Original Article

Midwives' Knowledge, Anxiety, and Stress Levels during the COVID-19 Pandemic in Turkey: A Descriptive Cross-Sectional Study

Ilknur Yesilcinar, PhD, RN
Associate Professor, Izmir Katip Celebi University, School of Health Sciences, Nursing Department, Izmir, Turkey
University of Massachusetts Dartmouth, College of Nursing and Health Sciences, MA, USA

Gulten Guvenc, PhD, RN
Professor, University of Health Sciences, Gulhane Faculty of Nursing, Ankara, Turkey

Nazan Karahan
Professor, University of Health Sciences, Faculty of Health Sciences, Midwifery Program, Ankara, Turkey

Correspondence: Ilknur Yesilcinar, PhD, RN University of Massachusetts Dartmouth, College of Nursing and Health Sciences, Dartmouth, MA, USA, 02747
E-mail: iyesilcinar14@gmail.com iyesilcinar@umassd.edu

Abstract
Objective: The COVID-19 pandemic has negatively affected the provision of healthcare services worldwide. This study aimed to evaluate midwives' knowledge, anxiety, and stress levels during the COVID-19 pandemic in Turkey.
Methods: This descriptive, online, cross-sectional study consisted of 369 midwives. Study data were collected using socio-demographic data collection form, COVID-19 knowledge assessment form, State-Trait Anxiety Inventory-I, and COVID-19 transmission fear and stress level assessment forms between May-August 10, 2020.
Results: Of the midwives, 45.5% stated that the unit they work in has changed due to the COVID-19 pandemic, and 67.2% stated a change in their working system. In the institution where 50.7% of midwives work, there was no protocol for the management of pregnancy, delivery, and postpartum processes in COVID-19 positive women, and in the institution where 59.3% of them work, there was no isolation room for safe delivery of pregnant women with COVID-19 carrier risk. Educational level, work shift, and family type affected midwives' knowledge levels.
Discussion and Conclusions: The knowledge level of midwives about COVID-19 was found to be high, but the work shifts of midwives affect their knowledge about COVID-19. It is recommended to prevent midwives from working for long hours and working in clinics outside of their fields to protect their health and workforce.

Keywords: Midwives, anxiety, stress, fear, COVID-19

Introduction

COVID-19 infection, which affects the whole world and has been declared a pandemic in a short time, causes serious sociological, psychological, physical, and economic problems and its vital effects on health. The inability to control the transmission of COVID-19 infection and the lack of a proven treatment cause the number of positive patients to gradually increase, especially healthcare professionals, to be negatively affected (Gorini et al., 2020; Jiang et al., 2020; Yoruk & Guler, 2021). Healthcare workers constitute the high-risk group in terms of COVID-19 transmission. In many countries, healthcare professionals from different disciplines have started to work in pandemic clinics within the scope of fighting

pandemics. On the other hand, working in COVID-19 related units and other units, healthcare professionals faced a severe increase in workload. Besides, healthcare workers experience anxiety and become prone to depression due to reasons such as the anxiety of transmission of the disease to themself or family members, isolation and burnout, distancing from the family, and intense and tiring working hours (Eckert, 2020; Jiang et al., 2020; Carmichael, Candidate, & Dillon, 2020; Jiang et al., 2020; WHO, 2020).

In Turkey, the first COVID-19 case appeared on March 10, 2020 (Republic of Turkey Ministry of Health, n.d.). Since the first peak of the pandemic in Turkey, midwives have fulfilled their routine duties and worked with other healthcare professionals to scan, diagnose, and treat COVID-19 infection. With the increase of COVID-19 positive cases, there have been changes in the working and workplace of many midwives. Therefore, midwives have been affected by the problems faced by all healthcare professionals. The literature has reported that the pandemic affects the physical and mental health of midwives who provide one-to-one care to patients (RCOG, 2020a). On the other hand, pregnancy and delivery services should also be maintained during the pandemic. With the increasing patient population, an increase in the number of positive/suspected pregnant women was also observed ("Interim U.S. Guidance for Risk Assessment and Public Health Management of Healthcare Personnel with Potential Exposure in a Healthcare Setting to Patients with Coronavirus Disease (COVID-19) | CDC," n.d.; Jiang et al., 2020).

In addition to the increased workload, midwives may be in need of knowledge about the care of COVID-19 positive or suspected pregnant women. They may experience stress and anxiety as a result. Although it has been reported in the literature that anxiety levels of midwives have increased due to reasons related to the COVID-19 pandemic (Aksoy & Kocak, 2020; Baumann et al., 2021), according to our knowledge, no study examining the correlation between anxiety and COVID-19 infection knowledge levels has been encountered. This study was conducted to evaluate midwives' knowledge, anxiety, and stress levels during the COVID-19 pandemic in Turkey.

Methods

Study design and study population: This online, descriptive cross-sectional study was conducted between May 10, 2020, and August 10, 2020. The survey was sent to the 600 midwives who were members of the Turkish Midwifery Association, who were actively working in a hospital by e-mail, and 369 of them completed the survey. After the data collection, the study sample (n=369) was used for statistical power analysis. The 369 midwives were sufficient at the 0.05 level of error with a 95% confidence interval and 0.90 power according to the post-hoc statistical power analysis.

Procedures: Midwives were invited by the researchers via e-mail to fill out the questionnaire created with the Google Survey. In the introduction part of the online questionnaire, brief information was given about the purpose, scope, and data collection forms of the study. The midwives who gave their informed consent to participate in the study filled out the online questionnaire. It took approximately 20 minutes for each midwife to complete the questionnaire. To evaluate the comprehensibility of the data collection forms, a total of 10 midwives were pre-applied by the researchers, and these midwives were not included in the sample.

Measurements: Data Collection Form: Data collection form was developed by the researchers according to the literature and aimed to reach information about the socio-demographic characteristics of midwives, their status of getting information about COVID-19 infection, and their working status during the pandemic. The form consists of 30 questions.

COVID-19 Knowledge Assessment Form: It was created by the researchers by reviewing the relevant literature and current guides (Jiang et al., 2020; Rasmussen, Smulian, Lednicky, Wen, & Jamieson, 2020; RCOG, 2020a, 2020b). The form consists of 28 statements and four parts that question the COVID-19 knowledge level. It includes five questions about general information about COVID-19 (3,4,7,10,11), 11 questions about pregnancy and COVID-19 (1,2,5,6,8,9,12-16), five questions evaluating the knowledge about COVID-19 infected or suspected

pregnant women, and seven questions about breastfeeding in COVID-19 infected or suspicious pregnant women. The midwives who participated in the study were asked to evaluate each statement as true, false, or, I do not know. One point was given for the correct answer and zero points for the answer I do not know. The minimum and maximum scores to be taken from each section are; 0-5 for general information about COVID-19, 0-11 for information about pregnancy, and COVID-19, 0-5 for COVID-19 infected or suspected pregnant women, and 0-7 for knowledge about breastfeeding in COVID-19 infected or suspected pregnant women. A minimum of 0 and a maximum of 28 points can be obtained from the entire form.

The State-Trait Anxiety Inventory-I (STAI-I): The State-Trait Anxiety Inventory-I (STAI-I) was used to measure pregnant women's anxiety levels. It is a 20-item, four-point Likert-type scale. The total score ranges between 20 and 80 points, and higher scores indicate higher anxiety levels (Spielberger et al. 1983, Oner & Le Compte, 1993). In this study, the Cronbach alpha value of the scale was found to be 0.72.

COVID-19 Transmission Fear and Stress Level Assessment Form: This form consisted of the Visual Analog Scale (VAS). We used VAS for subjective characteristics or behaviors that cannot be measured directly, such as fear ("Visual Analog Scale - an overview | Science Direct Topics," n.d.). The VAS with the descriptors 0 (no fear) on the left and 10 (maximum fear) on the right was designed and used to determine midwives' stress level, fear of COVID-19 transmission, fear of COVID-19 transmission to the child, spouse, and family members. Participants were asked to mark their current level of perceived fear and perceived stress levels along the scale.

Ethical Considerations: Before collecting this study's data, written permission and ethical approval were obtained from the research ethics committee on May 9, 2020, numbered 2020/173 and permission from Turkish Ministry of Health obtained. Online written informed consent was obtained from the midwives included in the study.

Data Analysis: The study data was evaluated using the IBM SPSS for Windows 26.0 (SPSS Inc, Chicago, IL) program. Data were presented for descriptive statistics as number (n) and percentage (%) for the categorical variables and mean±standard deviation (X±SD) for the continuous variables. One-way ANOVA was used for continuous variables with normal distribution in comparing two independent groups, independent samples t-test, and three or more groups. The relationships between scale scores were calculated with Pearson's correlation coefficient. A $p< 0.05$ value was accepted as statistically significant.

Results

The mean age of the midwives participating in the study was 32.89±7.21, and their mean working years were 10.11±8.04. Of midwives, 73.2% were undergraduate graduates, 65.3% were married, 77.5% had nuclear families, 58.0% had children, and 23.3% had chronic diseases. When examining the characteristics of midwives' working status, it was determined that 48.5% worked in the related services during pregnancy, delivery, and the postpartum period and 52.8% only worked in the daytime (Table 1).

Of the midwives, 45.5% stated that the unit they work in has changed due to the COVID-19 pandemic, and 67.2% stated that in their working system has changed. Of midwives, 58.0% received training on the COVID-19 pandemic and protective measures. In the institution where 50.7% of midwives work, there was no protocol for the management of pregnancy, delivery, and postpartum processes for COVID-19 positive women, and in the institution where 59.3% of them work, there was no isolation room for safe delivery of pregnant women with COVID-19 carrier risk. Of midwives, 23.8% stated that there were COVID-19 positive patients in the clinic where they worked at the study time (Table 2).

The mean knowledge scores of midwives about COVID-19 were found to be as follows: the mean knowledge score about infected pregnant women was 3.57 ± 1.20, the mean knowledge score about breastfeeding in infected pregnant women was 5.31 ± 1.26, the mean knowledge score about COVID-19 and pregnancy-related knowledge was 8.55 ± 1.53. The mean general COVID-19 knowledge score was 4.75 ± 0.63. The STAI-I mean scores of midwives were found to be 50.80 ± 10.61, their mean stress levels were

7.18 ± 2.52, the mean scores of feelings in the group at risk for COVID-19 transmission were 7.73 ± 2.16, and the mean scores for fear of transmitting COVID-19 to a family member were 8.63 ± 2.08 (Table 3).

No statistically significant correlation was found between STAI-I scores of midwives and the mean scores of COVID-19 general knowledge (p>0.05). A positive, weak, statistically significant correlation was found between midwives' COVID-19 general knowledge scores and infected/suspected pregnancy knowledge scores (p <0.001). As the general knowledge about COVID-19 increased, knowledge scores in pregnancy and COVID-19, infected or suspected pregnant women, and breastfeeding in infected or suspected pregnant women increased (Table 4).

A moderate and positive statistically significant correlation was found between the STAI-I mean scores and midwives' stress levels (r: 0.628, p <0.001). As the stress levels of midwives increased, their anxiety levels also increased. A statistically significant correlation was found between midwives' anxiety levels and the fear of COVID-19 transmission to their spouses, children, and families (p <0.001). The midwives' anxiety levels increased as their fear of COVID-19 transmission to their spouses, children, and families increased (Table 5).

Table 1. Characteristic of the sample

Characteristic	**$\overline{X}$±SD**
Age	32.89±7.21
Working Years (min-max:)	10.11±8.04
Education	**n(%)**
Associate degree	21 (5.7)
BSN	270 (73.2)
MSN	75 (20.3)
PhD	3 (0.8)
Marital Status	
Married	241(65.3)
Single	128 (34.3)
Family Type	
Single	32 (8.7)
Single parent family	15 (4.1)
Nuclear family	286 (77.5)
Extended family	36 (9.8)
Having child status	
Yes	214 (58.0)
No	155 (42.0)
Chronic Illness Status	
Yes	86 (23.3)
No	283 (76.7)
Work Shift	

Daytime work only - (08.00-16.00)	197 (53.3)
Night shift - (16.00-08.00)	4 (1.1)
Day and night shift (mixed)	96 (26.0)
24-hour watch	70 (19.0)
Working Unit	
Delivery room	91 (24.7)
Pregnancy, birth, and postpartum services	179 (48.5)
Newborn services	8 (2.2)
Infectious Disease Service	15 (4.1)
Adult intensive care units	4 (1.1)
Services such as internal medicine, surgery, urology	58 (15.7)
Other (supervisor, manager, etc.)	14 (3.8)

Table 2: Characteristics of midwives in their clinical practice in the Covid-19 pandemic

Characteristic	n (%)
Changes related to the unit you work in due to the Covid-19 pandemic	
Yes	168 (45.5)
No	201 (54.5)
Changes in your working system due to the Covid-19 pandemic	
Yes	248 (67.2)
No	121 (32.3)
Training status on the Covid-19 pandemic and protective measures	
Yes	214 (58.0)
No	155 (42.0)
Presence of protocols at your institution for the management of pregnancy, delivery, and postpartum processes in Covid-19 positive women	
Yes	182 (49.3)
No	187 (50.7)
Do you have a COVID-19 positive patient in your current service?	
Yes	88 (23.8)
No	281 (76.2)
Is there an isolation room in your institution for the safe delivery of pregnant women with the risk of COVID-19 carrier?	
Yes	150 (40.7)
No	219 (59.3)

Table 3. Average Scores of Stress Level, Covid-19 Transmission Fear, STAI-I and Knowledge Levels of the Midwives

	(n=369)		
	Min-max	**Mean**	**±SD**
General information about Covid-19	0-5	4.75	0.63
Knowledge about Covid-19 and pregnancy	0-11	8.55	1.53
Knowledge about Covid-19 infected or suspected pregnant women	0-5	3.57	1.20
Knowledge about breastfeeding in Covid-19 infected or suspected pregnant women	0-6	5.31	1.26
STAI-I	20-80	50.80	10.61
Stress level*	0-10	7.18	2.52
Feeling in high-risk group in terms of COVID-19 transmission*	0-10	7.73	2.16
Fear of Covid-19 transmission to their children*	0-10	7.89	3.32
Fear of Covid-19 transmission to their spouse*	0-10	7.89	3.11
Fear of Covid-19 transmission to their family*	0-10	8.63	2.08

*VAS

Table 4. Correlation of STAI and COVID-19 Knowledge Scales Scores of Participants(n=369)

Characteristics	**General information about Covid-19**		**Knowledge about Covid-19 and pregnancy**	
	r	**p**	**r**	**p**
STAI	0.041	0.430	0.140	0.077
General information about Covid-19			0.368**	**<0.001**
Knowledge about Covid-19 infected/suspected pregnant women	0.384**	**<0.001**	0.319	**<0.001**

*Pearson Correlation Test ** Correlation is significant at the 0.01 level.

Table 5: Correlation between STAI-I, Covid-19 Transmission Fear and Stress Levels of Midwives

(n=369)

Scales	Feeling in high-risk group in terms of COVID-19 transmission		Stress Level		Fear of Covid-19 transmission to their children		Fear of Covid-19 transmission to their spouse		Fear of Covid-19 transmission to their family	
	r*	p	r	p	r	p	r	p	r	p
STAI	0.283**	**<0.001**	0.628**	**<0.001**	0.286**	**<0.001**	0.294**	**<0.001**	0.402**	**<0.001**
Stress level	0.508**	**<0.001**		**<0.001**	0.402**	**<0.001**	0.442**	**<0.001**	0.594**	**<0.001**

Pearson Correlation Test ** Correlation is significant at the 0.01 level.

Table 6. Comparison of STAI-I, Knowledge about Covid-19 and pregnancy, General information about Covid-19, and stress levels according to some characteristics of midwives

Characteristics	STAI-I	Knowledge about Covid-19 and pregnancy	General information about Covid-19	Stress Level
Education				
Associate degree	52.52 (9.16)	8.04 (1.46)	4.47 (0.60)	7.81 (3.21)
BSN	50.67 (11.05)	8.43 (1.51)	4.75 (0.66)	7.09 (2.56)
MSN	50.25 (9.17)	9.12 (1.50)	4.82 (0.50)	7.23 (2.17)
PhD	64.00 (6.24)	9.00 (1.00)	5.00 (0.0)	9.33 (1.15)
F*	1.822	4.920	1.839	1.289
p	0.143	**0.002**	0.140	0.278
Family Type				
Single	49.90 (9.38)	8.03 (2.40)	4.50 (1.07)	6.56 (2.63)
Single parent family	47.00 (11.32)	8.66 (1.29)	4.93 (0.25)	5.73 (2.57)
Nuclear family	50.80 (10.969	8.55 (1.44) 9.00 (1.19)	4.79 (0.51)	7.19 (2.54)
Extended family	53.19 (8.00)		4.61 (0.96)	8.22 (1.80)
F	1.331	2.301	3.223	4.440
p	0.264	0.077	**0.023**	**0.004**
Having child status				
Yes	51.05 (10.37)	8.58 (1.42)	4.77 (5.44)	7.36 (2.52)
No	50.45 (10.95)	8.52 (1.67)	4.73 (0.73)	6.93 (2.51)

t	0.534	0.380	0.602	0.821
p	0.594	0.704	0.548	0.110
Chronic Illness Status				
Yes	53.31 (10.40)	8.53 (1.54)	4.79 (0.63)	7.97 (2.32)
No	50.04 (10.57)	8.56 (1.53)	4.74 (0.63)	6.94 (2.54)
t	2.544	-0.161	0.533	3.352
p	**0.012**	0.872	0.594	**0.001**
Work Shift				
Daytime work only - (08.00-16.00)	50.08 (10.50)	8.78 (1.31)	4.78 (0.45)	6.96 (2.57)
Night shift only - (16.00-08.00)	58.00 (11.60)	8.50 (1.73)	4.00 (1.15)	9.00 (2.00)
Day and night shift (mixed)	51.66 (10.39)	8.35 (1.71)	4.82 (0.66)	7.41 (2.41)
24-hour watch	51.12 (11.03)	8.20 (1.77)	4.62 (0.90)	7.33 (2.50)
F	1.581	2.509	2.657	1.786
p	0.179	**0.042**	**0.033**	0.240
Working Unit				
Delivery room	51. 41 (10.37)	8.25 (1.54)	4.76 (0.66)	7.31 (2.41)
Pregnancy, birth and postpartum services	50.98 (10.44)	8.65 (1.35)	4.76 (0.49)	7.03 (2.68)
Newborn services				
Infectious Disease Service	48.87 (15.49)	8.00 (2.61)	4.12 (1.80)	7.00 (2.97)
Adult intensive care units				
Services such as internal medicine, surgery, urology	55.53 (10.07)	8.00 (2.50)	4.46 (1.30)	8.60 (1.88)
Other (supervisor, manager, etc.)	41.75 (4.64)	10.00 (0.81)	5.00 (0.00)	7.00 (2.58)
	50.03 (11.03)	8.32 (1.62)	4.82 (0.42)	7.19 (2.36)
	45.45 (14.84)	9.50 (0.70)	5.00 (0.00)	7.50 (0.70)
F	1.207	1.542	2.117	0.943
p	0.302	0.164	0.51	0.465

*p values of F test was given when three and more groups are compared, and p values of t-test was given when two groups were compared.

A statistically significant correlation was found between midwives' education levels and their knowledge scores about COVID-19 infection in pregnancy (F= 4.920, p= 0.002). In the analysis performed with the Tukey test, the knowledge level of midwives with a master's degree was statistically significantly higher than that of midwives with an undergraduate study.

The knowledge levels (F=3.223, p=0.023) and stress levels of midwives with nuclear families were found to be higher than those living alone (F=4.440, p=0.004). No statistically significant difference was found between the knowledge levels about COVID-19 of midwives with chronic diseases, but the mean STAI-I scores (t= 2.544, p= 0.012) and stress levels (t= 3.352, p= 0.001) were found to be statistically significantly higher.

There was no statistically significant correlation between working styles of midwives and STAI-I and stress levels; however, the general knowledge of COVID-19 (F= 2.657, p= 0.033) and the level of knowledge of pregnant women and COVID-19 (F= 2.509, p= 0.042) were found to be higher than midwives who were on duty for 24 hours only. No statistically significant correlation was found between the unit in which midwives work and their level of knowledge about COVID-19, stress, and STAI-I scores.

There was no correlation between STAI-I and the unit changes where midwives work and the way they work. Although there was no statistically significant difference between the midwives' anxiety scores, the midwives' anxiety levels who worked in the infection clinic and whose working shift and the working unit were changed were found to be higher (Table 6).

Discussion

The rapidly spreading COVID-19 virus has negatively affected the provision of healthcare services and healthcare professionals all over the world. Especially in the early days of the pandemic, hospitals had problems meeting the increasing patient burden and adapting to the new process (Bar-Zeev, Breen-Kamkong, ten Hoope-Bender, Sahbani, & Abdullah, 2020). According to the results of our study, more than half of the midwives received training on the COVID-19 pandemic and protective measures; however, in the institution where half of the midwives work, there were no protocols for the management of pregnancy, delivery, and postpartum processes in women who are positive for COVID-19. Besides, in the institution where more than half of the midwives' work, there is no isolation room for the safe delivery of COVID-19 suspected/infected pregnant women. In line with these data, it can be said that obstetric clinics and hospitals that provide antenatal service were caught unprepared for the pandemic, and midwives had difficulty adapting to pandemic conditions. In the literature, it has been stated that the working conditions of midwives have changed due to pandemic conditions, and they experienced uncertainty and chaos in the early stages of the pandemic (Baumann et al., 2021; González-Timoneda, Hernández Hernández, Pardo Moya, & Alfaro Blazquez, 2020). Following weeks, on the other hand, they have stated that delivery rooms were organized following the pandemic and that uncertainties disappeared (González-Timoneda et al., 2020). Differences between countries are thought to affect adaptation to the pandemic.

In this study, the mean stress levels of midwives were found to be very high. Although the midwives in our sample were concerned about being infected with COVID-19, they were also worried about infecting their families. Besides, our study determined that the unit in which a significant portion (45.5%) of midwives' work has changed. These results suggest that the increased workload of midwives, being exposed to changing clinical processes, and worrying about risking their relatives' health increase the difficulties they experience. In addition to these, giving birth by using personal isolation measures during the pandemic process, not being able to provide adequate support during delivery, which is the most necessary process of tactile communication, negatively affects the care provided by midwives and increases the stress levels of midwives (González-Timoneda et al., 2020; Sheehy, Smith, Gray, & AO, 2021). Findings supporting our results have been reported in various studies (González-Timoneda et al., 2020; Holton et al., 2020).

According to our study, as the stress levels of midwives increase, their anxiety levels also increase. Besides, it was found in our research that as the concerns of midwives about COVID-19 transmission to their spouses, children and families increased, their anxiety levels increased. Our findings suggest that as stress and anxiety levels increase, anxiety is an expected result. In a study in which the psychological well-being due to the COVID-19 pandemic of healthcare personnel in Australia was evaluated, it has been found that midwives' anxiety and stress levels were moderate but higher than doctors' (Holton et al., 2020). In the studies conducted similarly, having school-aged children living at home, self-rated general health status and concerns were associated with anxiety and stress levels (Aksoy & Kocak, 2020; Gorini et al., 2020; Holton et al., 2020). In our country, being a woman of the midwives and the female-specific duties, such as taking the child's responsibility and the family's daily care, increase their anxiety regarding COVID-19 infection. In this case, we can say that midwives have a higher risk of experiencing mental health problems during the pandemic process. Anxiety and stress levels of midwives with chronic diseases were higher in our study. Since midwives with chronic illnesses are in the high-risk group, they experienced higher anxiety levels. Studies conducted with midwives and midwifery students in the literature have revealed similar results to our study (Aksoy & Kocak, 2020; Sogut, Dolu, & Cangol, 2021).

In our study, the general knowledge level of midwives about COVID-19, their level of knowledge about COVID-19 infected/suspected pregnant women, the level of knowledge about breastfeeding in infected pregnant women, and their knowledge about COVID-19 and pregnancy were found to be high. In a study evaluating the general level of knowledge of healthcare professionals about COVID-19, it has been found that the general knowledge level of the majority of healthcare personnel about COVID-19 was sufficient (Alrubaiee, Al-Qalah, & Al-Aawar, 2020). The high level of knowledge of midwives is an essential factor in increasing the quality of care they provide and preventing the spread of the virus; however, the results obtained from this study indicate that some characteristics of midwives affect their knowledge and anxiety levels about COVID-19. According to this, midwives' knowledge with a master's degree of education was higher than the midwives with an undergraduate study. Increasing the education level of midwives is very important in improving the quality of care given to patients (Rezaei, Falahati, & Beheshtizadeh, 2020). Similarly, in a study, it has been found that the level of education affected the level of knowledge of healthcare professionals about COVID-19 (Alrubaiee et al., 2020). Our study found that midwives who have nuclear families have higher knowledge and stress levels about COVID-19 than midwives who live alone. This is thought to be due to their fear of infecting their families with the COVID-19 infection. There are results in the literature that support this interpretation (Aksoy & Kocak, 2020; González-Timoneda et al., 2020; Holton et al., 2020).

In this study, it was found that work shifts of midwives affect their knowledge level about COVID-19. Midwives who work only in the daytime have higher general information about COVID-19 and their knowledge of COVID-19 infection during pregnancy than midwives who work 24 hours a day. It is thought that the reason for this may be the difficulties of accessing information and the physical fatigue of midwives who work for 24 hours. A low level of knowledge of midwives who do not sleep for 24 hours and work intensively in difficult pandemic conditions may also cause medical errors. In various studies, extended working hours and increased workload have been stated as healthcare workers' problems due to the pandemic (LoGiudice, 2024; Aksoy & Kocak, 2020; Gorini et al., 2020). This situation endangers the health of both midwives and the patients they care for and makes midwives more vulnerable to infection.

In our study, there is a correlation between midwives' level of knowledge about COVID-19 (breastfeeding, general knowledge, pregnancy); however, no correlation was found between their level of knowledge and their anxiety. In a study evaluating the knowledge and anxiety levels of healthcare professionals about COVID-19, it has been found that their anxiety increased as the level of knowledge increased (Alrubaiee et al., 2020). A high level of knowledge about

COVID-19 infection may increase anxiety by causing increased sensitivity. As a matter of fact, in this study, the knowledge and anxiety levels of midwives with children or living in nuclear families were found to be higher.

The change in the unit where midwives work, the way they work, and direct contact with people with a COVID-19 diagnosis did not affect anxiety levels at a statistically significant level; however, the anxiety levels of midwives who work in an infection clinic and whose work style and unit of work were changed were found to be higher. Studies have found that direct contact with people with a COVID-19 diagnosis was associated with increased anxiety levels (LoGiudice, 2024: Gorini et al., 2020; Holton et al., 2020). In a qualitative study examining midwives' experiences who care for pregnant women with COVID-19 during the delivery process, midwives have stated that they experienced anxiety and fear (González-Timoneda et al., 2020). In another study, midwives' anxiety levels who changed their work shift due to COVID-19 were higher (Gorini et al., 2020). A recent study revealed that mentoring support found effective on maintaining healthcare professionals' motivation (Komasawa et al., 2025). Therefore, for possible unexpected circumstances such as pandemics or disasters, mentor and supervisor support found effective on maintaining staffs' motivation and mental health.

Limitations: This study has some limitations. The study data were collected through a web-based online survey and based on midwifes' self-reports, resulting in a self-report bias.

Conclusions: Due to the COVID-19 pandemic, there have also been changes in the clinical practice of midwives. Midwives have had to work in clinics outside their offices due to the pandemic, and they experience high levels of anxiety and stress. In this process, midwives were concerned not only for their health but also because they risk their families' health. In our study, the knowledge levels of midwives about COVID-19 and pregnancy were high; however, working conditions affect the knowledge level of midwives. For this reason, it is recommended to prevent midwives from working for long hours and working in clinics outside of their fields to protect their health and be more useful in clinical applications during the pandemic process. In clinics, the absence of protocols related to pandemics puts both midwives and patients at risk. For this reason, there is a need to improve the working conditions of midwives by arranging their clinical conditions in accordance with pandemic conditions. Further studies are needed to evaluate changes and adaptation to the pandemic.

Acknowledgments: The authors would like to thank all midwives who participated in this study.

References

Aksoy, Y. E., & Kocak, V. (2020). Psychological effects of nurses and midwives due to COVID-19 outbreak: The case of Turkey. *Archives of Psychiatric Nursing*, *34*(5), 427–433. https://doi.org/10.1016/j.apnu.2020.07.011

Alrubaiee, G. G., Al-Qalah, T. A. H., & Al-Aawar, M. S. (2020). Knowledge, attitudes, anxiety, and preventive behaviors towards COVID-19 among health care providers in Yemen: an online cross-sectional survey, 1–11. https://doi.org/10.21203/rs.3.rs-32387/v1

Bar-Zeev, S., Breen-Kamkong, C., ten Hoope-Bender, P., Sahbani, S., & Abdullah, M. (2020). UNFPA supporting midwives at the heart of the COVID-19 response. *Women and Birth*, *34*(1), 4–6. https://doi.org/10.1016/j.wombi.2020.08.005

Baumann, S., Gaucher, L., Bourgueil, Y., Saint-Lary, O., Gautier, S., & Rousseau, A. (2021). Adaptation of independent midwives to the COVID-19 pandemic: A national descriptive survey. *Midwifery*, *94*(December 2020), 102918. https://doi.org/10.1016/j.midw.2020.102918

Carmichael, C. A., Candidate, M. S. M., & Dillon, E. (2020). Midwives ' Association of Washington State Interim Guidelines for Community-Based Midwives During the COVID-19 Pandemic, 1–15.

Eckert, M. (2020). COVID-19 – nurses and midwives impact on global security. *Australian Journal of Advanced Nursing*, *37*(2), 1–2.

González-Timoneda, A., Hernández Hernández, V., Pardo Moya, S., & Alfaro Blazquez, R. (2020). Experiences and attitudes of midwives during the birth of a pregnant woman with COVID-19 infection: A qualitative study. *Women and Birth*, 34(5):465-472. https://doi.org/10.1016/j.wombi.2020.12.001

Gorini, A., Fiabane, E., Sommaruga, M., Barbieri, S., Sottotetti, F., La Rovere, M. T., … Gabanelli, P. (2020). Mental health and risk

perception among Italian healthcare workers during the second month of the COVID-19 pandemic. *Archives of Psychiatric Nursing*, *34*(6), 537–544. https://doi.org/10.1016/j.apnu.2020.10.007

Holton, S., Wynter, K., Trueman, M., Bruce, S., Sweeney, S., Crowe, S., … Rasmussen, B. (2020). Psychological well-being of Australian hospital clinical staff during the COVID-19 pandemic. *Australian Health Review*. https://doi.org/10.1071/AH20203

Interim U.S. Guidance for Risk Assessment and Public Health Management of Healthcare Personnel with Potential Exposure in a Healthcare Setting to Patients with Coronavirus Disease (COVID-19) | CDC. (n.d.). Retrieved April 5, 2020, from https://www.cdc.gov/coronavirus/2019-ncov/hcp/guidance-risk-assesment-hcp.html

Jiang, R., Hospital, B. D., Liu, Z., Liu, Z., Han, B., Jiang, R., … Chen, H. (2020). The Lancet Mental health status of doctors and nurses during COVID-19 epidemic in China Title page Mental health status of doctors and nurses during COVID-19 epidemic in China. *The Lancet*.

Komasawa, M., Aung, M.N., Nsereko, C. *et al.* Determinants maintaining healthcare personnel's motivation during COVID-19 pandemic in Uganda. *Sci Rep* **15**, 3373 (2025). https://doi.org/10.1038/s41598-025-86685-6

Li, W., Yang, Y., Liu, Z.-H., Zhao, Y.-J., Zhang, Q., Zhang, L., … Xiang, Y.-T. (2020). Progression of Mental Health Services during the COVID-19 Outbreak in China. *International Journal of Biological Sciences*, *16*(10), 1732–1738. https://doi.org/10.7150/ijbs.45120

LoGiudice, J. A. (2024). Meta-synthesis of the experiences of midwives providing care during the COVID-19 pandemic. *Midwifery*, 104142.

Oner, N. and Le Compte, A. (1983) State-Trait Anxiety Inventory Handbook. Boğaziçi University Publications, Istanbul, 1-26. (In Turkish)

Rasmussen, S. A., Smulian, J. C., Lednicky, J. A., Wen, T. S., & Jamieson, D. J. (2020). Coronavirus Disease 2019 (COVID-19) and Pregnancy: What obstetricians need to know. *American Journal of Obstetrics and Gynecology*, *2019*. https://doi.org/10.1016/j.ajog.2020.02.017

RCOG. (2020a). Coronavirus (COVID-19) Infection in Pregnancy, *Version 5:*(March), 1–45.

RCOG. (2020b). Guidance for provision of midwife-led settings and home birth in the evolving coronavirus (COVID-19) pandemic, (April), 1–12.

Republic of Turkish Ministry of Health, 2020. (n.d.). https://www.saglik.gov.tr/?_Dil=2. Access Date: April 2021.

Rezaei, B., Falahati, J., & Beheshtizadeh, R. (2020). Stress, stressors and related factors in clinical learning of midwifery students in Iran: A cross sectional study. *BMC Medical Education*, *20*(1), 1–10. https://doi.org/10.1186/s12909-020-1970-7

Sheehy, A., Smith, R., Gray, J., & AO, C. H. (2021). Understanding workforce experiences in the early career period of Australian midwives: insights into factors which strengthen job satisfaction. *Midwifery*, *93*(October 2020), 102880. https://doi.org/10.1016/j.midw.2020.102880

Spielberger et al. 1983 in Skapinakis, P. (2014). Spielberger State-Trait Anxiety Inventory. In: Michalos, A.C. (eds) Encyclopedia of Quality of Life and Well-Being Research. Springer, Dordrecht. https://doi.org/10.1007/978-94-007-0753-5_2825

Sogut, S., Dolu, I., & Cangol, E. (2021). The relationship between COVID-19 knowledge levels and anxiety states of midwifery students during the outbreak: A cross-sectional web-based survey. *Perspectives in Psychiatric Care*, *57*(1), 246–252. https://doi.org/10.1111/ppc.12555

Visual Analog Scale - an overview | ScienceDirect Topics. (n.d.). Retrieved March 7, 2021, from https://www.sciencedirect.com/topics/medicine-and-dentistry/visual-analog-scale

WHO. (2020). (World Health Organization): Coronavirus disease (COVID-2019) situation reports. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports/. Retrieved on April 4, 2020, *2019*(March), 1–19. Retrieved from https://pers.droneemprit.id/COVID19/

Yoruk, S., & Guler, D. (2021). The relationship between psychological resilience, burnout, stress, and socio-demographic factors with depression in nurses and midwives during the COVID-19 pandemic: A cross-sectional study in Turkey. *Perspectives in Psychiatric Care*, *57*(1), 390–398. https://doi.org/10.1111/ppc.12659