78 were assigned to different units every month and 9 were assigned to different units almost every day. It was found that the nurses were mostly notified of these assignments verbally and on the day or a few days before they were going to start working in their new unit. According to Cengiz et al., the nurses who were assigned to different units almost each shift or each month, nurses who had never been trained before and who were assigned to different units where they had no experience with had difficulty adapting to this situation (Cengiz et al., 2021). Liu et al. reported that nurses from different clinics, although they were assigned on a voluntary basis, had difficulty communicating when working with different teams and with different protocols, which caused chaos and stress in the situation (Liu et al., 2020). In our study, it was found that nurses assigned to different units had a low satisfaction rate from the management of nursing services. Especially the nurses who were assigned to intensive care units and who had difficulty with accessing PPE had a lower satisfaction rate compared with nurses working in outpatient clinics. This finding is consistent with the literature. It is recommended that the action plans should be prepared in advance, the number and availability of nurse manpower should be considered, the nurses should be assigned based on their experience, adequate amount of PPE and medical supplies should be provided, and physical infrastructure should be re-organized during pandemic or disaster planning. When these arrangements and preparations are made, it is envisaged that rapid health care organization will be ensured and nurses will work without experiencing any negativity such as burnout, stress and dissatisfaction in case of possible emergencies.

Age and long working hours were associated with satisfaction with the management of nursing services in this study. The progression of age brings with it work and life experience, an increase in competence and problem-solving skills (Kwak et al., 2017). In this direction, the possibility of coping with the problems experienced in nursing services increases with the progression of age and therefore increases satisfaction. Having long working hours in pandemic conditions leads to increased exposure to viral infections, burnout, stress, fatigue and impaired psychological well-being (Sagherian et al., 2020). Therefore, it causes a decrease in satisfaction in nursing services.

Nurses who have been fighting devotedly on the front lines since the beginning of the pandemic also need to protect themselves. Despite this, it has been reported that nurses have serious problems in accessing PPE against the risk of becoming infected (Akkus et al., 2021; Cengiz et al., 2021; Fernandez et al., 2020). In our study, similar to the literature, it was found that institutions were not sufficiently able to provide PPE, and it was determined that almost more than half of the nurses had problems with accessing PPE. This makes nurses feel unprotected against COVID-19 and work with fear (Iheduru-Anderson, 2021). It is known that COVID-19 is transmitted by droplets and close contact (Cascella et al., 2021), and therefore, the use of medical masks, especially N95 and its derivative masks, is recommended for the prevention of transmission (Herron et al., 2020). In our study, it was found that there was a lack of provision of PPE, and among them, in particular, there were problems with

the supply of medical masks, especially N95 and its derivative masks, and these were among the variables that affected satisfaction with nursing services negatively.

This study showed that one of the factors affecting satisfaction with the management of nursing services was gender. Male nurses were more likely to be satisfied with the management of nursing services during the pandemic process. Guzek et al. (2020) have found that women paid more attention to hygiene and pandemic protection methods than men and women were more careful. This finding, which is different from these studies in the literature, may be due to the gender roles in Turkey. The burden of the pandemic might be more on especially women who bear the great burden of house works, caring of children and elderly. In addition to these reasons, the fact that women nurses stay away from their children and loved ones can be considered as factors that reduce satisfaction with nursing management services. In this context, it can be discussed that the problems experienced in pandemic-related nursing services are more severely felt by women, they evaluate the problems more seriously, and their satisfaction is negatively affected as a result.

The state of being infected was found to be a significant factor affecting satisfaction with nursing management services. Interestingly, it was found that nurses who were infected had higher satisfaction with the management of nursing services. Since 62.8% of infected nurses use quarantine leave, this positive response may have been caused by the feeling of being cared and protected by the administration of health care facilities. In some studies, it has been stated that nurses who have very busy and long working hours with the fear of being infected consider quarantine leave as a time they can rest (Labrague, 2021; Moreno-Mulet et al., 2021). Similar to this situation, taking a leave after being infected may have caused a high level of satisfaction with the management of nursing services among nurses.

4.1 | Study limitations

A few limitations were identified in this study. First, this study analyses self-reported problems by nurses, and this may cause response bias. Second, this study collected data from relatively small sample size, so the findings cannot be generalized to all hospitals and nurses in Turkey.

5 | CONCLUSION

The problems and risks highlighted in this study are as follows: problems in accessing PPE in adequate numbers, quality and conformity; the intense, challenging working conditions of nurses; substandard nurse/patient ratios; the high rates of coming into close contact with COVID-19 patients and being infected; and therefore, the nurses' dissatisfaction with management of nursing services. Even though the health legislation in Turkey and the international standards of the nursing profession have given nurses important duties and responsibilities during the pandemic, the neglect of nurses in the management of this process and the lack of standards for the organization of nursing workforce and nursing services, magnify these problems in the fight against the COVID-19 pandemic. This has led to problems in accessing equipment and materials needed to prevent contamination.

6 | IMPLICATIONS FOR NURSING MANAGEMENT

The problems that have arisen in the COVID-19 pandemic process have made it clear that there is a need for a 'Nursing Services Management Model in the Event of an Epidemic' in Turkey. Developing an Equipment Planning Model together with Manpower Planning of Nurses is the key in establishing success in the fight against the pandemic, and it is necessary to consider nurse workforce characteristics at all levels of nursing services as well as considering the health system and available resources in developing this management model. Nurse manpower planning, which is important for employee satisfaction, and the regular supply of PPE, should be among the priorities of nurse managers in extraordinary situations such as pandemics.

ETHICS STATEMENT

The necessary permissions from the Ministry of Health, which is required for data collection on COVID-19 and ethical approval from the Non-Interventional Clinical Research Ethics Committee of a university, were obtained. Informed consent was obtained from the nurses via a form added to the online questionnaire. The principles of the Helsinki Declaration were considered when conducting the study. Koc University Ethics Committee, ethical approval number: 2020.307.IRB.114.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest. They also declare that they agree with the content of this manuscript.

AUTHOR CONTRIBUTIONS

Sevilay Şenol Çelik: conceptualization, data curation, formal analysis, methodology, writing-review and editing, software and writing-original draft. **Azize Atlı Özbaş:** conceptualization, data curation, formal analysis, methodology, writing-review and editing and writing-original draft. **Mustafa Sabri Kovancı:** formal analysis, methodology, writing-review and editing, software and writing-original draft. **Hafize Savaş:** formal analysis, methodology and writing-review and editing. **Yusuf Çelik:** formal analysis, methodology, writing-review and editing, software and writing-original draft.

DATA AVAILABILITY STATEMENT

Authors do not wish to share the data.

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