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Research Article

THE EFFECT OF PERSONAL PROTECTIVE EQUIPMENT USE ON NURSES' PERCEIVED INDIVIDUALIZED CARE IN THE COVID-19 PANDEMIC

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Abstract: *This research was conducted between January and March 2021 as a descriptive, cross-sectional and correlational study to determine the effect of personal protective equipment use on nurses' perceptions of individualized care during the COVID-19 pandemic. The population of the study consisted of 130 nurses working in the COVID-19 clinics of a university hospital in a province in the east of Turkey, and the sample consisted of 127 nurses who agreed to participate in the study. Data were collected using the personal information form and the Individualized Care Scale-Nurse version A. While there was a statistically significant relationship between nurses' gender, education level, and the mean total score of the Individualized Care Perception Scale-Nurse A version ($p<0.05$), no significant relationship was found between them and other variables ($p<0.05$). Despite the increasing workload, it was determined that the long-term use of personal protective equipment during the COVID-19 pandemic did not affect the perception of individualized care and the caregiver role of professional nurses.*

Keywords*: COVID-19; individualized care perception; nurse; personal protective equipment.*

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1. Introduction

"COVID-19", defined as a disease that reasons severe pneumonia in Wuhan, China, is seen as a unique and major public health problem globally. In addition, it has a heavier meaning for nurses due to heavy working conditions and infection [1]. The World Health Organization (WHO) called the virus a pathogenic 2019-nCoV virus and declared it a pandemic in March 2020 due to its pandemic effects across the World [2-5]. The rapid transmission and spread of COVID-19 have created a high risk for all health professionals, especially nurses, who care for and treat these patients and are in contact with the patient, in terms of COVID-19 transmission and illness. Due to its rapid transmission and spread, nurses should take maximum droplet/contact isolation measures to have a high level of protection when they encounter patients with suspected or confirmed COVID-19 positif [1,2]. Healthcare workers have started to use personal protective equipment (PPE) including disposable 3M or N95 respirators, goggles, full face shields, liquid-resistant aprons, double-layer gloves, and protective shoes, and increased their frequency of hand hygiene during the pandemic [2,6,7]. Studies have reported that PPEs used for protection from infectious diseases cause adverse effects in healthcare workers, including headaches, deterioration of personal health and performance, mood worsening, symptoms associated with pressure in the ear and nose, and stress [8-10]. In addition to the risk of infection, healthcare professionals suffer from physical and mental fatigue, difficult triage decisions, and loss of patients and colleagues during the COVID-19 pandemic [11-13]. Nursing is a profession to provide holistic and humanistic care for

physiological and psychosocial needs and existing or potential problems of patients or healthy individuals [14,15]. It has been reported that nurses take the burden of patient care and responsibility quickly and successfully, even in emergency situations, despite difficult and critical conditions [16]. Every person has a different experience, value, culture, and background, making them different from other individuals. These features should be taken into account in the delivery of nursing care. Here, individualized care, which is considered a key point of nursing practices, comes to the fore. By reflecting the nursing belief in human worthiness, uniqueness, and singularity, this care increases nursing care quality, contributing to patient satisfaction [17,18]. For this reason, it is necessary to ensure and maintain individuality in nursing care. Studies show that the perception of individualized care is high in nurses despite the difficulties brought by modern health service delivery [19-21]. During the pandemic process, the workload of nurses increases and affects individualized care, which is an important element of patient care and satisfaction [12,22-24]. Nurses live with anxiety due to intense workloads and infection risks. Although it is difficult for them to put on and take off PPE, whose use/wearing for a long time causes a lot of additional burdens, nurses have to use PPEs in order to protect themselves, their loved ones, and other healthcare workers. These additional burdens cause burnout in nurses and negatively affect individualized care. In this regard, this study was conducted to determine the effect of personal protective equipment use on nurses' perceived individualized care during the COVID-19 pandemic.

Research Questions:

1. Does the use of personal protective equipment for a long time to be protected during the COVID -19 pandemic process affect the nurses' perception of individualized care?

2. Materials and Methods

2.1. Study Type

This study was conducted to determine the effect of personal protective equipment use on nurses' perceived individualized care in the COVID-19 pandemic. This study is descriptive and cross-sectional.

2.2. Study Place and Time

The study was conducted between January and March 2021 at the COVID-19 clinics of a university hospital in an eastern province of Turkey.

2.3. Study Population and Sample

The population of the study consisted of 130 nurses working in the COVID-19 clinics of a university hospital in an eastern province of Turkey. No sampling method was used in the study in order to reach all nurses in the COVID-19 clinics. However, the study was completed with 127 nurses, as two were on leave and one did not want to participate in the study. The personal protective equipment nurses used were medical or N95/FFP2 masks, eyes or face shields, gowns/overalls, caps, gloves, and disposable foot protectors/shoe covers.

Study Inclusion Criteria*;* (1) being a nurse aged 18 years and over; (2) agreeing to participate in the study; (3) working in Covid-19 clinics; (4) using PPE.

Study Exclusion Criteria; (1) being on leave during the time of the study; (2) not agreeing to participate in the study; (3) having a psychiatric diagnosis; (4) working in a clinic other than COVID-19 clinics; (5) not using PPE at all or using only one PPE.

2.4. Data Collection Tools

The data were collected using a personal information form and the Individualized Care Scale (ICS-A).

2.4.1 Personal Information Form

The form consisted of a total of 6 questions about the nurses' characteristics such as age, gender, education level, marital status, and professional experience [21, 25, 26].

2.4.2 Individualized Care Scale- Nurse A (ICS-A)

The Individualized Care Scale-Nurse A Version was developed by Suhonen et al. (2011) and its Turkish validity and reliability study was performed by Acaroğlu et al. (2011). The scale, which is a 5-point Likert type, scores from 1 to 5. It consists of a total of 17 items and 3 subscales, including clinical status, personal life status, and decision-making control over care. A high score on the scale indicates that nurses have a higher level of support for the individuality of their patients during the care they provide. The highest and lowest total scale scores are 85 and 17, respectively [17,27]. According to the Turkish validity and reliability study conducted by Acaroğlu et al., the Cronbach alpha internal consistency coefficient of the scale was found to be 0.92 [17]. In this study, the Cronbach Alpha internal consistency coefficient was found to be 0.93.

2.5. Data Evaluation

The data were analyzed using the SPSS 21.0 package program. The demographic data were presented using the number, standard deviation, percentage, mean, minimum, and maximum values. The Kruskal-Wallis test, the independent t-test, and Pearson's correlation analysis were used for the analysis of the data.

3. Results

Of the nurses included in the study, 35.4% were aged between 18-25 years, 42.5% were male, 44.1% were married, 56.7% had a bachelor's degree, and 52% had a professional experience of 5 years or less. The nurses' ICS-A total mean score was 3.86 ± 0.75, and their subscale mean scores were 4.09 ± 0.78 for Clinical Situation, 3.53 ± 0.92 for Personal Life Situation, and 3.86 ± 0.75 for Decisional Control Over Care. The nurses' mean duration of PPE use (min/day) was 344.02 ± 154.19 (min) (Table 1).

Table 1. Distribution of nurses according to their descriptive characteristics (n=127)

Descriptive Characteristics	Number	%
Age		
Between 18-25 years	45	35.4
Between 26-30 years	43	33.9
≥ 31 years	39	30.7
Gender		
Female	73	57.5
Male	54	42.5
Marital status		
Married	56	44.1
Single	71	55.9
Education level		
High school degree	32	25.2
Associate degree	23	18.1
Bachelor's degree	72	56.7

Table 1. Continued.

Descriptive Characteristics	Number	%
Professional experience		
≤ 5 years	66	52.0
6-10 years	44	34.6
≥ 11 years	17	13.4
	Min-Max. Score	**Mean±SD**
ICS-A and Subscales		
Clinical Situation (1-7)	1.00-5.00	4.09±0.78
Personal Life Situation (8-11)	1.00-5.00	3.53±0.92
Decisional Control Over Care (12-17)	1.00-5.00	3.98±0.88
ICS-A Total (17)	1.00-5.00	3.86±0.75
Duration of PPE Use (min/day)	120-520	344.02±154.19

No statistically significant difference was found between the nurses' ICS-A total and subscales mean scores with respect to age, marital status, and professional experience (p> 0.05). However, a statistically significant relationship was found between their gender, education level and ICS-A total mean scores (p <0.05) (Table 2).

Table 2. Comparison of nurses' ICS-A subscales mean scores according to descriptive characteristics

Descriptive Characteristics	ICS-A Subscale Mean Scores (X±SD)			
	Clinical Situation	Personal Life Situation	Decisional Control Over Care	ICS-A total
Age				
Between 18-25 years	4.12±0.86	3.42±0.96	.81±0.97	3.78±0.82
Between 26-30 years	4.00±0.75	3.62±0.84	4.15±0.70	3.92±0.61
≥ 31 years	4.11±0.72	3.57±0.97	3.97±0.94	3.88±0.80
Test and significance	KW=1.159 p=0.560	KW=1.125 p=0.570	KW=2.776 p=0.250	KW=0.525 p=0.769
Gender				
Female	4.27±0.62	3.68±0.90	4.13±0.65	4.03±0.59
Male	3.82±0.89	3.34±0.93	3.77±1.09	3.64±0.88
Test and significance	t=3.146 p=0.001	t=2.066 p=0.041	t=2.348 p=0.020	t=2.942 p=0.004
Marital status				
Married	4.13±0.79	3.54±0.97	3.99±0.93	3.88±0.78
Single	4.02±0.77	3.53±0.87	3.96±0.82	3.84±0.71
Test and significance	t=-0.796 p=0.428	t=-0.024 p=0.981	t=-0.136 p=0.892	t=-0.339 p=0.735
Education level				
High school degree	3.74±0.91	3.18±0.99	3.63±1.03	3.52±0.89
Associate degree	4.28±0.64	3.50±0.91	3.99±0.76	3.92±0.57
Bachelor's degree	4.16±0.72	3.70±0.87	4.13±0.82	4.00±0.69
Test and significance	KW=7.133 p=0.028	KW=6.037 p=0.049	KW=7.138 p=0.028	KW=7.499 p=0.024
Professional experience				
≤ 5 years	4.09±0.78	3.56±0.90	3.91±0.89	3.85±0.74
6-10 years	4.06±0.77	3,53±0.86	4.06±0.80	3.88±0.68
≥ 11 years	4.10±0.82	3.46±1.20	4.04±1.09	3.87±0.95
Test and significance	KW=0.102 p=0.950	KW=0.093 p=0.954	KW=1.683 p=0.431	KW=0.085 p=0.959

In addition, no statistically significant relationship was found between the nurses' ICS-A total and subscales mean scores and duration of PPE use ($p > 0.05$). Therefore, the duration of PPE use did not affect nurses' perceived individualized care (Table 3).

Tablo 3. The relationship between nurses' ICS-A and subscales mean scores and duration of PPE use

ICS-A and Subscales	Duration of PPE Use(min)	
	Test (r)	p
Clinical Situation	0.034	0.734
Personal Life Situation	0.023	0.794
Decisional Control Over Care	0.128	0.152
ICS-A total	0.072	0.423

4. Discussion

This study was conducted to determine the effect of personal protective equipment use on nurses' perceived individualized care in the COVID-19 pandemic.

In our study, the nurses' ICS-A total item mean score was 3.86 ± 0.75. Their subscale mean scores were 4.09 ± 0.78 for clinical status, 3.53 ± 0.92 for personal life status, and 3.98 ± 0.75 for decision-making control over care. Considering that the highest item-total mean score on ICS-A is 5.0, the nurses had a good level of perceived individualized care. Can and Acaroğlu found the nurses' ICS-A total item mean score as 3.88 ± 0.66, and determined their subscale item mean scores as 4.09 ± 0.62 for clinical status and 3.36 ± 1.03 for personal life status, and 3.98 ± 0.74 for decision making control over care [25]. Studies have reported similar ICS-A total and subscale mean scores of nurses to those in the present study [26-29]. Although there is no significant relationship between the long-term use of PPE, which we associate with the pandemic process and heavy workload, and nurses' perception of individualized care, it is seen that the sub-dimension of nurses' ICS-A score average is clinical status.

In this study, no statistically significant relationship was found between the nurses' age and ICS-A mean score. Similar studies have indicated that age does not affect individualized care perception [20, 28-31]. It is an expected result that the age of nurses is not affected by professional values. With the perception of individualized care, which is a result of the therapeutic relationship between the nurse and the patient, it is seen as a professional value that the life of the individual is valued and that individual care is given accordingly [31]. The present study found no statistically significant relationship between the nurses' marital status and ICS-A mean scores. Similar to the result of our study, some studies have reported that marital status does not affect individualized care perception [20,28]. However, Avcı and Yılmaz found that marital status affected individualized care perception [31]. The perception of individualized care is a perception that includes therapeutic communication and makes the patient to be seen as valuable and unique. For this reason, it is expected result that their marital status does not affect this perception.

In the present study, there was no statistically significant relationship between the nurse's professional working year and individualized care perceptions. Suhonen et al. also support this result of our study [29]. However, different from the results of our study, some studies found that years of nurses' professional work affected individualized care perception [20,30,31]. The fact that the majority of the nurses participating in this study had less than five years of professional experience may have contributed to this result.

This study determined a statistically significant relationship between the nurses' education level and ICS-A total mean scores. In parallel with the results of our study, studies have found that education level affects nurses' perceived individualized care [29,31,32]. However, different from the results of our study, some studies have reported that the education levels of nurses did not affect their

individualized care perceptions [28,31]. In Turkey, nursing education has been given only at the undergraduate level in recent years. However, high school and associate degree nursing graduates who are still actively working continue to work. This result shows that individualized care is provided when the nursing profession is performed by undergraduate nurses equipped with professional values, even in times of crisis in the world.

This study determined a statistically significant relationship between the nurses' gender and ICS-A total mean scores. Although there are studies showing that gender does not affect nurses' perceived individualized care [20,29,30]. There are also studies showing that gender affects nurses' individualized care perceptions [28]. It is seen that the mean score of female nurses is higher than the mean score of male nurses. It is thought that the responsibility of care as a social role imposed on women in Turkey is effective in this result.

No statistically significant relationship was found between the nurses' ICS-A total and subscales mean scores and duration of PPE use. Although there are several studies on PPE use by healthcare professionals, there are no studies addressing the effect of PPE use on individualized care perception [7-10]. In this respect, our study is the first study in this field.

Studies have reported that excessive workload and lack of a suitable environment affect nurses' individualized care [32,33]. We found that PPE use did not affect nurses' perceived individualized care, this may be because a large part of our sample consisted of undergraduate nurses and undergraduate nursing education made an important contribution to the nursing profession. In fact, Can and Acaroğlu (2015) reported a highly significant positive correlation between the nurses' total and factor mean scores on the Professional Values Scale and their item mean scores on the Individualized Care Scale and subscales [25]. Suhonen et al. argue that individualized care perceptions are a new concept that has received global attention and has been adopted in the literature [27]. This professional perception may also be the reason why wearing PPE for a long time does not affect the nurses' individualized care perceptions.

5. Conclusion

This study found that age, marital status, and professional experience did not affect nurses' perceived individualized care, but gender and education level affected their individualized care perceptions. In addition, no significant relationship was found between the nurses' ICS-A total and subscales mean scores and duration of PPE use.

Despite the increasing workload, it shows that the long-term use of PPE during the COVID-19 pandemic does not affect the perception of individualized care and the caregiver role of professional nurses. It is recommended to conduct studies on whether the long-term use of PPE by nurses affects their professional nursing roles.

Limitations

This study includes only the nurses working in COVID-19 clinics, therefore its results cannot be generalized to all nurses. As another limitation, this study covers nurses who have used PPE for different durations. The study has also some strengths. It assessed nurses' perceived individual care and duration of PPE use by using data collection tools with proven validity and reliability.

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Ethical Dimension of the Research: For conducting the study, ethical approval was obtained from the Clinical Research Ethics Committee of a university on January 05, 2021 (Number: 1/13), written institutional permission from the university hospital, Where the study was conducted, and written and

verbal consents from nurses who agreed to participate in the study. The research was carried out in accordance with the principles of the Helsinki Declaration.

Compliance with Research and Publication Ethics: This study was carried out by the rules of research and publication ethics.

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Authors' Contributions: Each Author's Contribution To The Paper: Leyla ZENGİN AYDIN (LZA), Aysel DOĞAN (AD), Leyla YILMAZ (LY)

Study design: LZA, AD, LY
Data collection: LY, AD
Data analysis: LZA
Study supervision: LZA, AD
Manuscript writing: LZA, AD, LY
Critical revisions for important intellectual content: LZA, AD

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Research Article

OSTEOPOROSIS KNOWLEDGE, OSTEOPOROSIS PREVENTING BEHAVIORS AND EATING HABITS AMONG HIGHLY EDUCATED YOUNG PREMENOPAUSAL TURKISH WOMEN

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Abstract: *The purpose of this study was to determine osteoporosis knowledge, osteoporosis-preventing behaviors, and eating habits among highly educated young premenopausal women under the age of bone mineralization termination. This cross-sectional study was conducted on 189 academic and administrative staff of Erciyes University, aged 18-35 years. The knowledge level of osteoporosis was evaluated with the Turkish version of the Osteoporosis Knowledge Test (OKT). Osteoporosis-preventing behaviors and eating habits of participants were assessed. Despite the high educational level of women, they had poor levels of knowledge about osteoporosis. The mean total score for knowledge achieved by all women, out of a possible score of 24, was 14.08±3.69 or 58.6%. The mean nutrition subscale score was 9.63±3.07 and the exercise subscale score was 9.19±2.85. The total osteoporosis knowledge score and nutrition subscale scores were higher among women who have adequate consumption (≥3 servings/day) of dairy products ($p<0.001$) and have less frequent coffee consumption ($p<0.05$). No association was found between the osteoporosis knowledge score and other osteoporosis preventive behaviors. This study showed that the osteoporosis knowledge score and nutrition subscale score was higher among women who have adequate consumption of dairy products. It is a promising result in transferring knowledge to practice. However, for the dissemination of osteoporosis preventive behaviors, awareness is required to be adopted protective measures such as nutrition and exercise as a lifestyle in the prevention of osteoporosis, which is a preventable and manageable major public health problem.*

Keywords: *Osteoporosis, Osteoporosis knowledge, Calcium, Nutrition*

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1. Introduction

Osteoporosis is a progressive systemic skeletal disease, which affects more than 200 million people worldwide, resulting in reduced bone mass and increased fracture risk and is also called the epidemic of the 21st century [1]. It is often referred to as a 'silent disease because there are no apparent early symptoms. It is not possible to feel that bones getting weaker. Mostly it is not even known by a person, that having osteoporosis until after breaking a bone. Osteoporosis is serious, even deadly. It was reported that 24% of hip fracture patients aged 50 and over die in the year following the fracture and one-quarter end up in nursing homes and half never regain the previous function [2].

This serious global health problem osteoporosis is preventable and manageable. About 85-90% of adult bone mass is acquired by the age of 18-20 years. Building strong bones during childhood and

adolescence can help prevent osteoporosis later in life [2]. The Health Belief Model has been widely used to predict the adoption of preventive behaviors associated with osteoporosis risk factors [3]. Adopting preventive behaviors such as adequate calcium and vitamin D intake and regular exercise is critical in delaying the onset and progression of this disease [3]. Bone mineralization is significantly affected by calcium and phosphorus metabolism which is controlled by vitamin D, parathormone, and calcitonin. Calcium and vitamin D form part of the bone mineral matrix as calcium phosphate and are required for bone strength. The best way to achieve adequate calcium intake is by adhering to a healthy diet. Major dietary factors which increase the risk of osteoporosis include a deficiency of calcium and vitamin D. Other contributing factors include smoking, excessive consumption of coffee, and long periods of immobilization. A daily intake of at least 1000 mg/day of calcium and 400-800 IU/day of vitamin D is recommended for the prevention of the deterioration of musculoskeletal health [4,5]. Due to the termination of bone mineralization at the beginning of the thirties, the inability to achieve peak bone mass under the age of the thirties increases osteoporosis risk in later life. Studies should also focus on young adults since the key factor in preventing osteoporosis is optimizing the peak bone mass during the early years. Moreover, this is particularly important in young adult individuals who are capable of making behavioral choices affecting modifiable lifestyle changes [6,7]. The lack of osteoporosis knowledge may be one of the reasons for insufficient calcium intake. However, knowledge does not guarantee the practical implementation of positive behavioral changes. Transferring knowledge into positive behavior changes is necessary. Education level is also an effective factor in nutritional knowledge level. There are studies comparing osteoporosis knowledge depending on the education level but fewer studies on women with highly educated. The study was conducted with highly educated women, to evaluate if high education level leads to a high osteoporosis knowledge level and leads to positive behavioral changes in nutrition. Therefore, this study aimed to determine osteoporosis knowledge, osteoporosis-preventing behaviors, and eating habits among highly educated young premenopausal women under the age of bone mineralization termination.

2. Materials and Methods

2.1. Design of the Study

This cross-sectional study was conducted on 189 academic and administrative staff working at Erciyes University (Kayseri/Turkey) between December 2017-March 2018 to evaluate the knowledge levels of osteoporosis in young adult women with a high level of education. The sample size was calculated (G*Power Version 3.1.9.4 Universität Düsseldorf, Germany) power of 80% with 0.05 significance, using of scale mean of a previous study [8] and generating a sample of 178 individuals. Considering the drop-out rate, 189 participants were reached. The study was completed with 189 participants. This study was conducted according to the guidelines laid down in the Declaration of Helsinki. Ethical approval was taken from the Clinical Research Ethics Committee of Erciyes University, Faculty of Medicine (Protocol number 2017/401; Date: 21/7/2017)). Written informed consent was obtained from all participants included in the study.

The data were collected by face-to-face interview method. The questionnaire was filled out by the participants and the researchers were controlled that all of the questions were filled. The exclusion criteria included: participants were (i) < 18 years old and > 35 years old, (ii) suffered from lactose intolerance or milk allergy which may alter dairy products consumption and daily calcium intake, (iii) had any medication on calcium metabolism.

2.2. Osteoporosis Knowledge

The knowledge level of osteoporosis was evaluated with the Turkish version of the Osteoporosis Knowledge Test (OKT) [9]. The OKT was developed to determine the knowledge of osteoporosis by Kim et al. [10], and the Turkish adaptation, validity, and reliability of the OKT were performed by Kılıç and Erci (2004) [9]. Kim et al. (1991) found the reliability of a Kuder-Richardson reliability co-efficiency (KR-20) of the OKT between 0.69 and 0.72 [10]. Kılıç and Erci (2004) found the (KR-20) as 0.79 [9]. The Turkish version of the OKT aims to assess osteoporosis knowledge in relation to various issues such as calcium intake, exercise, and activity levels to prevent osteoporosis. The OKT has 24 items and the answers of all 24 items were coded as 0=incorrect and 1=correct, with a possible range of scores from 0 to 24. The knowledge score was computed by adding all correct answers. Higher scores indicate more knowledge of osteoporosis. The knowledge scores were converted to a percentage, derived from the total knowledge score of 24. By the reason of the absence of a cut-off point for the tool, the knowledge of osteoporosis was considered good knowledge if the percentage was 60% or more, and poor knowledge if it was less than 60%. The OKT has 2 subscales; the OKT Nutrition (Calcium) subscale has 26 items (items 1 to 9 and 17 to 24) and the OKT Exercise subscale has 16 items (items 1 to 16). The Cronbach's Alpha co-efficiency was found 0.609 for OKT total score.

2.3. Osteoporosis Preventing Behaviors and Eating Habits

A questionnaire was used to assess the osteoporosis preventing behaviors and eating habits of participants. Osteoporosis preventive behaviors included physical exercise, daily exposure to sunlight (for ≥10 min) without sunscreen, vitamin D supplementation, and dietary consumption of calcium from dairy products (milk, cheese, yogurt), caffeine-containing drinks, and soft drinks prevention. The eating habits for dairy products caffeine-containing drinks, and soft drinks were evaluated by food frequency and consumption records questionary.

The adequate consumption of dairy products was defined based on the Dietary Guidelines of Turkey recommendations [11]. It's recommended that three servings of milk and dairy products daily for adults. A medium-sized cup of milk of 240 mL or yogurt of 200-240 mL or cheese in the size of two matchboxes (40-60 g) constitutes a serving. Three servings and above were interpreted as having adequate intake and less than three servings as inadequate intake. Anthropometric measurements, weight, and height scores were recorded based on the self-reports of participants. Body mass index (BMI; kg/m^2) was calculated was obtained by dividing the body weight by the square of the height in meters researchers and recorded.

Statistical Analysis

All statistical analyses were performed using the IBM SPSS Statistics 22.0 package program. Continuous variables were expressed as the mean and standard deviation. The regularity of distribution of all parameters was evaluated using the Shapiro–Wilk test. Statistical differences between groups were assessed using the Chi-Square test for categorical variables, while the Student's t-test was used for continuous variables. Comparisons between groups were performed using the one-way repeated analysis of variance (ANOVA) test. A statistically significant difference was assumed with the level of $p<0.05$ for each test.

3. Results

Participants' baseline characteristics were presented in Table 1. The mean age of participants was 29.22±4.09, 56.7% of them have a postgraduate education level, and the mean BMI was 23.08±3.48.

Table 1. Participants' baseline characteristics (n=189)

Variable		n	(%)
Age (year)			
Mean ± SD	29.22±4.09		
Marital status			
Single		98	51.9
Married		90	47.6
Educational level			
Bachelor degree		82	43.3
Postgraduate		107	56.7
BMI (kg/m²)			
Mean ± SD	23.08±3.48		
Underweight	(<18.5)	3	1.6
Normal	(18.5-24.9)	139	73.5
Overweight	(25.0-29.9)	31	16.4
Obese	(≥30.0)	11	5.8

The mean osteoporosis knowledge score was 14.08±3.69. Among the subscales, the mean exercise knowledge score was 9.19±2.85, and the mean nutrition knowledge score was 9.63±3.07. The correct answer rate of OKT questions on nutrition was found 62.6%, and on other questions associated with osteoporosis was found 55.8% (Table 2).

Table 2. Osteoporosis knowledge subscale scores (n=189)

Variable	Mean ± SD
Osteoporosis knowledge score	
Total score	14.08±3.69
Exercise subscale score	9.19 ±2.85
Nutrition (calcium) subscale score	9.63 ±3.07
Correct answer (%)	
Exercise subscale	55.8 %
Nutrition (calcium) subscale	62.6%

Among osteoporosis preventive behaviors, 24.3% of the participants reported having vitamin D supplementation, 88.9 % not smoking, 23.8% do exercise, and 10.1% daily exposure to sunlight (Table 3). There was no association between the osteoporosis knowledge score and exercise, smoking, vitamin D supplement, and sun exposure. When a comparative assessment of participants with good versus poor knowledge was performed, 42.3% (n=80) of participants were found to have good knowledge (score ≥ 60%). Nevertheless, the osteoporosis preventive behaviors were similar among participants who have a good or poor knowledge level (p>0.05) (Table 3).

Table 3. Osteoporosis preventive behaviors and osteoporosis knowledge level (n=189)

Variable	n (%)	Osteoporosis knowledge scores (Mean±SD)	*p*	Osteoporosis knowledge scores		*p*
				Good knowledge (score ≥ 60%) (n = 80)	Poor knowledge (score < 60%) (n = 109)	
Smoking						
Yes	21 (11.1)	13.81 ± 3.61	0.718	8	13	0.677
No	168 (88.9)	14.12 ± 3.71		72	96	
Exercise						
≥3 day/week	14 (7.4)	13.64 ± 3.48		5	9	
1-2 times/week	31 (16.4)	14.58 ± 3.24	0.470	12	19	0.765
None	144 (76.1)	14.02 ± 3.81		63	81	

Table 3. Continued.

Variable	n (%)	Osteoporosis knowledge scores (Mean±SD)	*p*	Osteoporosis knowledge scores		*p*
				Good knowledge (score ≥ 60%) (n = 80)	Poor knowledge (score < 60%) (n = 109)	
Vitamin D suplement						
Yes	46 (24.3)	14.24 ± 3.50	0.745	18	28	0.614
No	143 (75.7)	14.04 ± 3.76		62	81	
Sunlight exposure						
Daily	19 (10.1)	14.90 ± 3.28		8	11	
1-3 times /week	60 (31.7)	14.16 ± 3.63	0.750	27	34	0.931
None	110 (58.2)	13.89 ± 3.79		45	64	
Duration of sunlight exposure						
≥10 min	79 (41.8)	14.24 ± 3.58	0.624	34	45	0.867
< 10 min	110 (58.2)	13.97 ± 3.78		46	64	

In food consumption records only 14.3% (n=27) of participants have adequate consumption (≥3 servings/day) of dairy products/day and 4.2% (n=8) of participants have no consumption of dairy products. The total osteoporosis knowledge score and nutrition subscale scores were higher among women who have adequate consumption (≥3 servings/day) of dairy products ($p<0.001$) and who have less frequent (4-5 times/week) coffee consumption ($p<0.05$) (Table 4).

Table 4. Dairy products, coffee, tea, and soft drinks consumption and osteoporosis knowledge score **(n=189)**

Food item	Consumption	n	%	Osteoporosis knowledge score (n=189)			
				Total		Nutrition subscale	
				Mean ± SD	*p*	Mean ± SD	*p*
Dairy products	≥ 3 servings /day	27	14.3	14.88 ± 4.15[a]	<0.001*	10.33±3.46[a]	0.026*
	< 3 servings /day	154	81.4	14.13 ± 3.48[b]		9.64 ±2.97[b]	
	None	8	4.2	10.37 ± 4.24[bc]		7.00±2.67[bc]	
Milk	≥ 1 serving/day	40	21.1	14.70 ± 3.87[a]	0.017*	10.35±3.26[a]	0.024*
	≤4-5 servings/week	102	53.9	14.06 ± 3.66[a]		9.52±3.02[a]	
	None	47	24.8	13.59 ± 3.60[b]		7.25±3.00[b]	
Yogurt	≥ 1 serving/day	64	33.8	14.20 ± 3.67[a]	<0.001*	9.78 3.24[a]	0.031*
	≤4-5 servings/week	113	59.7	14.18 ± 3.56[a]		9.64 2.95[a]	
	None	12	6.34	12.50 ± 4.83[b]		7.75 3.38[b]	
Cheese	≥ 1 serving/day	102	53.9	14.23 ± 3.51[a]	0.005*	9.86 3.18[a]	0.033*
	≤4-5 servings/week	74	39.1	14.01 ± 3.82[a]		9.56 2.98[a]	
	None	13	6.87	12.23 ± 3.78[b]		8.23 2.55[b]	
Coffee consumption	≥3 servings/day	26	13.7	13.03 ± 3.50[a]	0.041*	8.92 ±3.07[a]	0.038*
	1 serving/day	80	42.3	13.73 ±3.90[a]		9.52 ±3.13[a]	
	4-5 servings/week	24	12.7	15.79 ±3.88[b]		11.2 ±3.12[b]	
	≤1-2 servings/week	59	31.2	14.32 ±3.19[a]		9.44 ±2.83[a]	
Tea consumption	≥3 servings/day	49	25.9	13.46 ± 3.51	0.280	9.40 ±3.06	0.903
	1 serving/day	106	56.1	14.43 ± 3.40		9.78 ±2.88	
	4-5 servings/week	15	7.9	14.20 ±v4.61		9.44 ±3.79	
	≤1-2 servings/week	19	10.0	13.63 ± 4.82		9.52 ±3.68	
Soft drink consumption	≥3 servings/day	3	1.6	13.66 ± 3.78	0.788	9.66 ±1.52	0.981
	1 serving/day	5	2.6	15.00 ± 5.04		10.02±3.70	
	4-5 servings/week	10	5.3	14.40 ±1.77		9.70 ±2.21	
	≤1-2 servings/week	171	90.4	14.88 ±3.75		9.63 ±3.07	

[abc] *Statistically significant difference between groups*

**p<0.05*

4. Discussion

This study showed that despite the high educational level of women, they had poor levels (<60%) of knowledge about osteoporosis. The total osteoporosis knowledge score (14.08±3.69 or 58.6%) was lower than expected in this group of highly educated women.

Measuring knowledge about osteoporosis is inherently difficult, and this may be probably the main reason why observed results from previous studies differ. Studies evaluating the level of osteoporosis knowledge in the literature are in a wide range in terms of methods and cohort characteristics. We mainly discussed the studies that have been conducted on highly educated women. Studies utilizing the OKT or similar instruments have also reported poor to moderate levels of knowledge, with mean total scores between 42% and 74% [12-14]. Peng et al. (2020) studied with orthopedic nurses and found overall knowledge of osteoporosis was moderate-to-low (11.4±2.5, out of 17 or 58%) similar to the present study results [12]. Malak and Toama (2015), studied female teachers and found the mean OKT scores 18.17±5.55 or 46.6% [13]. Hurst et al. (2007), found the mean OKT total score 63% (16.4, out of 26) in highly-educated women aged 20–49 years [14]. Sava et al. (2020), stated that the cohort received a moderately-high average OKT total score (17.36±2.3, out of 32), with a lower exercise knowledge score, and a higher calcium knowledge score in highly-educated women [3]. Ishtaya et al. (2018), found the mean OKT total score was 13.5±4.2 nutrition knowledge score was 11±3.6, and the exercise knowledge score was 8.8±2.8, indicating poor osteoporosis knowledge [15]. In the literature, studies conducted on women have reported poor to moderate osteoporosis knowledge, although most of them reported moderate knowledge levels [12-15]. In the study by Ishtaya el. (2018) the potential reasons for poor knowledge among participants were most probably the study population of diabetic women and the poor educational level and poor awareness of dietary approaches.

Studies conducted in Turkey give different results on osteoporosis knowledge levels. Similar to the present study results, Ungan and Tümer (2001), found the knowledge score on osteoporosis was 63.1% in Turkish women [8]. In the other two studies in Turkey, the osteoporosis knowledge scores were found to be low. In a study by Gemalmaz and Oge (2008), the mean osteoporosis knowledge score was found 5.52, out of 20, in the whole study population, and for rural women with a higher level of education was 9.26 [16]. Aslan and Kilic (2017), found the mean osteoporosis knowledge score was 9.86±4.36, out of 24, in women [17]. In a study by Gezer and Ocak (2019), the total OKT scores of the women with bachelor's degrees (13.3±4.56) were higher than those of unschooled literate women (8.9±4.76) ($p<0.05$). Additionally, the OKT total, OKT-exercise, and OKT-nutrition scores of the women in the high school group were found 10.4, 5.3, and 4.8 times higher than those of the unschooled literate women, respectively [18]. The difference is probably due to the different characteristics of the study populations.

In the present study, when a comparative assessment of women with good versus poor knowledge about osteoporosis was performed, 42.3% of the women were found to have good knowledge (score ≥ 60%). But the osteoporosis preventive behaviors were similar among women who have a good or poor knowledge level ($p>0.05$) (Table 3). In a study by Vadivelan et al. (2020), results showed that 62% of women have a good knowledge level about osteoporosis [19]. Similarly, Mortada et al. (2020), demonstrated that 59% of the participants showed an inadequate knowledge level about osteoporosis [20]. Hallit et al. (2020), (demonstrated that 40% of the women had adequate/good knowledge (score ≥13; above the median) [6].

The knowledge level of osteoporosis is important in the prevention of osteoporosis, but this may not be sufficient. The knowledge needs to be transferred to the practice. Exercise, daily exposure to sunlight, vitamin D supplementation, dairy product consumption, caffeine-containing drinks, soft drinks prevention, and avoiding smoking are qualified as osteoporosis preventive behaviors [15].

Mortada et al. (2020), had examined osteoporosis preventive behaviors among women of reproductive age and showed that only 38.0% of the participants reported that they were exposed to sunlight daily and 27.9% reported vitamin D supplementation [20]. When the overall osteoporosis preventive behavior of the participants was dichotomized into adequate and inadequate levels, the majority of participants (70.7%) had shown inadequate osteoporosis preventive behavior. Koç et al. (2016), studied osteoporosis knowledge among young premenauposal women and showed that of the participants 15.1% reported having vitamin D supplementation, 83.5% not smoking, 12% exercise regularly, 89% exposure to sunlight daily [21]. Women with a high knowledge score (score ≥ 40%; above the median) had higher rates of regular exercise, exposure to sunlight, no smoking, and adequate amounts of dairy product consumption than women with low knowledge scores. In the current study, 24.3% of the women reported having vitamin D supplementation, 88.9 % not smoking, 23.8% do exercise, and 10.1% exposure to sunlight daily. But no association was found between osteoporosis knowledge level and osteoporosis preventive behaviors. Studies investigating osteoporosis knowledge and osteoporosis preventive behaviors reported different results on the effect of osteoporosis knowledge on behaviors. It was reported that positive effects of osteoporosis knowledge on behaviors in some studies [22,23], although there were no significant differences between intervention and control groups in other studies [24,25]. Osteoporosis knowledge and its associated risk factors may play a role in revealing behavioral change, but factors underlying behavior affect osteoporosis knowledge. These results support that knowledge does not guarantee the practical implementation of behavioral changes.

In eating habits, although most of the women (95.7%) consume dairy products, the rate of adequate consumption (≥3 servings/day) of dairy products (14.3%) was not high as expected. Most of the studies evaluating osteoporosis knowledge focus on the knowledge level and health beliefs about osteoporosis, the knowledge of the importance of calcium intake, and the importance of exercise [12-20]. But there are few studies evaluating the association between knowledge level and dietary habits, dairy products, and calcium-rich food consumption [26-27]. High knowledge of osteoporosis is important but it is not enough to achieve effective prevention of osteoporosis. Awareness and transferring knowledge to practice are required to be adopted protective measures such as nutrition and exercise as a lifestyle in the prevention of osteoporosis. Food consumption and knowledge level about osteoporosis were also examined in this study. The results of the present study showed that the osteoporosis knowledge score and nutrition subscale score was higher among women who have adequate consumption of dairy products ($p<0.001$). The knowledge scores were also higher in women who consume coffee 4-5 times/week than those who consumed it more often ($p<0.05$). Ramli et al. (2018), investigated the knowledge, attitude, and practice regarding osteoporosis among 106 health sciences students [26]. They indicated that the osteoporosis knowledge levels of female participants were at moderate levels. When the practice of participants regarding osteoporosis was examined, they found that the score of practice was at a poor level. Among the participants, only 12.3% drank milk, 38.7% took vitamin D supplements and 6.6% practiced a well-balanced diet according to the food pyramid. Only 12.3% of the participants reported that they spent 15 min/day in the sunlight and only 8.5% of them exercised at least 20 min/day. Similarly, Jalili et al. (2007), showed the practice score was lower than that of knowledge and attitude [27]. The average score for knowledge, attitude, and practice were 9.3 out of 21, 2.6 out of 5, and 1.5 out of 6, respectively. Adequate osteo-protective exercise and sufficient calcium intake were found only in 3.8% and 5.5% of participants, respectively. This was again supported by previous findings that knowledge does not always ensure preventive behaviors.

5. Limitations

This study has also several limitations. First, it aimed to examine the effect of knowledge of osteoporosis on protective behaviors and food consumption in premenopausal women (<35 years old before the termination of bone mineralization) with high education levels. The sampling method used in the present study limits the comparisons and also a generalization of the results to the population. Similar studies compared the knowledge level according to education level, age group, and gender; but since the study sample has similar features these characteristics couldn't be compared. Second, food frequency and consumption amounts were recorded but, to determine the correlation between the knowledge level and dairy products and calcium intake complete food consumption records should be recorded. A causal inference couldn't be made between the outcome and independent variables in the present study.

6. Conclusion

This study showed that the osteoporosis knowledge score and nutrition subscale score was higher among women who have adequate consumption of dairy products. But no association was found between osteoporosis knowledge level and other osteoporosis preventive behaviors including exercise, sunlight exposure, and vitamin D supplementation. It is a promising result in transferring knowledge to a practice that women who consume adequate dairy products have high osteoporosis knowledge scores. However, for the dissemination of osteoporosis preventive behaviors, awareness is required to be adopted protective measures such as nutrition and exercise as a lifestyle in the prevention of osteoporosis, which is a major public health problem. Comprehensive effective programs on the importance of nutrition, calcium and vitamin D intake, and exercise in the prevention of osteoporosis can be implemented for the general public.

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Ethical approval

Ethical approval was taken from the Clinical Research Ethics Committee of Erciyes University, Faculty of Medicine (Protocol number 2017/401; Date: 21/7/2017).

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Conflict of interests

The authors declare that they have no conflicts of interest.

Author contributions

NK designed and conducted the study and EK contributed to the study conception and design. NK provided essential constructs and databases necessary for this study. NK wrote the first draft of the manuscript and all authors read and approved the final manuscript. NK had primary responsibility for the final content.

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Research Article

THE EFFECT OF DEPRESSION LEVELS ON THE QUALITY OF LIFE OF INTENSIVE CARE STAFF DURING THE COVID-19 PROCESS

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Abstract: *This study was conducted to examine the effect of depressive symptoms on the quality of life of healthcare staff working in intensive care units during the COVID-19 process. This study was designed as descriptive, cross-sectional, and correlational. It was carried out with the participation of 133 healthcare professionals between November and December 2020. The data were collected through face-to-face interviews with the participants in an average of 10-15 minutes. Personal Information Form, Beck's Depression Inventory (BDI), and Professional Quality of Life Scale (ProQOL R-IV) were used for data collection. Kurtosis, Skewness, and Shapiro-Wilk, Student's t, ANOVA tests were used for data analysis. Pearson correlation and regression analysis were performed. Depressive symptoms and low quality of life were detected in healthcare workers working during the Covid-19 pandemic. It was seen that women's ProQOL R-IV total scores were higher than men's and BDI total score averages of associate degree health workers were significantly higher than those of health workers with undergraduate or graduate degrees. It was determined that 39.1% of the participants were considering resigning during the pandemic process. It has been determined that those who do their job reluctantly have higher BDI total scores than those who do it fondly. In addition, it was determined that those who do their job fondly have higher ProQOL R-IV total scores than those who do it reluctantly. It was observed that the total BDI scores of the participants whose family members were diagnosed with COVID-19 were higher than those who did not and those who thought about resigning during the pandemic process were higher than those who did not. As a result, it is thought that extremely important to identify mental disorders that may occur in healthcare workers due to the difficulties brought on by the pandemic process at an early stage and to stop their progression.*

Keywords: *Covid-19, Intensive care, Healthcare Professional, Depression level, Quality of life.*

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1. Introduction

Coronavirus disease 2019 (COVID-19) is an infection thought to arise as a virus that has been mutated or otherwise adapted to act as a pathogen in humans [1]. It is transmitted from person to person in an incubation period of 2-14 days through close contact with respiratory droplets and causes pneumonia [1,2]. Measures to control infection are the most important practices. Healthcare workers in contact with infected patients are at high risk [2,3]. This situation significantly affects the health and life of healthcare workers [4]. It has been reported that the risk is higher in hospitals than in homes and communal living areas [5]. In a study on COVID-19 in China, it was stated that healthcare professionals have concerns about transmission of the disease from their colleagues, transmitting the disease to family members, and not being able to find protective equipment [6].

Quality of life is an indicator of individuals' physical functions, mental states, familial and social relationships, and the extent to which these interactions affect them [7]. Quality of life, which is also defined as the integrated state of individual satisfaction and social relations, is largely dependent on the quality of work life [8]. Objective indicators of an individual's quality of life are shown as income level, education level, occupation, health, home, etc. Satisfaction with the existing possibilities of the individual is also reported as a subjective indicator of the quality of life [9]. Increasing job satisfaction will make individuals feel like a part of the workplace and bring positive developments in work performance and work efficiency [10].

COVID-19 poses serious psychological stress to people around the world, especially healthcare workers [11]. Both the disease itself and accompanying many social, psychological and economic problems like additional working hours, changes in working conditions, the high number of patients, the high number of patients lost per day due to the lack of a specific treatment in the initial period of the disease, concerns about finding protective equipment, obligation to give medical priority to some patients due to insufficient medical devices, witnessing the death of their own colleagues and/or loved ones, feeling inadequate to provide adequate medical care, fear of not being able to access tests when they have symptoms of the disease, concerns about the transmission of the disease to themselves and their families (in a study conducted in China, 63% of healthcare workers were reported to be infected with COVID-19), uncertainty about meeting and supporting their families' needs if they get sick, access to childcare during increased work hours and school closures, increase in demand for social needs have affected all areas of life and quality of life [12,13,14]. Anxiety and depressive symptoms have been observed especially in clinicians and nurses who are in close contact with infected patients and work in physically and emotionally difficult conditions, and it has been reported that they often experience fatigue, burnout, mental exhaustion, emotional depression, and sleep disorders [15]. An increase in the level of depression and a decrease in the quality of life has been reported due to COVID-19 [16,17]. It has been stated that healthcare workers may experience psychological distress, post-traumatic stress, burnout, and hopelessness, and suicide cases increase among intensive care nurses. It is also stated that these conditions negatively affect the professional performance of health workers and decrease the quality of care [12].

This study, it is aimed to examine the effect of depressive symptoms on the quality of life in intensive care staff (doctor, nurse, health officer, assistant staff, etc.) who interact with patients one-on-one during the COVID-19 process.

2. Materials and Methods

2.1. 2.1 Design of the Study

A descriptive, cross-sectional and correlational research design was used in this study.

2.2. 2.2 Sample of the Study

The research was carried out with all healthcare professionals working in the Third Stage Internal and Surgical Intensive Care Units of Batman Regional State Hospital in November-December 2020. Sample calculation was not made in the study, the personnel working actively in the intensive care units were included in the study. At the time of the study, the number of active workers in intensive care units was reported as (N=134), and 133 health personnel participated in the study. Only one staff member refused to participate in the study. It is thought that the reason for the high participation in the study is that the data collection was done by the researcher working in the intensive care unit. The data were collected by the researcher through face-to-face interviews with the participants in an average of 10-15 minutes.

2.3. Inclusion Criteria

Individuals who have been working in intensive care units for at least 1 month, who are intensive care staff, and who agreed to participate in the research were included in the study. Non-volunteer healthcare staff was excluded from the study.

2.4. Data Collection Instruments

In data collection, the Personal Information Form including participants' sociodemographic characteristics, Beck's Depression Inventory (BDI), and Professional Quality of Life Scale (ProQOL R-IV) were used.

2.4.1 Personal Information Form

It is a form prepared by researchers in line with the literature [2,4,5,6]. In the form, personal information was asked such as gender, age, education status, occupation, income status, place of residence before and after COVID-19 and people with whom they live, smoking/alcohol use, hobbies, physical-mental diseases, working status with COVID-19, daily-weekly-monthly working hours, working fondly, duration of occupation, marital status, and having child.

2.4.2 Beck's Depression Inventory (BDI)

Beck's Depression Inventory is a 21-item self-assessment scale designed to measure the level of findings observed in depression-related emotion, cognition, and motivation dimensions. Each item is a Likert-type scale that provides a fourfold measure of a depression-related behavioral pattern consisting of phrases rated from least to great. The lowest scale score is 0, the highest scale score is 63. The statements are associated with symptoms of depression. The Turkish validity and reliability study of the scale was carried out by Hisli (1988), and the cut-off point was accepted as 17 [18]. In this study, Cronbach's alpha coefficient of the scale was found to be 0.87.

2.4.3 Professional Quality of Life Scale (ProQOL R-IV)

It is a self-assessment tool consisting of thirty items and three subscales. Occupational satisfaction is the first of the subscales that expresses the feeling of satisfaction and satisfaction that the employee helps someone in need of help in a situation related to his profession or job. Items 3, 6, 12, 16, 18, 20, 22, 24, 27, and 30 in the scale measure occupational satisfaction, the high score obtained from this subscale indicates the level of satisfaction, and the Cronbach's Alpha reliability coefficient of the scale is 0.87. The burnout subscale is the second subscale that measures the feeling of burnout that occurs when there is difficulty in being hopeless and coping with the problems in the profession, and a high score indicates a high level of burnout. Items 1, 4, 8, 10, 15, 17, 19, 21, 26, 29 in the scale measure burnout and the Alpha reliability value of the scale is 0.72. Compassion fatigue is the third sub-scale created to measure the symptoms that occur when faced with stressful situations. Support and help are recommended for those who score high on this subscale. Items 2, 5, 7, 9, 11, 13, 14, 23, 25, and 28 in the scale were developed to measure this situation, and the Alpha reliability value was determined as 0.80. While evaluating the scale scores, items 1, 4, 15, 17, and 29 should be calculated by reversing them. Item evaluations in the scale are made on a six-step chart that ranges from "never" (0) to "very often" (5) [7]. In this study, Cronbach's alpha coefficient of the scale was found to be 0.81.

2.5. Analysis of the Data

In the analysis of the study data, SPSS 25.0 software was used. Mean, standard deviation, maximum and minimum number values and percentages were used for the analysis of descriptive data. The total score average of the scales was taken and whether they showed a normal distribution for each group was examined. It was determined that the scale scores showed normal distribution by using

Kurtosis, Skewness, and Shapiro-Wilk tests for normality. Student's t-test and ANOVA test were used to analyze sociodemographic variables. Pearson correlation and regression analysis were performed to examine the relationship between the scales. In the internal consistency analysis of the scales, Cronbach's alpha coefficient was calculated, and $p<0.05$ was found to be significant in all the findings.

2.6. Ethical Considerations

This study was conducted in accordance with the obligations of the Declaration of Helsinki. Written approval was obtained from the Republic of Turkey Ministry of Health General Directorate of Health Services (11.06.2020 /2020-06-05T22_29_23), and from the Non-Interventional Ethics Committee of a University (16.07.2020/255). Verbal and written consent was obtained from the participants who met the criteria for inclusion in the study and agreed to participate in the study.

3. Results

The sociodemographic characteristics of the participants are shown in Table 1. It was determined that the mean age of the health workers participating in this study was 30.38±5.61, 56.4% were male, 75.9% had undergraduate or graduate degrees, and 62.4% were married. When the occupational characteristics of the health workers were examined, it was determined that 69.2% of them were nurses and 38.3% of them worked in the profession between 6-10 years, 66.9% of them worked in the pandemic service and 70.7% of them worked on shift. It was found that 54.1% of the employees did not change the people they lived with during the pandemic period, 50.4% had children and 50.4% had incomes equal to their expenses.

When the sociodemographic characteristics of the participants were compared with the scale total score averages, a significant difference was found in terms of gender compared to the ProQOL R-IV total score average. It was determined that women's ProQOL R-IV total scores were higher than men's. In addition, it was determined that the total scores of ProQOL R-IV varied between the groups according to the working style of the employees. It was determined that the total scores of ProQOL R-IV were found to be significantly higher among those who worked overtime than those who expressed a mixed working style. There was a negative and very weak significant correlation between the age of the participants and the BDI total score (r:-0.17, p:0.04). A significant difference was determined between the groups in terms of BDI total scores according to the education levels of the healthcare professionals. BDI total score averages of health workers who graduated with an associate degree were found to be significantly higher than those of health workers with undergraduate or graduate degrees (Table 1, $p<0.05$).

Table 1. Comparison of Participants' Sociodemographic Characteristics with BDI and ProQOL R-IV Total Scores

Characteristic	**Mean± SD**	**Min-Max**	**BDI**	**ProQOL R-IV**
Age	30,38±5,61	20-46	r: -0,17* p<0,05	r:0,05 p:0,52
	N	**%**	**BDI**	**ProQOL R-IV**
Gender				
Female[1]	58	43,6	t: -0,39	t: 2,11
Male[2]	75	56,4	p: 0,69	p<0,05 1>2
Education Level				
High School[1]	20	15	F: 5,57	F: 0,64
Associate Degree[2]	12	9	p<0,01	p:0,53
Undergraduate or Graduate[3]	101	75,9	2>3	

Table 1. Continued.

Characteristic	N	%	BDI	ProQOL R-IV
Occupation				
Nurse	92	69,2	F: 0,92	F: 2,23
Physician	11	8,3	p:0,43	p:0,87
Other	30	22,5		
Duration of Occupation				
1 month-5 years	49	36,8	F: 2,70	F: 2,61
6-10 years	51	38,3	p:0,07	p:0,07
10 years and longer	33	24,8		
Unit				
Pandemic Service	89	66,9	t: 3,11	t: 0,95
Service	44	33,1	p<0,01	p:0,34
Working Type				
Overtime[1]	26	19,5	F: 0,76	F:3,51
Shift[2]	94	70,7	p:0,46	P<0,05
Mixed[3]	13	9,8		1>3
Marital Status				
Married[1]	83	62,4	t: -0,54	t: -0,33
Single[3]	50	37,6	p:0,58	p:0,73
People who living with				
Did not change	72	54,1	t: -0,51	t: 1,64
Changed	61	45,6	p:0,61	p:0,10
Having Child				
Yes	67	50,4	t: -1,70	t: -0,20
No	66	49,6	p:0,28	p:0,98
Income Level				
Income Less than Expenses	53	39,8	F: 2,55	F: 0,35
Income Equivalent to Expenses	67	50,4	p: 0,08	p: 0,70
Income More than Expenses	13	9,8		

* The correlation is significant at the 0.05 level. 1,2,3: These numbers are used for ranking.

The health variables of health workers and the comparison of these variables with the scale scores are given in Table 2. It was determined that 62.4% of the participants did not smoke and 87.2% did not use alcohol, 38.3% had a hobby that did not require physical strength, and 54.9% enjoyed their job. When the participants were asked about any mental or physical illness before the pandemic period, it was determined that 94% of them did not have a chronic disease. It was determined that 71.4% of the employees were not diagnosed with COVID-19 during the pandemic period, 57.1% of their family members were not diagnosed with COVID-19 and 62.4% of them did not experience loss during the pandemic period. It was determined that the most frightening situation for the participants during the pandemic process was the transmission of the disease to their family members with 63.2% and 39.1% of them thoughts to resign during the pandemic process.

There was a difference between the groups in terms of scale scores according to the variables of doing their job with pleasure, having a mental or physical illness before the pandemic period, being diagnosed with COVID-19, and thinking about resigning during the pandemic period. It was determined that the BDI total scores of those who do their job unlovely are statistically significantly higher than those who do it fondly and those who do it fondly than those who do it fondly. It was determined that those who do their job fondly have higher ProQOL R-IV total scores than those who do it reluctantly. It was determined that individuals with chronic mental or physical chronic diseases before the pandemic had significantly higher BDI total scores than those without. In addition, it was found that the BDI total scores of the participants whose family members were diagnosed with COVID-19 were higher than those who did not, and those who thought about resigning during the pandemic process were significantly higher than those who did not ($p<0.05$ Table-2).

Table 2. Comparison of Participants' Health Variables and Scale Scores

Characteristics	**n**	**%**	**BDI**	**ProQOL R-IV**
Smoking				
Non-smoker	83	62,4	F: 0,84	F: 0,49
Quitter	10	7,5	p:0,43	p:0,61
Smoker	40	30,1		
Alcohol Use				
Using	6	4,5	F:3,30	F: 0,55
Not Using	116	87,2	p:0,07	p:0,57
Sometimes Using	11	8,3		
Hobby Types				
Non-physical activities	51	38,3		
Physical activities	19	14,3	F:0,26	F:0,94
Both	22	16,5	p:0,85	p:0,42
Do not have a hobby	41	30,8		
Love of the Job				
Yes[1]	73	54,9	F:16,22	F:3,90
No[2]	28	21,1	p<0,001	P<0,05
Sometimes[3]	32	24,1	2>1	1>2
			3>1	
Presence of Mental or Physical Illness Before the Pandemic				
No[1]	124	94	t:-2,04	t:0,40
Yes[2]	7	6	p<0,05	p:0,68
			2>1	
COVID-19 Diagnosis				
Yes[1]	38	28,6	t:1,58	t:-0,28
No[2]	95	71,4	p:0,11	p:0,77
COVID-19 Diagnosis of Family Members				
Yes	57	42,9	t:2,81	t: 0,75
No	76	57,1	p<0,01	p:0,45
			1>2	
The Most Frightening Situation in the Pandemic Process				
Infecting the family	84	63,2		
Death	12	9	F:1,19	F:1,75
Infecting others	6	4,5	p:0,31	p:0,14
Being infected	10	7,5		
Other	21	15,8		
Losses During Pandemic Process				
None	83	62,4		
Loss of first-degree relatives	13	9,8	F: 2,64	F: 0,83
Loss of distant relatives	25	18,8	p: 0,05	p: 0,47
Loss of acquaintances	12	9		
Thoughts on Resigning During Pandemic Process				
Yes[1]	52	39,1	F: 8,54	F: 1,93
No[2]	48	36,1	p<0,001	p: 0,12
Undecided[3]	33	24,8	1>2	

1,2,3: These numbers are used for ranking.

The mean scores of the BDI and ProQOL R-IV total scales used in this study and the relationship between the scales are shown in Table 3. According to the Pearson correlation analysis, no significant correlation was found between BDI and ProQOL R-IV total score averages.

Table 3. The Relationship Between BDI and ProQOL R-IV Total Mean Scores

Scales	Mean±SD	Min-Max	BDI	ProQOL R-IV
BDI	16,35±9,32	0-38	-	r: -0,12 p:0,16
ProQOL R-IV	70,18±17,64	5-116	r: -0,12 p:0,16	-

*The correlation is significant at the 0.05 level.

The model established in the simple linear regression analysis performed to determine the relationship between BDI and ProQOL R-IV was not found to be statistically significant (F:4.72, p:0.16). Accordingly, it was found that the explanatory power of the depressive symptoms experienced was not statistically significant on the quality of life of the employees (R2=0.015; Adjusted R Square=0.007) (Table-4).

Table 4. Effect of BDI on ProQOL R-IV

Dependent Variable	Independent Variable	B	ß	t	p	F	Model (p)	R^2
ProQOL R-IV	**Constant**	66,42		21,465	p<0,01	4,72	0,16	0,015
	BDI	,229	,121	1,395	0,16			

R: The simple linear regression analysis

4. Discussion

This study was conducted to examine the effect of depressive symptoms on the quality of life in intensive care health workers (doctor, nurse, health officer, assistant staff, etc.) who interact with patients one-on-one during the COVID-19 process, and the study findings are discussed here.

It was determined that the mean age of the participants was 30.38±5.61, more than half of them were male and married, and two-thirds of them had undergraduate or graduate degrees. It was determined that health workers often worked as nurses and on duty in the pandemic service. It was found that the people with whom the employees generally lived together during the pandemic period did not change, they had children and their income was equal to their expenses. In addition, it was determined that the majority of them did not use cigarettes or alcohol, and they enjoyed their job. It was determined that the majority of the participants and their family members were not diagnosed with COVID-19 during the pandemic period and did not experience losses during the pandemic process. It was determined that the most frightening situation for the participants during the pandemic process was generally infecting their family members, and therefore they thought of resigning during the pandemic process. These data are compatible with other study results [19,20].

When the sociodemographic characteristics of the participants were compared with the scale total score averages, there was a significant gender difference compared to the ProQOL R-IV total score average. It was determined that women's ProQOL R-IV total scores were higher than men's. It was determined that the total scores of ProQOL R-IV were significantly higher than those who expressed the working style of the overtime employees as mixed. Studies in the literature have reported that psychological symptoms such as depression are higher in female healthcare workers. It is known that high mental symptoms reduce the quality of life in individuals [21-25]. The reason why the result obtained in this study is different from other studies may be due to the different scales used.

There was a negative and very weak significant correlation between the age of the participants and the BDI total score. A significant difference was determined between the groups in terms of BDI total scores according to the education levels of the healthcare professionals. BDI total score averages of associate degree health workers were found to be significantly higher than those of health workers

with undergraduate or graduate degrees. There is no complete consensus in the literature regarding this information. Being at a young age and having insufficient professional experience have also been reported as risk factors for mental symptoms [26,27]. In the study of Liang et al. (2020), a statistically insignificant correlation was found between age and depressive symptoms, and depression scores were found to be higher in employees under the age of 30 [27]. In the study conducted by Zengin and Gümüş (2019) before the pandemic, it was reported that depressive symptoms increase as age increases. In this study, it was reported that depressive symptoms increased in younger patients [28]. It is thought that this difference may have triggered the increase in the number of deaths due to the pandemic and the fear of death in individuals. Again, there is no consensus in the literature regarding this information. Young and inexperienced healthcare professionals may be experiencing more mental distress because they are inexperienced in coping with diseases and need a superior organization to lead. For these reasons, pre-employment training, situations in which the disease can be transmitted and ways to prevent it, and protocols to be created with clear rules may be beneficial for those who are new and have insufficient professional experience in terms of reducing stress and increasing the level of professional confidence, as well as reducing mental problems [26,29].

When the BDI and ProQOL R-IV total scale score averages used in this study were examined, it was reported that the BDI scores were below the scale cut-off score, that is, depressive symptoms were reported in the employees. In addition, there was a difference between the groups in terms of scale scores according to the variables of doing their job with pleasure, having a mental or physical illness before the pandemic period, being diagnosed with COVID-19, and thinking about resigning during the pandemic process. It was determined that the BDI total scores of those who do their job reluctantly are statistically significantly higher than those who do fondly, and those who sometimes do fondly compared to those who do fondly. It was determined that those who do their job fondly have higher ProQOL R-IV total scores than those who do their job reluctantly. Studies have shown the presence of depressive symptoms in healthcare workers during the pandemic period. In the study conducted by Ekinci and Ekinci (2021), depression was found to be 20.9% (3.5% severe depression) in the participants [20]. According to a study conducted in China, the depression level was determined as 12% in the doctor and nurse group, and it was stated that having a chronic disease and working actively in Covid-19 clinics are independent risk factors for the emergence of depression [30]. In another study in which doctors and nurses participated, depression was found at a rate of 50.4% [31]. In the study conducted by Cai et al. (2020), depression rates of 14.3% were reported in healthcare workers active in Covid-19 clinics [32]. In the study by Zhu et al. (2020), depression was found to be 13.5% of healthcare workers, and chronic disease was accepted as a risk factor in employees [33]. In a study in Poland, depression was found at a rate of 70.7% among healthcare workers [34]. In another study involving Spanish healthcare professionals, the depression level of healthcare professionals was found to be 46% [35]. In a multicenter study, the depression level of healthcare workers was reported as 50.7% [36]. Frontline healthcare professionals working with COVID-19 patients have been reported to have more depressive symptoms and a lower quality of life. In addition, more depressive symptoms and lower quality of life were reported in this personnel compared to personnel working in other clinics [37,38]. In a study conducted with 200 healthcare workers, mostly nurses, during the Covid-19 pandemic in Iran, depression levels were reported to be normal [39]. In another study, depressive symptoms and low quality of life were reported in healthcare workers [40]. In a study conducted with nurses during the Covid-19 process, it was reported that nurses had depressive symptoms and decreased quality of life [15]. In another study conducted during the Covid 19 pandemic, it was reported that the quality of life of healthcare workers decreased [41]. In a study conducted with 618 healthcare professionals, in which depression was examined due to the coronavirus epidemic among healthcare professionals in our country throughout Turkey, it was found that 54.4% of healthcare professionals were at risk of depression [21]. When a similar study

conducted in our country before the Covid-19 pandemic was examined, 68.4% of nurses reported moderate depression [28]. It was determined that 50.3% of the nurses had depression symptoms before the pandemic [42]. In a study examining the variables of quality of life, it was reported that professional quality of life was affected by choosing the profession voluntarily and choosing to work in the unit [43]. In another study, it was reported that those who voluntarily chose the profession had higher quality of life scores [19]. In another study, it was observed that mental symptoms were observed much more frequently in healthcare workers with a chronic disease or those over 65 years of age, or those who shared the same house with family members with chronic diseases. This result suggests that these people may be more susceptible to psychological influences due to underlying psychopathology and related factors [21].

5. Conclusion

In summary, in this study, depressive symptoms and low quality of life were found in healthcare workers working in the Covid-19 pandemic. It is thought that the effective and high quality of health services is directly related to the physical and mental well-being of health workers during the pandemic process. It is thought that it is extremely important to determine the mental disorders that are likely to occur due to the difficulties brought by the process in the health workers who work with great devotion and at high risk during the pandemic process and to stop their progression at an early stage.

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Ethical statement

The current study was carried out in accordance with research and publication ethics rules. Approval of this study was obtained from the Dicle University Faculty of Medicine Nonınterventional Ethics Committee with the number 347 on 22.10.2020.

Conflict of interest:

All three authors declared that they had no conflict of interest in this study.

Authors' Contributions

The authors declare that their contribution to the work is equal.

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Research Article

HEALTHCARE PROFESSIONALS' ATTITUDES TOWARDS VAGINAL BIRTH AFTER CESAREAN SECTION; ISTANBUL EXAMPLE

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Abstract: *Rapidly increasing cesarean birth rates around the world continue to cause concern. Repeated cesarean sections are the most important cause of this increase. Vaginal birth after cesarean section (VBAC) is a good solution but is not used widely enough in clinical practice. This cross-sectional descriptive study aimed to determine the attitudes of healthcare professionals toward VBAC and the factors that affect them. The study was conducted at a maternity hospital in Istanbul and the sample included 254 healthcare professionals. The data were collected using a personal information form and the VBAC Attitudes Form. Percentages, means, Pearson's chi-squared test, the Kruskal-Wallis H test, and the Mann-Whitney U test were used. The threshold for statistical significance was p<0.05. Of the participants, 66.1% saw VBAC as an effective mode of birth, 68.5% thought that it should be widely used in Turkey, and 85.4% thought that women have the right to request VBAC. But only 53.5% knew that Turkey has national VBAC management guidelines, and 37.8% would recommend VBAC to pregnant women. Their mean score for seeing VBAC as a safe mode of birth was 5.15±2.19 (min:0-max:10), and the score for willingness to work on VBAC teams was 4.95±3.42 (min.0-max:10). The factors that affected their attitudes towards VBAC were: being less than 25 years old, higher education levels, one to three years of professional experience and being female(p<0.05). The participants had positive attitudes about VBAC in theory but remained reluctant about it in their clinical practice. The participants who were less than 25 years old, female, had higher education levels, and had one to three years of professional experience had more positive attitudes towards VBAC.*

Keywords: *Attitudes, cesarean sections, healthcare professionals, vaginal birth after cesarean section*

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1. Introduction

Vaginal birth is defined as a natural birth process that does not usually require significant medical intervention. World Health Organization (WHO) recommends vaginal birth for women. Because in comparison to other methods of childbirth, vaginal birth is the simplest, safest, and most cost-effective process of birth. On the other hand cesarean section (C-section) is considered a mother-friendly surgical operation that protects maternal and infant health. The ideal application rate for C-section is between 10-15% [1, 2]. C-section births above this rate are not related to reductions in maternal and infant mortality [2-4]. However, the rate of 10-15% has been exceeded in many countries over the years due to C-sections without indication [1, 2]. The dictum, once a C-section always a C-section, leads to routine repeat cesarean sections (RRCs) even if the first one was carried out without indication, and this multiplies the rate of c-sections [5, 6]. The negative effects of RRCs on maternal and infant health and the health economy are

becoming clearer every day, and ethical debates on the subject are emerging [6-10]. A consensus around the world on reducing C-section rates to their ideal limits has been reached. Vaginal birth after cesarean section (VBAC) has been shown to be an effective method to reduce RRC [2, 3, 11]. However, interest in VBAC has varied over the years and from country to country [5,11-15].

Although VBAC is the only way to reduce RRC, the response is not at the desired level. This is due to obstetric factors, fear of childbirth, legal responsibilities and fear of malpractice, cultural differences, the nature of healthcare systems, difficulty accessing VBAC services, midwives' lack of autonomy in labor management, doctors having the last word about the type of delivery, lack of cooperation among team members, healthcare workers' negative attitudes, the lack of childbirth preparation education, the nature of prenatal services, failure to encourage VBAC, policies and lack of birth support [14-19].

In 2017, Turkey's rate of 53.1% was the highest cesarean section rate among OECD (Organisation for Economic Co-operation and Development) countries, so policies were developed to reduce its alarming cesarean rate [20, 21]. However, there is no official evidence that VBAC is widely practiced in clinics [22, 23]. VBAC is not widely used in Turkey, and obstacles are preventing it. The attitudes of healthcare professionals are among the factors that affect the prevalence of VBAC. However, a review of the literature found that there are not enough studies on this subject in Turkey, so this study was conducted to determine the attitudes of healthcare professionals toward VBAC and the factors that affect them.

Study questions

1. What are the attitudes of health professionals towards VBAC?
2. What are the factors that affect the attitudes of health professionals towards VBAC?

2. Materials and Methods

2.1. Study design and population

This cross-sectional descriptive study was conducted from February 11, 2019, to October 31, 2019, in a state hospital in Istanbul. Istanbul is the largest city in Turkey and the city with the highest cesarean section rate (53.5%). Of the C-sections, 37.9% were performed before uterine contractions started. Hospital, where the study was conducted actively, provides prenatal education, and physicians and midwives jointly provide labor and birth support. The hospital is also one of the few health institutions in Istanbul that provides counseling, examination, birth and postpartum care, and support services for expectant mothers who are considering VBAC. This hospital was chosen for the study because of these features.

The sample size of the study was calculated to require 260 participants with a 0.05 confidence interval and a 95% sampling error based on the hospital's 807 midwives, nurses, and physicians. A total of 400 people were invited to participate in the study. However, 134 people did not want to participate, and 12 people were excluded because they did not fill out the forms completely, so the study was completed with 254 participants. The inclusion criteria were: actively working as an obstetrician, midwife, or nurse, voluntary participation, and filling out the questionnaires completely.

2.2. Data collection tools

2.2.1 The Personal Information Form

The form was developed by the researchers to determine the sociodemographic characteristics that affect attitudes towards VBAC. It has five questions about age, gender, education level, occupation, and professional experience.

2.2.2 The VBAC Attitudes Form

After a review of the literature, this form was developed by the researchers to determine attitudes towards VBAC [14, 15, 24, 25]. The form has seven questions. The responses to the first five items are: I agree, I disagree. These items are: "VBAC is an effective method for reducing cesarean section rates", "Pregnant women with previous C-sections should have the right to request VBAC", "VBAC should be widely used in Turkey", "Turkey has national VBAC management guidelines", and "I would recommend VBAC to pregnant women with previous C-sections". The form has two questions that use the Visual Analog Scale (VAS) for responses. Although the one-dimensional VAS was developed for the assessment of pain, it is also used to determine the opinions of individuals regarding specific situations[26]. They are asked to rate their opinions on a scale of 0 to 10, with 0 meaning not at all, and 10 meaning very much. On the VAS, 0-3 is low, 4-6 is moderate, and 7-10 is high [27]. In this study, the two VAS questions were: How safe do you think is VBAC as a method of birth? and how willing are you to work on a VBAC team?

2.3. Data collection

Data were collected during daytime work hours in order not to interfere with the functioning of the clinics. The researchers visited the clinics, and after they had obtained the participants' consent, they asked them to fill out the personal information form and the VBAC Attitudes Form. The forms were filled out by the participants and collected in sealed envelopes.

2.4. Statistical analysis

The study data were analyzed using SPSS 24.0 software. The distribution of the descriptive characteristics and their responses to the VBAC Attitudes Form was identified using frequencies. Normality distributions of the scores were analyzed using the Kolmogorov-Smirnov test. As the data set did not meet the assumptions of the normal distribution, the study utilized the nonparametric test statistics Kruskal-Wallis H test and the Mann-Whitney U test were used. The threshold for statistical significance was $p<0.05$.

2.5. Ethical considerations

Before the study, ethical approval was obtained from the Zeynep Kamil Women and Children Diseases Training and Research Hospital Ethics Committee (February 6, 2019; approval number 26). Written consent was obtained from the hospital administration, and written and verbal consent was obtained from the participants by means of a voluntary consent form prepared in accordance with the Declaration of Helsinki.

3. Results

Sociodemographic characteristics and responses to the VBAC Attitudes Form of the participants is shown in Table 1.

Table 1. Distribution of the participants' descriptive characteristics and their responses to the VBAC Attitudes Form (N=254)

	n (%)
Age group (*30.18±7.66, min: 20, max: 53)*	
25 years or younger	94 (37.0)
26-35 years	98 (38.6)
36 years or older	62 (24.4)

Table 1. Continued.

	n (%)				
Gender					
Female	210 (82.7)				
Male	44 (17.3)				
Education level					
Health Vocational High School/Associate's Degree	30 (11.8)				
Bachelor's degree	179 (70.5)				
Postgraduate	45 (17.7)				
Occupation					
Physician	25 (9.8)				
Midwife	74 (29.1)				
Nurse	155 (61.0)				
Professional experience *(8.78±7.88 min: 1 / max: 35)*					
1-3 years	87 (34.3)				
4-9 years	80 (31.5)				
10 years or more	87 (34.3)				
VBAC is an effective method for reducing C-section rates					
I agree	168 (66.1)				
I disagree	86 (33.9)				
Women with previous C-sections should have the right to request VBAC					
I agree	217 (85.4)				
I disagree	37 (14.6)				
VBAC should be widely used in Turkey					
I agree	174 (68.5)				
I disagree	80 (31.5)				
Turkey has national VBAC management guidelines					
I agree	136 (53.5)				
I disagree	118 (46.5)				
I would recommend VBAC to pregnant women with previous C-sections					
I agree	96 (37.8)				
I disagree	158 (62.2)				
	n	**$\bar{x}$**	**s**	**Min**	**Max**
Mean VAS score for finding VBAC safe	254	5.15	2.19	0	10
Mean VAS score for being willing to work on a VBAC team	254	4.95	3.42	0	10

This study made a comparison of considering VBAC as an acceptable birth method, women having the right to request VBAC, VBAC should be widely used in Turkey, Turkey has national VBAC management guidelines and some features (Table 2). Analysis results showed that the ratios of finding VBAC as an effective method of reducing C-sections were higher for the participants who were 25 years old or younger and the participants with one to three years of professional experience. But it was lower for the participants with health vocational high school diplomas or associate's degrees ($p<0.05$). On the other hand, the women agreed with 'pregnant women should have the right to request VBAC' more than the men ($p<0.05$). Also, the rate of agreement that VBAC should be widely used in Turkey' was higher for the participants who were 25 years old or younger and the participants with one to three years of professional experience ($p<0.05$). Similarly rate of knowing that Turkey has national VBAC management guidelines was significantly higher for the participants who were 25 years old or younger, the participants who had one to three years of professional experience, the participants who were male, and the participants who were physicians ($p<0.05$). However, there were no statistically significant differences in the participants' willingness to recommend VBAC to pregnant women by demographic characteristics ($p>0.05$).

Table 2. Comparison of the participants' characteristics and their opinion about VBAC (N=254)

	VBAC as an effective birth method		Women have the right to request VBAC		VBAC should be widely used in Turkey		Turkey has national VBAC management guidelines		I would recommend VBAC to pregnant women with previous C-sections.	
	I agree	I disagree	I agree	I disagree	I agree	I disagree	I agree	I disagree	I agree	I disagree
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Gender										
Female	142 (67.6)	68 (32.4)	186 (88.6)	24 (11.4)	144 (68.6)	66 (31.4)	97 (46.2)	113 (53.8)	79 (37.6)	131 (62.4)
Male	26 (59.1)	18 (40.9)	31 (70.5)	13 (29.5)	30 (68.2)	14 (31.8)	39 (88.6)	5 (11.4)	17 (38.6)	27 (61.4)
P	0.277		0.002*		0.960		0.000*		0.899	
Age group										
25 years or younger	76 (80.9)	18 (19.1)	80 (85.1)	14 (14.9)	78 (83.0)	16 (17.0)	62 (66.0)	32 (34.0)	41 (43.6)	53 (56.4)
26-35 years	63 (64.3)	35 (35.7)	87 (88.8)	11 (11.2)	64 (65.3)	34 (34.7)	47 (48.0)	51 (52.0)	28 (28.6)	70 (71.4)
36 years or older	29 (46.8)	33 (53.2)	50 (80.6)	12 (19.4)	32 (51.6)	30 (48.4)	27 (43.5)	35 (56.5)	27 (43.5)	35 (56.5)
P	0.000*		0.362		0.000*		0.008*		0.056	
Occupation										
Physician	12 (48.0)	13 (52.0)	20 (80.0)	5 (52.0)	14 (56.0)	11 (44.0)	20 (80.0)	5 (20.0)	13 (52.0)	12 (48.0)
Midwife	46 (62.2)	28 (37.8)	66 (89.2)	8 (10.8)	46 (62.2)	28 (37.8)	41 (55.4)	33 (44.6)	33 (44.6)	41 (55.4)
Nurse	110 (71.0)	45 (29.0)	131 (84.5)	24 (15.5)	114 (73.5)	41 (26.5)	75 (48.4)	80 (51.6)	50 (32.3)	105 (67.7)
P	0.055		0.464		0.081		0.012*		0.060	
Professional experience										
1-3 years	72 (82.8)	15 (17.2)	73 (83.9)	14 (16.1)	71 (81.6)	16 (18.4)	59 (67.8)	28 (32.2)	38 (43.7)	49 (56.3)
4-9 years	50 (62.5)	30 (37.5)	73 (91.3)	7 (8.8)	51 (63.8)	29 (36.3)	39 (48.8)	41 (51.3)	27 (33.8)	53 (66.3)
10 years or more	46 (52.9)	41 (47.1)	71 (81.6)	16 (18.4)	52 (59.8)	35 (40.2)	38 (43.7)	49 (56.3)	31 (35.6)	56 (64.4)
P	0.000*		0.186		0.004*		0.004*		0.366	
Education level										
Health Vocational High School/Associate's Degree	10 (33.3)	20 (66.7)	25 (83.3)	5 (16.7)	20 (66.7)	10 (33.3)	11 (36.7)	19 (63.3)	14 (46.7)	16 (53.3)
Bachelor's degree	128 (71.5)	51 (28.5)	154 (86.0)	25 (14.0)	123 (68.7)	56 (31.3)	100 (55.9)	79 (44.1)	61 (34.1)	118 (65.9)
Postgraduate	30 (66.7)	15 (33.3)	38 (84.4)	7 (15.6)	31 (68.9)	14 (31.1)	25 (55.6)	20 (44.4)	21 (46.7)	24 (53.3)
P	0.000*		0.908		0.973		0.143		0.168	

$\chi 2$: Pearson's chi-squared test, *$p<0.05$

The comparison of the participant's characteristics and their mean VAS scores for the question of how safe they considered VBAC and their willingness to work on VBAC teams are shown in Table 3. The women and the participants with postgraduate educations found VBAC safer ($p<0.05$). Also, the participants who were 25 years old or younger and the participants with one to three years of professional experience were more willing to work on VBAC teams ($p<0.05$). Contrary the participants with postgraduate educations were less willing to work on VBAC teams ($p<0.05$).

Table 3. Comparison of the participants' characteristics with mean VAS score for finding VBAC safe and being willing to work on a VBAC team (N=254)

	VAS scores for finding VBAC safe				**VAS scores for being willing to work on VBAC teams**			
	n	$\bar{x}$	s	p	n	$\bar{x}$	s	p
Gender								
Female	210	5.44	2.01	0.000*	210	5.07	3.52	0.236
Male	44	3.77	2.51		44	4.41	2.90	
Age group								
25 years or younger[1]	94	5.40	1.60	0.072	94	6.10	2.97	0.001** 1-2 1-3
26-35 years[2]	98	5.33	2.40		98	4.32	3.34	
36 years or older[3]	62	4.48	2.50		62	4.23	3.78	
Occupation								
Physician[1]	25	4.92	2.72	0.616	25	4.12	4.04	0.475
Midwife[2]	74	5.01	2.25		74	4.95	3.67	
Nurse[3]	155	5.25	2.08		155	5.09	3.19	
Professional experience								
1-3 years[1]	87	5.29	1.40	0.627	87	6.10	2.90	0.001** 1-2 1-3
4-9 years[2]	80	5.24	2.53		80	4.19	3.33	
10 years or more[3]	87	4.93	2.50		87	4.51	3.71	
Education level								
Health Vocational High School/Associate's Degree[1]	30	4.20	3.27	0.001** 1-3	30	4.90	4.44	0.005** 1-3
Bachelor's degree[2]	179	5.21	1.94	2-3	179	5.34	3.06	2-3
Postgraduate[3]	45	5.53	2.13		45	3.44	3.70	

*p<0.05(Mann-Whitney U test), **p<0.05 (Kruskal-Wallis H test)

4. Discussion

More than half of the participants thought that VBAC is an effective method of birth and believed that it should be widely used in Turkey. The majority thought that pregnant women have the right to request VBAC. Although these findings were not at the desired level, they show that the participants were positive about VBAC in theory. However, only half of the participants knew that Turkey has national VBAC management guidelines, only a few of them would recommend VBAC to pregnant women with previous C-sections, they saw VBAC as only moderately safe, and they were only moderately willing to work on a VBAC team. These facts indicate that they were hesitant about VBAC in the clinical setting. A study conducted in Turkey found that only 32.4% of participants believed that VBAC should be widely used. The same study found that only 20.7% of the participants said that they or their spouses wanted to give birth with VBAC [25]. Another previous study reported that most health professionals (82.1%) believed that women have the right to demand VBAC, while few (25.3%) would

recommend it to pregnant women, and few (26.3%) wanted to join VBAC teams [24]. In some European countries with low VBAC rates, clinicians' negative attitudes towards VBAC play a substantial role in keeping VBAC rates low [15]. In some European countries with high VBAC rates, most health professionals have positive attitudes towards VBAC and consider VBAC the first alternative for pregnant women with previous C-sections unless there is a medical contraindication [14]. The results of similar studies in Turkey indicate that health professionals' attitudes about VBAC may be related to low VBAC rates. The fact that VBAC rates are high in countries where healthcare professionals have positive attitudes toward VBAC also supports this conclusion.

This study also examined the factors that are thought to affect attitudes toward VBAC. The participants who were 25 years old or younger and the participants with one to three years of professional experience found VBAC more effective, wanted it to be widely used in Turkey, were better informed about Turkey's national health policy on the subject and were more willing to work on VBAC teams than the participants with more professional experience. Ünsal et al., (2017) reported that age and professional experience did not affect considering VBAC a safe method of birth [25]. Uçar et al., (2018) found that older participants with more professional experience had more VBAC experience. However, they presented no evidence that this was voluntary [24]. Unlike the previous studies, this study found that younger health professionals in Turkey had more positive attitudes toward VBAC. These attitudes should be protected and improved because they will play an important role in reducing C-section rates and increasing VBAC rates in the future.

In this study, the rate of participants with health vocational high school diplomas or associate's degrees who saw VBAC as an effective method of reducing C-section rates was lower than that of the participants with undergraduate or postgraduate educations. On the other hand, the participants with postgraduate educations found VBAC safer than the participants with other education levels, indicating that education positively affects attitudes towards VBAC. Ünsal et al., (2017) reported that education affects healthcare professionals' attitudes toward VBAC [25]. However, this study's participants with postgraduate educations were less willing to work on VBAC teams than its participants with other education levels. This indicates that education level alone will not suffice to increase the willingness to join VBAC teams.

In this study, more male participants knew about Turkey's national VBAC management guidelines than female participants. However, the males also found VBAC less safe and were less likely to affirm that pregnant women have the right to request VBAC. This indicates that the female participants had more positive attitudes toward VBAC. Unlike this study, Ünsal et al., (2017) reported that gender did not affect seeing VBAC as safe [25].

Physicians determine the method of birth and increasing C-section rates in Turkey [28, 29]. The results of studies of the differences in VBAC attitudes by occupation are contradictory. Kısa et al., (2017) reported that midwives believe that C-section rates were much higher than physicians and that VBAC will be an effective way of reducing C-section rates [30]. Ünsal et al., (2017) found that occupation did not affect beliefs about whether VBAC is safe or not [25]. A study conducted in Iran found that the willingness of physicians, who were seen as the authorities on modes of birth, was the most important condition for the implementation of VBAC. The same study reported that midwives were not included in the process of determining the method of birth, although they take part in labor, and that this was an obstacle to the spread of the use of VBAC in Iran [18]. A study conducted in Australia found that midwives support women's choice of VBAC more than physicians [17]. A previous study in the same country found that fewer midwives advocated VBAC than physicians [31]. A study conducted in a country with high VBAC rates found that the support of the healthcare system and collaboration between midwives and physicians were the main factors in VBAC success [14]. On the other hand, VBAC rates were low and C-section rates were high in countries where physicians have

the last word on birth methods [16]. None of this study's findings support the hypothesis that occupation affects attitudes toward VBAC. Based on our findings and the literature, physicians, midwives, and nurses should all be encouraged to increase their motivation to increase VBAC rates.

5. Conclusion

More than half of the participants in this study saw VBAC as an effective method for reducing C-section rates and thought that it should be widely used in Turkey and that pregnant women should have the right to request VBAC. However, their rates for being willing to recommend VBAC, knowing that Turkey has national VBAC management guidelines, finding VBAC safe, and being willing to join VBAC teams were low. Like previous studies, the education levels of healthcare workers affected their attitudes towards VBAC, but unlike other studies, the occupation had no effect. Unlike other studies, this study found that age, gender, education level, and occupational experience affected VBAC attitudes. The participants who were less than 25 years old, had higher education levels, were female and had one to three years of occupational experience had more positive attitudes towards VBAC.

Based on the results of this study, it is recommended to develop certificate programs that will increase the motivation and courage of especially healthcare professionals to practice VBAC in clinics.

Limitations of the study: This study's results can only be generalized to its participants.

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Ethical statement: This study was approved by Zeynep Kamil Kadın ve Çocuk Hastalıkları Eğitim ve Araştırma Hastanesi Ethics Committee (February 6, 2019; approval number 26).

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Authors' Contributions:

R.M: Conceptualization, Methodology, Formal analysis, Writing - Original draft preparation

T.Y.E: Conceptualization, Methodology, Investigation, Formal analysis

All authors read and approved the final manuscript.

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Research Article

PATIENT SATISFACTION WITH INTERPERSONAL COOPERATION AND HEALTH SERVICES AT THE LEVEL OF PRIMARY AND SECONDARY HEALTHCARE

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Abstract: *Interprofessional cooperation and teamwork among health professionals in the health care system are crucial for improving patient satisfaction, with health services and saving health care resources. The research aims to examine the satisfaction of patients with interpersonal cooperation and health services provided at the level of primary and secondary health care. The research was done as a cross-sectional study and was conducted at the Niksic General Hospital and two health centers in Podgorica. The sample consisted of 154 respondents, both sexes. The research used a questionnaire for healthcare users designed for this research. The questionnaire consists of a general and a specific part based on similar questionnaires. Descriptive statistics measures and χ^2 tests were used for statistical data processing. The results of the research shows that there is a statistically significant correlation between gender and patient satisfaction with services χ^2 (2, N = 154) = 104.117, p = 0.000, as well as between age and patient satisfaction with services χ^2 (6, N = 154) = 139.294, p = 0.000. Understanding interpersonal cooperation is important for improving the efficiency of health care, its organization, and customer satisfaction.*

Keywords: *Satisfaction, collaborative cooperation, health care, health care services*

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1. Introduction

The health care system is one of the sub-systems of society that works to protect people's health from birth to death, ie throughout their entire life expectancy. Therefore, it is completely clear that as such it is not only responsible but also necessary for the health and health development of both the individual and the family and society as a whole. The World Health Organization (WHO) and the International Council of Nurses (ICN) have set the ultimate goal of maintaining the highest possible level of health for all people and providing high-quality care to achieve this goal [1]. Therefore, it does not matter what the health system is like and how it works, how it is organized, how much it costs, and how successful it is. Better functioning of the health care system means improving the health of citizens according to the principle of equal access to health services, and respect for patients' rights, with the efficient use of financial, human, and other resources. Patient satisfaction has been defined by scientists in various ways. These are defined as people's expectations of health services based on health, disease, quality of life, and other requirements [2]. The American Nurses Association (2000) describes patient

satisfaction with nursing care as patients' perceptions of care provided by medical staff during hospitalization [3]. Moreover, measuring patient satisfaction provided key performance information, thus contributing to overall quality management. Based on that, it provides information on the performance of the provider in meeting the values and aspirations of the client, on topics in which the client is the greatest authority [4].

In order to provide the best possible care to their patients and clients, healthcare professionals must work together as a team, sharing their skills and knowledge through interprofessional cooperation. In the past two decades, there have been significant political and economic changes in the world that have had a negative impact on the healthcare delivery system. Therefore, these impacts are now required through interventions to help health professionals cope with the challenges created by the sharply increased demand for their services [5]. Health services are the main pillars of social services that the state support and fund, in order to help ensure the protection of the health of their citizens and communities. Changes in the provision of health care services often change the boundaries that define the roles and responsibilities of different health professions. At the international level, the professional education of health workers speaks of this change through the provision of interprofessional learning [6]. The key elements of interprofessional education are based on the need to develop flexible team workers with a high level of interprofessional skills who understand the contribution that each health profession makes to man and health [7]. Interprofessional education means acquiring education in educational institutions and the working environment in the fields of health and social protection, before and after acquiring qualifications [8]. Interprofessional education has different meanings in different contexts and discussion groups. The most commonly used definition is given by the Center for the Advancement of Interprofessional Education in the United Kingdom CAIPE. Interprofessional education is when two or more professionals learn with others, from others, and about others to improve mutual cooperation and the quality of health care. Therefore, the main goal of interprofessional cooperation is that everyone understands their role in the team and that there is mutual trust and respect among health professionals and users of health services. Thus, it creates positive interaction, encourages further cooperation, reduces stress, and possible professional mistakes, and makes employees and patients more satisfied, and health care improved [9].

Professions working together provide not only mutual support but also mutual control that reduces the likelihood of error and creates a safer healthcare system. The first step towards effective and efficient collaborative practice is the application of interprofessional education [10]. Communication between nurses and doctors is considered a major part of the flow of information in health care. Numerous pieces of evidence show that poor communication can create a chronic state of conflict within a multi-professional team leading to an increase in medical errors and poor outcomes for healthcare users, health systems, and society as a whole [11]. On the other hand, members of a well-functioning multi-professional team have the same goals, everyone understands their role and, most importantly, there is mutual trust. Collaboration and teamwork of nurses, physicians, and other healthcare professionals can improve patient outcomes and reduce healthcare costs, increase job satisfaction, and maintain patient safety [12].

Satisfaction and preferences of health care users and satisfaction of service providers should be an imperative of organizational culture in order to achieve the desired expected outcomes and patient safety in health care systems. Effective teamwork creates optimal conditions for patient care and promotes satisfaction with professional work and retention of members [13].

Interprofessional cooperation is the key to satisfaction with the work performed by a health worker, and thus the effort invested in providing health services to patients will be at a much higher level, and the satisfaction of health care users, ie patients. It has been documented that interprofessional

cooperation has a positive effect on patient satisfaction with health care [14]. Patient satisfaction is simply defined as the patient's judgment of the quality and outcome of care [15].

Different types of information can be obtained from patients through a survey. After discharge, patients may be asked to report their perceptions of what happened during their stay, rate their perceptions of the quality of care and service they received, or indicate how satisfied they were with care and service [16]. In addition to the factors that appear during the patient's hospitalization, many other factors can affect patient satisfaction, such as the patient's age, gender, educational level, social standards, previous experiences with health care providers, psychological factors, patient needs, and expectations, the explanation was given, etc. Despite an ingrained loyalty to health professionals and the quality of care they provide, patients are currently looking for easy, fast, and quality care in a rapidly evolving world [17]. In developing countries, patient expectations from the health care system seem to be largely ignored by many factors such as the quality of clinical care provided, staff behavior, waiting time, cost of care, hospital infrastructure, physical comfort, emotional support, and respect for the patient. [18, 19, 20].

Feysia et. al. reported that: due to a lack of nursing population, scarcity of resources, incompetence, and an ineffective healthcare system, satisfaction with medical care in sub-Saharan Africa is low [21]. A study (2019 [22]) showed that the quality of the patient experience was associated with high satisfaction, which in turn was positively associated with improved treatment outcomes A comparative study [23] that compared patient satisfaction with care services between primary and tertiary levels of health care, revealed that patients who received care services at the Health Center were significantly more satisfied in domains such as patient-doctor communication, availability, and quality of care services, technical equipment, financial aspects of care and general satisfaction compared to those in a tertiary institution. [23] Other predictors of the satisfaction of respondents of the aforementioned study were younger age, male gender, marriage, higher education, and Muslim religion.

The evaluation of the provision of health services from the perspective of patients is gaining more attention and is becoming a key attribute of any health system because it serves as a valuable indicator for measuring the success of service provision, especially in hospitals in the public sector [13], such as our health institutions where we conducted the research. According to the literature, we did not come across any published research on the topic of patient satisfaction with health care services in the territory of Montenegro, although patient satisfaction monitoring is implemented in the evaluation of the quality of health care. The research was carried out as part of the preparation of the Master's thesis on Nursing studies in Belgrade, with which we wanted to draw the attention of the public to an important aspect of the assessment of the quality of health services.

The research aims to examine the satisfaction of patients with interpersonal cooperation and health services provided at the level of primary and secondary health care.

2. Methodology

The research was conducted as a cross-sectional study in the period from August to September 2020 among patients in two Health Centers in Podgorica ("Stari aerodrome" and "Pobrežje") and the General Hospital Nikšić. The data were collected through an anonymous survey questionnaire after approval by the Ethics Committee of the institutions and the signing of voluntary participation in the research.

The research used the Questionnaire for patients/users of health care services, which was designed for the purposes of this research and consists of a general and specific part. The general part refers to the collection of sociodemographic data, which includes the general characteristics of the respondents through 4 questions. A specific part of the questionnaire assesses the attitudes and opinions of patients

about health services during their care in primary and secondary healthcare institutions. It consists of 22 questions that assess patients' attitudes and opinions about collaborative cooperation, of which 3 are open-ended and 19 are closed-ended. Each question on the Likert scale was scored and the total score of answers received ranged from (0 - 100) points, with a higher number showing greater satisfaction of users with received health care services. Criteria for inclusion in the study were: patients older than 18 years who use care services in primary and secondary care for at least six months and patients who do not have any of the coexisting diseases (Alzheimer's, psychiatric diseases, febrile conditions, etc.) that could affect understanding of the questionnaire and voluntary consent. After analyzing the questionnaire, patients were divided into three groups: very satisfied with the services (70-100 points), satisfied with services (30-69), and the third group - dissatisfied with services (0-30).

Descriptive statistics measures were used in statistical processing, while differences between groups were determined using the X^2 test. Statistical processing and analysis were done in the computer program SPSS v20 (Statistical Package for the Social Sciences) for Windows. The tabular and graphical presentation was done in Excel.

3. Results

The research included a total of 154 respondents. Among the respondents, there were 90 (58.44%) males and 64 (41.56%) females, whose age structure was evenly distributed in the surveyed healthcare institutions. Respondents, who provided some of the health services, were mostly employed (42.21%), pensioners (31.17%) unemployed (18.83%), and students (7.79%). Out of the total number of patients included in the research, the highest number was 103 (66.88%), and 29 (18.83%) with high school or university degrees (Table 1).

Table 1. General data on respondents

	n (%)
Gender,	
Male	90 (58,44)
Female	64 (41,56)
Age,	
18-20	21 (13,64)
21-40	38 (24,68)
41-60	61 (39,61)
60+	34 (22,08)
Level of education,	
Without school	7 (4,55)
Elementary school	7 (4,55)
High school	103 (66,88)
High vocational studies, college	29 (18,83)
Master, Doctorate	8 (5,19)
Occupation,	
Employed	65 (42,21)
Retired	48 (31,17)
Unemployed	29 (18,83)
Students	12 (7,79)
Total	**154 (100)**

In Table 2 we can see that patients were divided into two groups according to the level of health care. Patients came to the Podgorica Health Center mainly for pulmonology (51.7%), rheumatology (11.4%), and systematic examinations (11.4%), while patients from the Nikšić General Hospital were hospitalized for several weeks 33 (82.5%), of which a smaller number were waiting for surgery 8 (20%).

Furthermore, based on the obtained results, we can see that at the level of primary and secondary health care, health professionals explain the purpose of their diagnostic procedures (55%; 57%), acquaint patients with treatment, possible complications, and possible outcomes (62.5%; 64, 9%), provide the necessary information about the disease (65%; 55.3%).

Users of health services have the impression that health workers perform their work thoroughly, responsibly, and safely (70%; 71.9%), that doctors, nurses, and other health workers cooperate adequately as a team (80%; 36.8%), and are satisfied with communication and cooperation with them (77.5%; 81.6%), as well as to believe that they as a team instill confidence and security in solving their health problems (72.5%; 72.8%). Also, patients state that health professionals are kind during their care (85%; 58.8%), and that they dedicate themselves as much as necessary (57.5%; 67.5), although when it comes to presenting their health problems health workers spend more time at the primary level of health care (65.8%) than at the secondary level (50%). Users of health services at the secondary level of health care believe that they do not wait long for the necessary health service (70%) and that health workers do not neglect them and have an understanding of their problems (77.5%), while at the level of primary health care patients think they health workers neglect (66.7%) and wait a long time to provide the necessary services (57%).

Table 2. Distribution of respondents by satisfaction with health services

	OBN (n=40) n(%)			**DZP (n=114) n(%)**		
Are you in hospital treatment?						
No	0(0)			114 (100)		
Yes, several days	7 (17,5)			0(0)		
Yes, several weeks	33 (82,5)			0(0)		
Yes, several months	0(0)			0(0)		
Are you waiting for surgery?						
Yes	8 (20)			7 (6,1)		
No	32 (80)			107 (93,9)		
What reason for coming to the health facility?						
ORL	2 (5)			7 (6,1)		
Pulmonology	18 (45)			59 (51,7)		
Rheumatology/Allergology	3 (7,5)			13 (11,4)		
Gynecology	9 (22,5)			10 (8,8)		
Neurology	3 (7,5)			4 (3,5)		
Orthopedic / Physiatry	2 (5)			8 (7,1)		
Systematic Review	3 (7,5)			13 (11,4)		
	OBN (n=40) n(%)			**DZP (n=114) n(%)**		
	Yes	No	Sometimes	Yes	No	Sometimes
Do health professionals explain the purpose of all diagnostic procedures to you?	22 (55)	0 (0)	18 (45)	65 (57)	13 (11,4)	36 (31,6)
Do health professionals acquaint you with the method of treatment, possible complications, and possible outcomes?	25 (62,5)	0 (0)	15 (37,5)	74 (64,9)	12 (10,5)	28 (24,6)

Table 2. Continued.

	OBN (n=40) n(%)			DZP (n=114) n(%)		
	Yes	No	Sometimes	Yes	No	Sometimes
Do you have the impression that health professionals do their job thoroughly, responsibly, and safely?	28 (70)	0 (0)	12 (30)	82 (71,9)	9 (7,9)	23 (20,2)
Do health professionals give you enough time to present all your problems during your care?	15 (37,5)	5 (12,5)	20 (50)	75 (65,8)	11 (9,7)	28 (24,5)
Do all health professionals pay equal attention to you?	12 (30)	18 (45)	10 (25)	52 (45,6)	23 (20,2)	39 (34,2)
Do health professionals give you the information you need about the disease?	26 (65)	0 (0)	14 (35)	63 (55,3)	23 (20,2)	28 (24,5)
Do health professionals as a team instill confidence and security in you while solving your health problems	29 (72,5)	0 (0)	11 (27,5)	83 (72,8)	4 (3,5)	27 (23,7)
Are you satisfied with the communication and cooperation with health professionals during your care?	31 (77,5)	0 (0)	9 (22,5)	93 (81,6)	5 (4,4)	16 (14)
Do health professionals sometimes neglect you and have no understanding of your problems?	2 (5)	31 (77,5)	7 (17,5)	76 (66,7)	12 (10,5)	26 (22,8)
Do you wait long for the necessary help/service during your care?	4 (10)	28 (70)	8 (20)	65 (57)	26 (22,8)	23 (20,2)
Do health professionals ignore you during your care?	0 (0)	32 (80)	8 (20)	22 (19,3)	63 (55,3)	29 (25,4)
Do you ever doubt the accuracy of a doctor's diagnosis?	4 (10)	32 (80)	4 (10)	6 (5,3)	66 (57,9)	42 (36,8)
Are your health professionals kind and friendly to you during care?	34 (85)	1 (2,5)	5 (12,5)	67 (58,8)	11 (9,6)	36 (31,6)
Do health professionals always dedicate themselves to you as much as you think they need to?	23 (57,5)	6 (15)	11 (27,5)	77 (67,5)	13 (11,4)	24 (21)
Do you have the impression that doctors, nurses, and other health professionals cooperate adequately as a team?	32 (80)	7 (17,5)	1 (2,5)	42 (36,8)	36 (31,6)	36 (31,6)
Non-cooperation among health professionals leads to professional mistakes in work that can lead to poor patient outcomes.	29 (72,5)	2 (5)	9 (22,5)	15 (13.2)	73 (64)	26 (22,8)
Adequate professional cooperation of health professionals reduces the possibility of professional errors to a minimum.	32 (80)	0 (0)	8 (20)	87 (76,3)	13 (11,4)	14 (12,3)

n (%) - number of respondents (percentage); OBN- General Hospital Nikšić; DZP- Health Center Podgorica

The values obtained in Table 3 show that there is a statistically significant correlation between gender and patient satisfaction with services χ^2 (2, N = 154) = 104,117, p = 0,000. We can notice that there is a statistically significant correlation between age and patient satisfaction with services χ^2 (6, N = 154) = 139.294, p = 0.000. The obtained results suggest that among male patients there are more who are satisfied with health service compared to female patients, as well as that among younger patients (less than 20 years, from 21 to 40 years) there are more who are satisfied with health service in compared to elderly patients (over 60 years of age) who are predominantly dissatisfied. It was found that there is a strong relationship between variables based on the calculated value of Cramer V = 0.822 for gender and service satisfaction and Cramer V = 0.672 for variables: age and patient satisfaction. Variables were

omitted from the impact analysis: education and occupation, due to the small number of respondents by category.

Table 3. Correlation of gender, age, and satisfaction with health services

		Patients' satisfaction				
	N	**Dissatisfied with services**	**Satisfied with services**	**Very satisfied with the services**	**χ^2**	**p**
Gender						
Male	90	/	/	90	104.117	**0.000**
Female	64	26	24	14		
Age						
18-20	21	/	/	21	139.294	**0.000**
21-40	38	/	/	38		
41-60	61	/	16	45		
60+	34	26	8	/		
Institution						
OBN	40	4	7	29	1.841	**0.398**
DZP	114	22	17	75		

OBN- General Hospital Nikšić; DZP- Health Center Podgorica

4. Discussion

This comparative study looked at satisfaction with the care provided, among patients who received services, at the level of primary and tertiary care. Patient satisfaction is an important factor both for assessing the quality of health care and for predicting positive health outcomes [24]. Good outcomes of caring for users also require strong patient participation and consideration of their preferences. It is believed that strengthening the relationship between healthcare providers and their patients will, among other benefits, lead to earlier disease detection, better understanding and adherence to selected care/treatment and care strategies, cost reduction, and better healthcare outcomes [12]. Satisfaction of users/patients with the services received by health teams during collaborative practice, most health systems see as a significant way to identify gaps/deficiencies, but also as a method and initiative to improve health care services. Consumer/user assessment in health care systems is the gold standard when it comes to health care satisfaction surveys. Measures/results of patients' experiences are indicators of the quality of health services [25, 23]. The recommendations emphasize the importance of assessing patient interaction with all care providers. The value is contained in the understanding of the effectiveness of collaborative care of users by the entire interprofessional team and not individual health professionals, which was confirmed by the results of the study [26] where the most satisfactory aspect in the hospital was rated by the participants of the mentioned study as the teamwork of health professionals. Conducted research [22] in a study that monitors patient experience/satisfaction shows a clear link between improving patient experience/satisfaction and providing higher quality health care as well as a clear and positive relationship between patient satisfaction with service quality and adherence to selected and agreed treatment strategies [22]. Patients who had better access to their health center and its services rated the quality of services with more satisfaction. They also found a higher level of patient satisfaction and better adherence to selected/agreed care strategies, in patients who were cared for in decentralized healthcare units, rather than in patients cared for in the main hospital [25].

The results of our research showed significantly higher satisfaction with the received care services in the group of respondents, OB Nikšić (73%) compared to (66%) as recorded in DZ Podgorica, χ^2 (2, N = 154) = 1,841, p = 0.398, which is in contrast to the results of the aforementioned study [25], which noted greater satisfaction with primary health care services. A study conducted in Serbia in 2017,

reported greater satisfaction of users with inpatient care compared to outpatient care, which is in line with the results of our study [27].

The results of our research indicate that the greatest differences between the respondents of our study were noted in terms of satisfaction with the information provided regarding the disease and diagnostic and therapeutic interventions. Differences between the study groups were also noted in terms of evaluation of communication and kindness during care services. Our results also indicate significant differences between the examined groups in terms of assessing the collaborative practice of health professionals, among the examined groups of patients. Namely (80%) of OB Nikšić patients evaluated positively the cooperation of health professionals during the collaborative practice according to (36%), in the group from DZ Podgorica. Based on the presented results, we can conclude that success is satisfaction with the provided services within the scope of the dialogical dimension, ie showing interest in listening, which is in line with the results of studies [26, 28]. Thus, openness to listening and talking positively and directly affects user satisfaction with care in healthcare facilities. Attitudes of respect, attention, and kindness influenced the assessment of the quality of care received. When users did not feel welcome and listened to, the services were poorly rated. This shows the importance of solidarity care, which affects service satisfaction.

Natesan, Hadid, Harb, Hitti (2019) in a study [29] cites factors that affect patient satisfaction with received health services and reported on predictors of satisfaction. It was found that two factors predict satisfaction: clinical team and systemic processes (work organization). The study reported that work organization was a statistically significant predictor of overall satisfaction, while the clinical team predicted overall satisfaction to a lesser extent. The analysis of the results of our research showed that the patients evaluated the organization of work in health care institutions, as the most important factor of satisfaction, of the patients of both examined groups. Namely, the answer to the question: What would you most like to change or improve in the health institution where you are being treated? About half of the respondents from both groups (51% OB Nikšić and 46% DZ Podgorica) answered: "better organization and less waiting". All other proposals such as everything complete in terms of treatment, technical improvement, and the provision of a larger number of staff and higher salaries led far from a smaller number of patients. In support of the results of our study, a study from Brazil [30] also reported dissatisfaction with primary health care services due to the long wait for appointments and the inability of getting appointments due to limited resources and too many people in need of care. Researchers from other studies have also discovered a long waiting time for appointments and the necessary care service at the scheduled time [26, 31, 32].

We also found a significant correlation between gender and patient satisfaction with services, χ^2 (2, N = 154) = 104,117, p = 0,000 in our study. All male patients in both study groups were very satisfied with the services. The results of the correlation analysis also showed a significant negative correlation between age and service satisfaction. Namely, patients in both groups, younger than 40 years, were more satisfied with the services compared to older patients, especially those over 60 years of age, where the greatest dissatisfaction with the received services was recorded (Cramer V = 0.672). Similar results were found by researchers in the study [33] which aimed to establish a link between patient satisfaction and the gender of physicians in community health organizations. They reported that the increase in the number of male doctors was positively correlated with patient satisfaction, ie. oLDER patients and those with higher medical bills were more dissatisfied [33]. The study [34], which evaluated user satisfaction with health care, revealed the association of other sociodemographic characteristics with satisfaction with the care services received. The previously mentioned study reported that: a higher degree of professional education, occupation, and living in the city were associated with a higher degree of satisfaction, which we did not prove in our study.

Determinants of satisfaction with health care services may be related to the behavior and attitude of health care professionals who care for the patient. Supporting this claim Feysia et al. state that the level of competence of healthcare workers affects patients' satisfaction with healthcare [21] This was further confirmed in the study by Akinyinka et al. in a study in Lagos, Nigeria that the level of trust in health professionals affects the level of satisfaction with care [26]. The results of our study revealed the greatest differences between the examined groups of patients of the primary and secondary level of ZZ in terms of satisfaction with the information provided regarding the disease and diagnostic-therapeutic interventions, as well as in terms of the assessment of communication and kindness during care services.

It is important to mention the attitude of patients about the importance of quality interprofessional cooperation during the collaborative practice of health professionals. Namely, both examined groups of patients in our study stated that the interprofessional cooperation of health workers is very important for the quality of protection/care provided by health institutions.

A study conducted in Nigeria (2005) reported that the decline in health service delivery over time has resulted in a loss of consumer confidence in existing services, underutilization of primary health care (PHC) services with accompanying over-dependence on tertiary health care institutions, which is also the case in healthcare in our area [35]. These results of our study could be connected with the facts of not a timely investment in health infrastructure, the outflow of quality personnel from our areas, and the insufficient readiness of health systems to compensate for this quickly.

Secondly, the way of providing care services at the level of tertiary health care is realized through closer oral permanent interprofessional team cooperation, as opposed to services at the primary level of health care where this cooperation is achieved more through written documentation with insufficient awareness of health professionals about joint/collaborative responsibility for care services provided to consumers.

Third, the increasing complexity in the provision of health care due to the increase in the number of so-called complex patients with a large number of coexisting comorbidities who use health care services, where teamwork and interprofessional cooperation are imperative for the efficiency of health services, positive outcomes of care, and saving resources in the health care system.

5. Conclusion

The research was conducted with the aim of examining patients' satisfaction with interpersonal cooperation and health services provided at the level of primary and secondary health care.

The obtained results showed that satisfaction with the received care services was significantly higher in the group of patients cared for at the secondary level of health care, in contrast to those who were cared for at the primary level of health care. The biggest differences in terms of satisfaction with the services received were noted in terms of satisfaction with the information provided regarding the disease and diagnostic and therapeutic interventions, to the greater satisfaction of patients cared for at the level of secondary health care. Emphasis can also be noticed at the level of gender, where all male respondents are satisfied with the care services received. It is important to note that the patients, cared for at the primary and secondary level of health care, stated that the interprofessional cooperation of health workers is very important for the quality of services provided to them in the health institution.

This research is just one of the possible approaches in analyzing patient satisfaction with interpersonal cooperation and health services provided at the level of primary and secondary health care and is only the basis for further research that would result in deepening knowledge in the field of interprofessional cooperation.

Ethical statement:

Certificate of research approval. The number of the decision for the health center is 05 / 14-374 from 25.01. 2021. and for O: B. Nikšić number 9630 from 10.12. 2020

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Research Article

THE ANTIOXIDANT ROLE OF STORAX IN BORON COMPOUNDS INDUCED HACAT CELLS

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Abstract: *The skin is the first line of defense against microbial and chemical agents. Keratinocytes represent the major component of the skin. Storax is thought to have antioxidant, anti-inflammatory, and antimicrobial effects. some substances in storax have a cytotoxic effect and storax can be a source of oxidative stress. Boron compounds have a wide physiological effect on biological systems at low concentrations and are toxic at high concentrations. The aim of this study is to evaluate the oxidative effect of storax on boron compounds treated HaCaT keratinocytes in vitro. To determine the effect of boron compounds on cell viability and 50% lethal dose, the MTT method was employed, and the IC50 dose was found to be 1000 µg/ml borax and 250 µg/ml colemanite at the 24th hour. To determine the antioxidant activity of storax cells treated with borax and colemanite with or without storax and then the oxidative stress index, SOD, GPx, and MDA levels were evaluated with ELISA. Storax reduces the oxidative stress index through GPX, SOD, and MDA activities. When all the results are evaluated, the idea arises, that storax can be used as a possible therapeutic agent for the skin.*

Keywords*: Borax, Colemanite, Keratinocyte, Skin, Storax*

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1. Introduction

The skin is the primary interface between the environment and the body is the skin which provides the first layer of defense against chemical and microbial agents [1]. Keratinocytes are the major component of the skin that takes part in the skin's immune system by producing, constitutively or upon stimulation, numerous soluble mediators [2, 3]. The increasing oxidative stress in epidermal keratinocytes results in decreasing barrier function, the dermal-epidermal junction flattening, and reduced trans-epidermal water loss [4, 5].

There are some mechanisms to prevent cellular damage caused by oxidant molecules in the body. Antioxidants are substances that prevent the formation of free radicals, metabolize free radicals, or increase the scavenging of free radicals in order to prevent the oxidation of oxidizable substances such as proteins, lipids, carbohydrates, and DNA in living cells. Normally, there is a counterpoise among antioxidants and oxidants in our body, and oxidative stress caused by free radicals inspired by exogenous or endogenous events occurs [6]. Antioxidants are divided into endogenous (enzymes and non-enzymes) and exogenous sources. Antioxidants, which are endogenous enzymes; glutathione transferase (GST), superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx), mitochondrial oxidase and glutathione reductase system. The antioxidant enzyme Superoxide Dismutase (SOD) catalyzes the conversion of superoxide radicals to molecular oxygen and hydrogen peroxide. Catalase; breaks down hydrogen peroxide into oxygen and water. Catalase takes place mainly in peroxisomes, to a lesser extent in the cytosol and the microsomal fraction. Glutathione peroxidase: It turns hydrogen peroxide into the

water while oxidizing glutathione. Glutathione reductase converts oxidized glutathione (GSSG) to reduced (active) glutathione (GSH) [7].

Antioxidants interact with each other. Generally, these substances work as synergists. This interaction creates the total antioxidant capacity by making an effect more than the sum of the effects of the components alone. A decrease in one antioxidant can be compensated by an increase in another. Therefore, the measurement of total antioxidant capacity provides more valuable information than measuring antioxidants one by one [8]. Oxidative stress and tissue damage occur when the total oxidant status (TOS) exceeds the total antioxidant status (TAS). ROS (Reactive oxygen species) induced oxidative stress is one of the most important factors involved in the development of a wide variety of pathological conditions by altering metabolic homeostasis and regulation of cell growth and differentiation. Hence, the antioxidant production against excessive accumulation of ROS in cells and tissues has been shown to be an important pathogenic mechanism.

Lipid peroxidation is the reaction of polyunsaturated fatty acids found in mammalian cell membranes by free oxygen radicals to various products such as hydroxy fatty acids, alcohols, aldehydes, peroxides, pentane, ethane, malondialdehyde (MDA) [9]. The degree of the cell damage caused by lipid peroxidation depends on the activity levels of the defense systems inside the cell. These defense systems are free radical scavengers and antioxidants [10].

In Turkey, often known as the Anatolia sweetgum tree (*Liquidambar Orientalis Mill.*) is the *Hamamelidaceae* family, from the *Bucklandioida* subfamily, is a genus *Liquidambar* and is a kind of showing the spread of Southwestern Turkey. Liquidambar type has a balsam channel in its body. Considering its name, it is a combination of the words "liquidus", which means liquid in Latin, and "amber", which means the general name given to fragrant aromatic substances in Arabic, so it is also known as the fragrant liquid.

Liquidambar genus have 4 different species. The *Liquidambar Orientalis* (LO) is the most common species, which is called Turkish sweetgum or sığla. The medicinal products of LO are mostly obtained by damaging the outer surface of the tree. Storax has been used for treating, coughs, dysentery, infections, and wounds. Storax has had medicinal use since ancient times [11]. Storax has been described to contain numerous compositions (α -terpinol, terpinene-4-ol, γ –terpinene, sabinene, etc.) which have anti-microbial and antioxidant effects [12].

Boron (B) is a nonmetal element that is in the IIIA group in the periodic table and has an oxidation state of +3. Its atomic number is 5, its atomic weight is 10.81. Boron is an essential and important element for the plant, animal, and human health. This element has toxic effects at high concentrations and wide physiological effects at low concentrations. Although there are many studies on the toxicity and biological effects of boron, more studies are needed to understand its mechanism of action [13].

Boron does not exist in the form of a pure element in nature. Borax and colemanite are different forms of boron structures. Usage areas of boron compounds include glass, ceramics, cleaning, bleaching, cosmetics, metallurgy, nuclear, computer, and aircraft industry, energy sector, agriculture, and health. It is stated that there are more than 250 boron compounds in the air, soil, and water. Due to the high affinity of boron for oxygen, there are a wide variety of boron-oxygen compounds called borates [14]. Boron oxide (B_2O_3) and boric acid (H_3BO_3) are these compounds. They are the simplest structured ones [15]. In addition, boron has calcium, magnesium, and sodium elements and compounds. Some of the important ones are borax ($Na_2B_4O_7.10H_2O$) and colemanite ($Ca_2B_6O_{11}.5H_2O$). Borax and colemanite are widely used as antiseptics, bactericides, soaps, and detergents such as cleaning agents, preservatives, fire retardants, fertilizers, insecticides, and herbicides [16].

The aim of this study is to evaluate the oxidative effect of storax on boron compounds treated HaCaT keratinocytes in vitro and try to figure out the oxidative damage of boron compounds on keratinocytes and the potential antioxidative effect and mechanism of storax on treated keratinocytes.

2. Material and Methods

2.1. Cell Culture

DMEM-high glucose (Gibco) with 10% FBS (Gibco) and 1% penicillin-streptomycin (Gibco) used for HaCaT (RRID: CVCL_0038) keratinocyte cell culture. Cells were grown in a 5% CO2, 95% air-humidified incubator at 37 °C. The medium was removed, and fresh medium was added every 2-3 days. After reaching 80 to 90% confluence, the cells were trypsinized with 0.25% trypsin-EDTA-solution and recultured.

2.2. Storax Analysis Method

Gas Chromatography Mass Spectrometry was used for essential oil and a Gas Chromatography Flame Ionization Detector is used to determine percentages. For sample preparation, a 5% solution of essential oil in n-hexane dissolved. The analysis was done at Bezmialem Vakıf University Phytotherapy Education Research and Application Center (BITEM).

2.3. MTT Assay

The effects of the following agents were tested: borax (Na2B4O7·10H2O, CA S N o.1303-96-4), colemanite (Ca2B6O11·5H2O, CA SNo. 1318-33-8). The compounds were purchased from Eti Mine Works General Management (Turkey). The Effects of borax and colemanite on cell proliferation in HaCaT keratinocytes were detected by MTT assay according to manufacturer methodology (MTT Cell Viability Assay Kit; Biotium cat no: 30006). HaCaT cells were seeded into 96-well plates at a concentration of 1×10^4 cells per well. After 24 hours of incubation, the cells were treated with 250 μg/ml, 500 μg/ml, 750 μg/ml, and 1000 μg/ml concentrations of borax, and colematine dissolved in dH2O during 24 and 48hr. Untreated cells were used as control cells. After the incubation period, the MTT mixture was added and then formazan formation was determined at 570 nm (reference wavelength 630 nm) by a microplate reader (Biotek). Background absorbance was subtracted from signal absorbance to obtain normalized absorbance values.

Viability (%) = Absorbance of experiment well / Absorbance of control well × 100

2.4. Total Antioxdant Status (TAS) and Total Oxidant Status (TOS)

HaCaT cells were seeded into T-25 flasks (Sarstedt) at a concentration of 1×10^6 cells. After 24 hours of incubation, the cells were treated with 1000 μg/ml borax and 250 μg/ml colemanite at 24 hr with or without 50 μg/ml storax. After 24 hours the medium of culture was stored for the subsequent experiments.

TAS levels were measured using TAS assay kits (Cat.No: RL0017, Relassay, Turkey). The novel automated method is based on the bleaching of the characteristic color of a more stable ABTS (2,2′-Azino-bis(3-ethylbenzothiazoline-6-sulfonic acid)) radical cation by antioxidants. The results were expressed as mmol Trolox equivalent/L [17].

TOS levels were measured using TOS assay kits (Cat.No: RL0024, Relassay, Turkey). The oxidants present in the sample oxidized the ferrous ion-o-dianisidine complex to the ferric ion. The oxidation reaction was enhanced by glycerol molecules abundantly present in the reaction medium. The ferric ion produced a colored complex with xylenol orange in an acidic medium. The color intensity, which could be measured spectrophotometrically, was related to the total amount of oxidant molecules present in the sample. The assay was calibrated with hydrogen peroxide and the results were expressed in terms of micromolar hydrogen peroxide equivalent per liter (μol H2O2 equivalent/L) [18].

OXIDATIVE STRESS INDEX (OSI)

The ratio of TOS to TAS was accepted as the oxidative stress index (OSI). For calculation, the resulting unit of TAS was converted to µol/L, and the OSI value was calculated according to the following Formula :

OSI (arbitrary unit) = TOS (µol H2O2 equivalent/L) / TAC (µol Trolox equivalent/L) [19, 20, 21].

2.5. 2.5 SOD, GPx, MDA ELISA

$1x10^6$ HaCaT cells were seeded per well of a 6-well plate. After 24 h, cells were treated with 250 µg/ml Colemanite, 1000 µg/ml Borax, and with or without 50 µg/ml Storax. The culture medium was collected at the 24th hour, and the amount of SOD, GPx, and MDA was determined with ELISA. The collected media at the specified times were kept at -20 °C until ELISA measurement was performed. ELISA assay was performed according to the manufacturer's instructions (Cat. No: E4502Hu, E3921Hu, SH0020 BT-Lab, China).

2.6. Statistical Analysis

IBM SPSS Version 23 (SPSS Inc., Chicago, IL, USA) analysis program was used to perform the parametric and nonparametric analysis of dose and control groups. ELISA results were evaluated with a one-way ANOVA test. p <0.05 was considered to indicate statistical significance.

3. Results

3.1. Storax Analysis

According to the GC-MS data and chromatogram (Figure 1). Cinnamyl cinnamate constitutes the bulk of the essential oil composition (64.708 %). Then the second most abundant substance was p-ethlyphenol (8.632%). The other compounds were Alpha pinene (3.259%), 3-Phenylpropanol (3.183%), Cinnamyl Alcohol (2.428%), Ethyl Cinnamate (1.374%), Beta Pinene (1.126%), Acetophenone (0.933%), and the compounds with an amount less than 0.1% (14.357%).

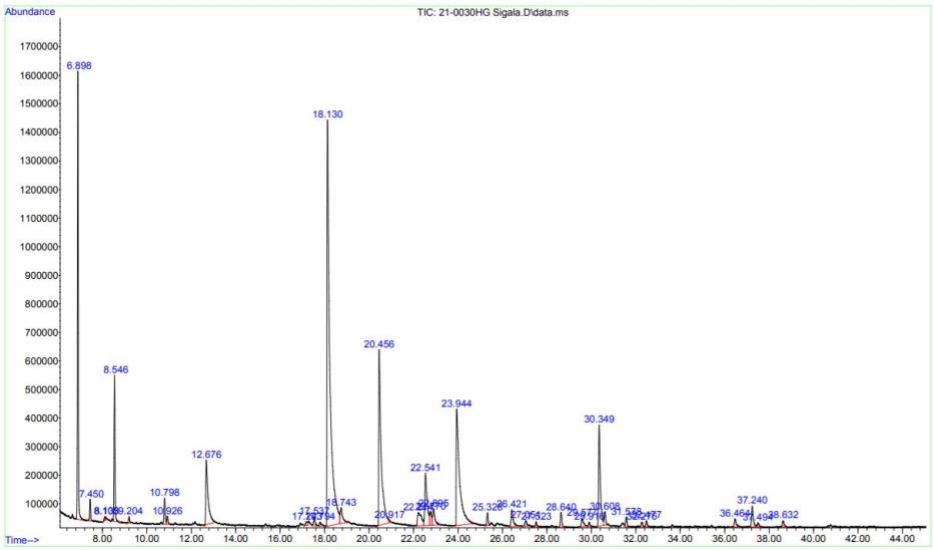

Figure 3.1. Gas chromatography-mass spectrometry (GC-MS) profiles of Storax essential oil

3.2. Effect of Borax and Colemanite on HaCaT keratinocyte cells

The effect of borax and colemanite on HaCaT keratinocytes was determined by MTT assay. In this way, the effect of borax and colemanite on HaCaT keratinocytes was investigated depending on time and dose. The IC_{50} dose of borax was found to be 1000 µg/ml in the 24th hour while the IC_{50} dose of colemanite was found to be 250 µg/ml in the 24th hour.

3.3. Antioxidant effect of storax in borax and colemanite-induced keratinocytes

For detecting the antioxidant activity of storax on boron compounds treated keratinocytes, the total oxidant, and antioxidant status were evaluated, and the oxidative stress index was calculated. OSI levels of the borax-treated cells were statistically different than the control group (2.016 vs 0.407, $p<0.05$) and the group which is treated both with borax and storax (2.016 vs 1.470, $p<0.05$). Also, OSI levels of the colemanite-treated cells were statistically different than the control group (2.142 vs 0.407, $p<0.05$) and the group which is treated both with colemanite and storax (2.142 vs 1.099, $p<0.05$) (Figure 2).

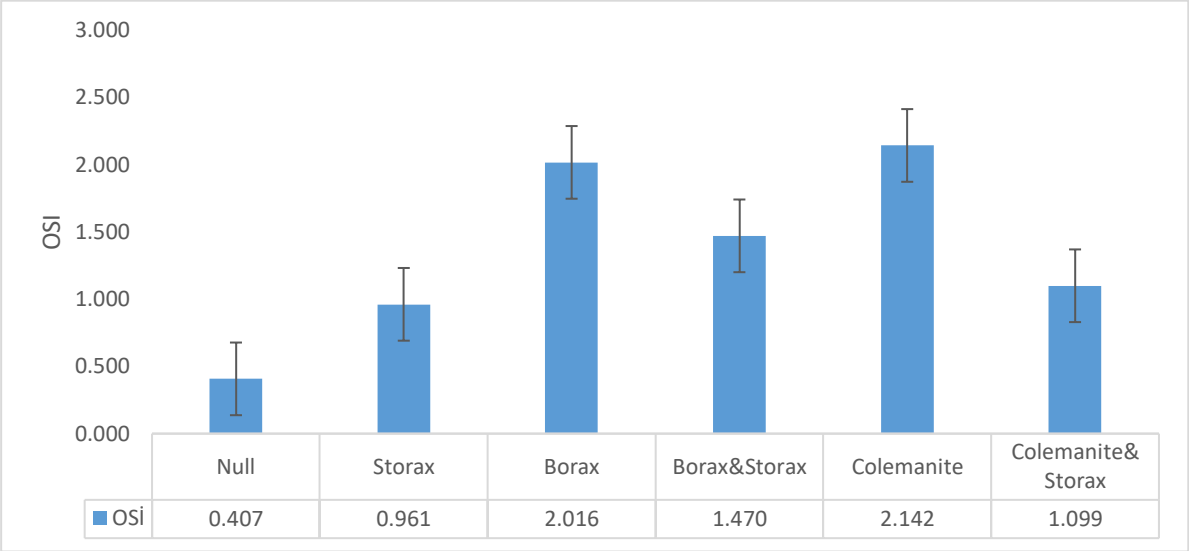

Figure 2. Oxidative stress index in borax, storax, and colemanite treated HaCaT keratinocytes.

To explain the changes in the oxidative stress index the antioxidant enzymes superoxide dismutase (SOD) and glutathione peroxidase (GPx), lipid peroxidation product malondialdehyde (MDA) levels were measured and statistically evaluated. Twenty-four-hour borax treatment caused alterations in the antioxidant enzyme activities of keratinocytes. GPx level decreased with borax treatment (6.0 vs 9.0, $p<0.05$) but treatment with borax and storax restore the GPx level in the control group (9.4 vs 9.0, $p>0.05$). SOD level decreased with borax treatment (0.26 vs 1.51, $p<0.05$) and storax treatment decreases the SOD level with or without borax treatment (0.66 vs 0.21, $p<0.05$). Twenty-four-hour colemanite application caused alterations in the antioxidant enzyme activities of keratinocytes. GPx level increased with colemanite treatment (11.6 vs 9.0, $p<0.05$), and also treatment with colemanite and storax increased the GPx level more (12.8 vs 11.6, $p=0.238$). SOD level decreased with colemanite treatment (0.56 vs 1.51, $p<0.05$) but storax treatment decreases the SOD level (0.56 vs 0.74, $p<0.05$) (Figure 3).

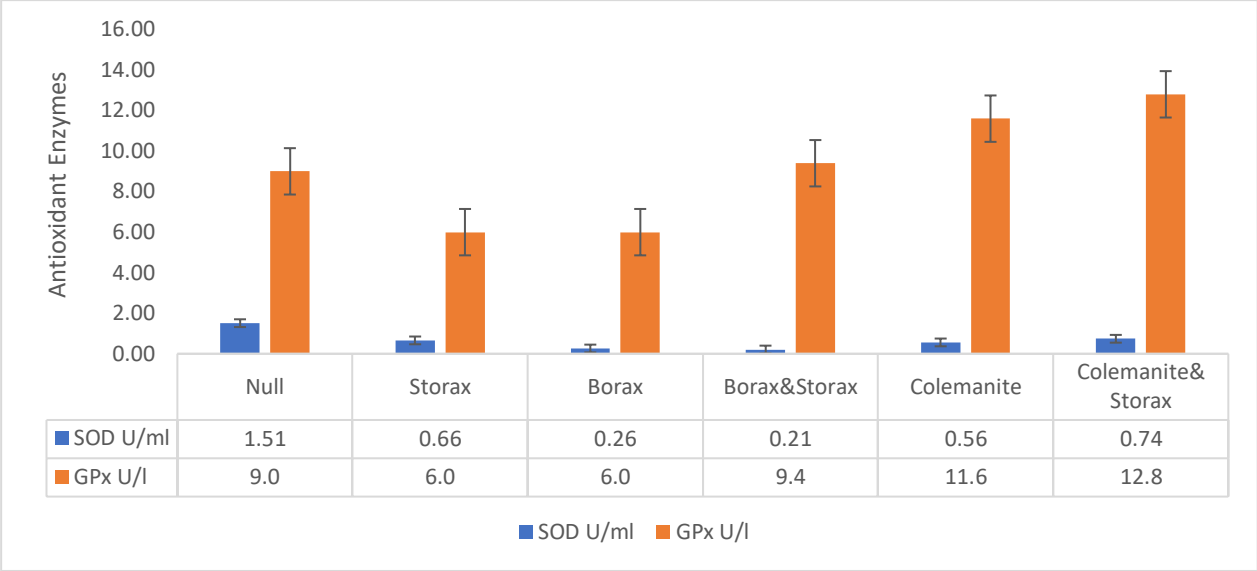

Figure 3. Antioxidant enzyme status in borax, storax, and colemanite treated HaCaT keratinocytes.

The MDA level increased with borax treatment (0.5 vs 0.456, $p<0.05$) but treatment with borax and storax restore the MDA level in the control group (0.5 vs 0.464, $p>0.05$). The MDA level increased with colemanite treatment (0.637 vs 0.456, $p<0.05$) but treatment with borax and storax increased the MDA level lower than the control group (0.21 vs 0.456, $p<0.05$) (Figure 4).

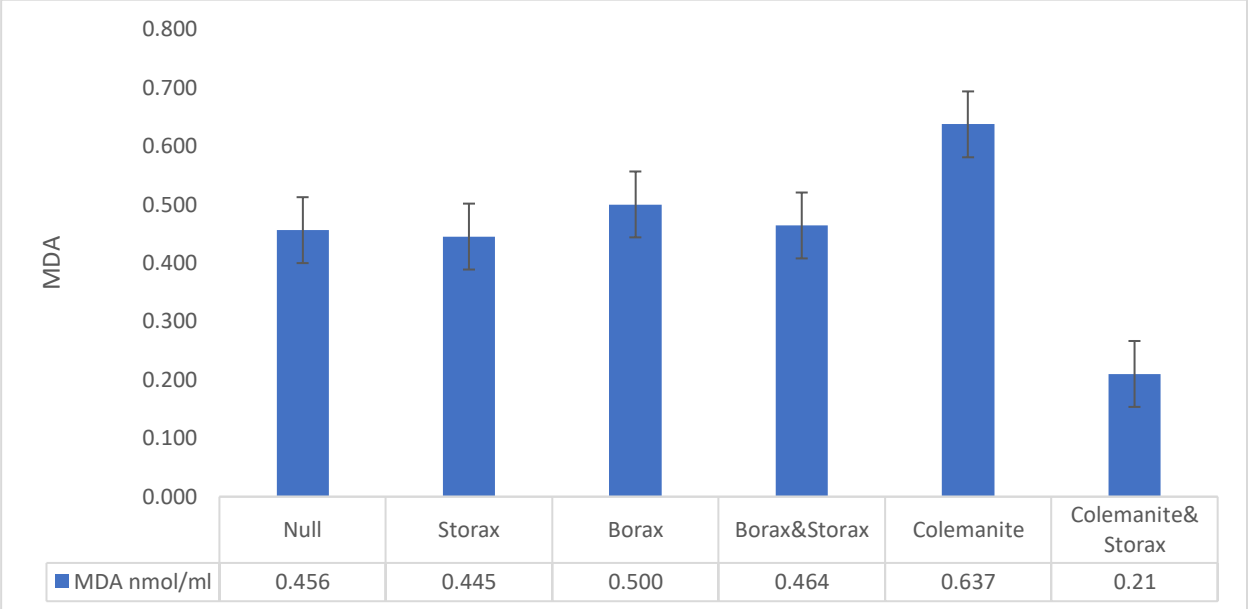

Figure 4. Lipid peroxidation status in borax, storax, and colemanite treated HaCaT keratinocytes.

4. Discussion

Oxidative stress is caused by an imbalance between the production of the reactive oxygen system's ability to detoxify the reactive products or easily repair the resulting damage. The reactive oxygen species (ROS) can trigger the signaling processes and lead to cytotoxicity in many disorders, as the role of the antioxidant system.

Storax obtained from *Liquidambar orientalis Mill (Hamamelidaceae)* has been used as an antiulcerogenic in Turkish folk medicine for centuries [22]. Antibacterial activity of storax has been reported by in vitro techniques performed by Sağdıç et al. [23,24]. Antioxidant activity was determined by the DPPH test by Topal et al. [25]. Suzek et al. have extensively investigated the antioxidant activity of storax in vivo. They concluded that storax, a resinous exudate obtained from the injured body of Liquidambar Orientalis and locally named "Sığla Yağı", has a protective property and antioxidant activity [26].

Storax contains 65% Cinnamyl cinnamate, a phenolic compound. Antioxidant, antibacterial, and anti-inflammatory properties of this substance have been demonstrated in studies with plant extracts containing Cinnamyl cinnamate and propolis. It was also shown that Cinnamyl cinnamate protects some cells from lipid peroxidation and damage, caused by various oxidative toxins. Storax is thought to have antioxidant, anti-inflammatory, and antimicrobial effects with Cinnamyl cinnamate even though there is no detailed information about its pharmacokinetics in humans [27].

It has been shown that some substances in storax have a cytotoxic effect and that storax can be a source of oxidative stress. It was emphasized that storax carries out these properties through DNA damage, and this is the source of the antimicrobial effect of storax. Therefore, it has been stated that storax is a plant oil that has oxidant properties as well as an antioxidant effect [28]. In our study, storax treatment increased the oxidative stress index and the level of the antioxidant enzyme (SOD and GPx) decreased. These results are parallel with the literature which point to the oxidative effects of storax.

The lipid peroxide radicals formed to cause the formation of new lipid radicals by affecting other polyunsaturated fatty acids in the membrane structure. The most important breakdown product resulting from lipid peroxidation, MDA causes cell damage by reacting with functional groups of various compounds in the cell [29]. In our study, MDA levels did not change with the storax treatment. While storax and bor compounds co-treatment the MDA levels decrease.

SOD has a central role in oxidative damage. This enzyme catalyzes the dismutation of superoxide to oxygen and hydrogen peroxide [30]. Türkez et al. indicated that not only borax but also colemanite have caused significant increases in the SOD activity in blood plasma. In our study, storax and bor compounds treatment decreases the SOD level [31]. Storax could reverse the SOD activity at co-treatment with colemanite, but it is still significantly different from than control group. Furthermore, storax could reverse the GPx activity at co-treatment with borax. Interestingly, the GPx levels of colemanite and storax-colemanite co-treatment were higher than the control group.

5. Conclusion

In conclusion, the oxidant properties of storax were also confirmed by the significant difference in OSI values with the control group versus storax treated group. However, when a secondary oxidative stress source (borax and colemanite) is co-treated, it has been shown that storax reduces the oxidative stress index through GPX, SOD, and MDA activities. When all the results are figured out, the idea appears that storax can be used as a possible therapeutic agent for skin. In this respect, it is important to expand and accelerate in vitro studies and to start in vivo studies using experimental animals.

Declarations

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Consent for publication: All authors have read and approved the manuscript and its submission to the Biological Trace Element Research

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Research Article

BREASTFEEDING SELF-EFFICACY IN PREGNANT WOMEN AND EFFECTIVE FACTORS IN THE COVID-19 PANDEMIC

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Abstract: *This study was conducted to identify the factors affecting the breastfeeding self-efficacy of pregnant women during the COVID-19 pandemic. This descriptive correlational study was conducted between 15 January and 15 June 2021. The sample consisted of 320 pregnant women, who were in their third trimester, had a singleton pregnancy and a healthy fetus, a spontaneous pregnancy, and no health problems. The data of the study were collected using an Information Form and the Prenatal Breastfeeding Self-Efficacy Scale. The mean total Prenatal Breastfeeding Self-Efficacy Scale score of the participants was 79.08±13.86. The seven variables with significant effects on the mean total Prenatal Breastfeeding Self-Efficacy Scale scores of the participants were being knowledgeable on COVID-19, thinking breastfeeding is beneficial for the baby, visiting the outpatient clinic for prenatal follow-ups on time, gestational week, educational level, age, and receiving breastfeeding consultancy in the COVID-19 pandemic. Especially young pregnant women who have low educational levels and are not experienced or knowledgeable about breastfeeding should be provided with counseling on breastfeeding. This study is believed to contribute to the literature and guide interventional studies to be conducted in the future by evaluating prenatal breastfeeding self-efficacy levels and affecting factors.*

Keywords*: Breastfeeding, Breastfeeding self-efficacy, COVID-19, Pandemic, Pregnancy*

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1. Introduction

Breast milk is the most ideal source of nutrition for babies under any condition, be it natural disasters or even pandemics. The fact that breast milk is an especially important source of antibodies makes it a necessity for breastfeeding to be provided and continued, especially in these days when we are experiencing the COVID-19 pandemic. WHO has deemed breastfeeding to be safe under all circumstances in the COVID-19 pandemic [1].

Numerous factors affecting breastfeedings, such as the mother's age, educational level, economic status, and insufficient breast milk, have been reported in the literature [2-4]. One of these factors is the mother's breastfeeding self-efficacy [3-5]. Breastfeeding self-efficacy affects whether the mother will breastfeed, her thoughts on breastfeeding, and her skills of coping with the emotional difficulties that she is likely to encounter during this process [6]. Breastfeeding self-efficacy starts to develop in the

prenatal period. This self-efficacy that is expected to develop in the prenatal period is also highly important in the successful management of breastfeeding behaviors in the postpartum period [7].

Breastfeeding self-efficacy is a strong indicator of the duration of breastfeeding which can be affected by a set of factors in various situations including crises [8]. In the COVID-19 pandemic, which is indeed a crisis period, planning and implementation efforts during the prenatal period with information based on evidence by identifying the factors affecting breastfeeding self-efficacy have become more important compared to other periods in terms of maternal and infant health. Moreover, the breastfeeding self-efficacy of the mother should be improved during the prenatal period for breastfeeding to start as soon as possible in the postpartum period and in terms of successful breastfeeding outcomes [20, 21, 22]. Therefore, this study was conducted to identify the factors affecting the breastfeeding self-efficacy levels of pregnant women during the COVID-19 pandemic.

2. Materials and Methods

2.1. Research Design

The study has a descriptive correlational design.

2.2. Sample

The population of the study comprised all pregnant women presenting to the obstetrics outpatient clinic of a university hospital. Having predicted the effect size of the independent variables on the prenatal breastfeeding self-efficacy scale scores of pregnant women to be f2:0.08 (small effect) based on the multiple regression analysis results, it was determined that at least 285 pregnant women should participate in the study as per the sample size calculation made using the G*Power (3.1.9.2) software with a 5% alpha margin of error (two-tailed) and 90% power. Taking into account the possibility of data losses during the data collection process, it was decided to include 314 pregnant women in the study, 10% higher than the number found in the sample size calculation step. Pregnant women who were in their third trimester (27^{th} gestational week and later), had a singleton pregnancy and a healthy fetus, a spontaneous pregnancy, and no health problems were included in the study.

2.3. Measurement

The data were collected using an Information Form and the Prenatal Breastfeeding Self-Efficacy Scale. The Information Form was prepared by the researchers, and it consisted of twenty-five questions on the characteristics of the participants, including their sociodemographic, obstetric, and breastfeeding characteristics, as well as their knowledge related to COVID-19.

The Prenatal Breastfeeding Self-Efficacy Scale (PBSES) was created by Wells et al. (2006) to determine the breastfeeding self-efficacy perceptions of pregnant women in the prenatal period [10]. Cronbach's alpha coefficient of the scale was reported as 0.89. The validity and reliability study of the scale that was adapted to Turkish was conducted by Aydın and Pasinlioğlu (2018), and its Cronbach's alpha coefficient was found 0.85 [10]. The scale consists of 20 items in total and has four subscales. These; information collection (1, 2, 3, 5, 17), ability (6, 7, 8, 9, 10, 11, 12), breastfeeding and breastfeeding nearby other people (13, 14, 15, 16), and wishes (18, 19). It is a 5-point Likert-type scale. The minimum and maximum scores to be obtained from the scale are 20 and 100. Higher scores reflect higher levels of breastfeeding self-efficacy. The Cronbach’s alpha coefficient of PBSES in this study was determined to be 0.90 for the overall scale, 0.76 for the information collection subscale, 0.82 for the ability subscale, 0.74 for the breastfeeding nearby other people subscale, and 0.64 for the wishes subscale.

2.4. Data Collection

The data were collected by the researcher between 1 March 2021 and 1 June 2021 using the random sampling method, which is a non-probability sampling method. The purpose of the study was explained to the pregnant women, who visited the hospital for routine follow-ups, after their examinations, and their verbal consent was taken before data collection.

2.5. Data Analysis

The data obtained in the study were analyzed using SPSS Statistics Version 20.0 (IBM Inc., Armonk, NY, USA). The frequency, percentage, mean, and standard deviation values of the data are provided as descriptive statistics. To analyze the differences among the mean PBSES scores of the participants based on the independent variables, the independent-samples t-test and Mann-Whitney U test ($n<30$) were used in the comparisons of two independent groups, and one-way analysis of variance (ANOVA) (post hoc analysis: Tukey's HSD) and Kruskal-Wallis test were used for comparing more than two independent groups. The relationships between the numeric independent variables and the participants' PBSES scores were analyzed with correlation analyses. The independent variables that were discovered to have a significant effect on PBSES scores in the univariate analyses were analyzed using the multiple regression (backward method) analysis methods. The statistical significance level was accepted to be $p<0.05$.

2.6. Ethical Statement

Before starting the study, approval was obtained from the Non-Invasive Clinical Studies Ethics Committee of the Meram Faculty of Medicine at Necmettin Erbakan University (decision no: 2021/3018; Date: January 8, 2021).

3. Results

The pregnant women who participated in this study were between 18 and 43 years of age, 44.7% of them were 25 years old or younger, 21.5% held at least a bachelor's degree, and 89.4% were not working. Among their partners, 20.3% held at least a bachelor's degree, and 95.9% were employed. All participants were married. The mean duration of their marriages was 6.26±5.48 years. The mean gestational week of the participants was 33.25±3.66, 33.8% were primiparous, and 66.2% were multiparous. The majority of the participants did not have a history of miscarriage (65.3%) or abortion (79.1%). When asked about which sex they would want their babies to be, 19% answered female, 13% answered male, and 68% stated that they did not mind either way. When asked about the sex of their babies, 40.7% answered female, 51.2% answered male, and 8.1% said that they did not know. Of all participants who thought of breastfeeding after giving birth, 96.3% thought that breastfeeding is beneficial for the mother, and 91.9% thought that it is beneficial for the baby. During the COVID-19 pandemic period, 25.9% of the participants had received breastfeeding consultancy, while 74.1% had not. It was found that 15.6% of the participants had been tested for COVID-19, and 7.2% had tested positive. When questioned about their knowledge of COVID-19, 80.9% claimed to be knowledgeable about COVID-19, while 19.1% claimed to be partially knowledgeable about it. While 58.1% of the participants stated their source of information as social media/internet, 39.4% and 2.5% expressed their sources of information to be TV and health personnel, respectively. It was stated 84.1% of the participants that isolated themselves at their homes, and 98.4% reported that they complied with mask/social distancing/hygiene rules during the pandemic period. While 49.1% of the participants thought that the pandemic affected their pregnancy when asked about the feeling that they had for most

of the time in the pandemic period, 37.1% answered it was fear, 24.1% felt sadness, 23.8% felt haste, 9.1% claimed to feel nothing/be neutral, and 5.9% felt hopelessness.

The total PBSES scores of the participants ranged between 27 and 100, and their mean score was found as 79.08±13.86. It was observed that the mean PBSES score of the participants who were 26 years old or older was significantly higher than that of the participants aged 25 or younger ($p<0.05$, Table 1). It was also determined that the participants holding at least a bachelor's degree had a significantly higher mean total PBSES score than those who had high school or lower degrees ($p<0.05$), and the significance of this difference was high ($p<0.001$).

Table 1. Differences in PBSES Total Scores Based on the Independent Variables

Independent Variables	n	PBSES $\bar{X}$ ±SD	test	p
Age				
≤ 25	143	77.20±13.28	t*: 2.188	0.029
≥ 26	177	80.59±14.17		
Educational Level				
Literate/elementary school [a]	151	77.97±13.83	F**: 14.990	0.000
High school [a]	100	75.57±14.56		(a < b)
Bachelor's degree or higher [b]	69	86.58±9.64		
Working				
Yes	34	85.24±13.15	t: 2.768	0.006
No	286	78.35±13.79		
Partner's Educational Level				
Literate/elementary school [a]	147	77.67±15.26	F: 3.589	0.029
High school [a]	108	78.59±12.33		(a < b)
Bachelor's degree or higher [b]	65	83.08±12.31		
Number of births				
1	108	79.94±11.97	t: .797	0.426
2 or above	112	78.64±14.74		
Has a history of abortion				
Yes	111	80.01±12.60	t: .875	0.382
No	209	78.58±14.50		
Has a history of miscarriage				
Yes	67	82.54±10.92	t: 2.712	0.008
No	253	78.16±14.42		
The sex of the baby				
Girl	130	78.84±15.48	KW***: .064	0.969
Boy	164	79.01±13.11		
The desired sex of the baby				
Female [a]	61	74.90±12.34	F: 3.557	0.030
Male [b]	40	79.25±14.66		(a < c)
It does not matter [c]	219	80.21±13.96		
Attends prenatal follow-ups on time				
Yes	267	80.72±12.31	t: 3.863	0.000
No	53	70.79±17.90		

Independent-samples t-test, df:318, **Analysis of variance, intergroup/intragroup comparisons between groups/within groups 2/317/319, ***Kruskal-Wallis test df:2

The participants who were working had a significantly higher mean scale score than the non-working participants ($p<0.01$). The participants whose partners had at least a bachelor's degree were determined to have a significantly higher PBSES mean score than those whose partners had high school or lower degrees ($p<0.05$). The participants with a history of miscarriage were determined to have a significantly higher mean score than those with no such history, and the significance of this difference was high ($p<0.01$).

The participants who did not mind the sex of their babies had a significantly higher PBSES mean score compared to those desiring to have a female baby ($p<0.05$). The participants who visited the outpatient clinic for their prenatal follow-ups on time had a significantly higher PBSES mean score than the ones who did not, and the significance of this difference was ($p<0.01$).

It was seen that the participants who considered breastfeeding to be beneficial for the mother had a higher PBSES mean score than those who were indecisive about the benefits of breastfeeding, however, this difference was not significant ($p>0.05$). It was also found that the participants who considered breastfeeding to be beneficial for the baby had a higher PBSES mean score than those who were indecisive about the benefits of breastfeeding for the baby ($p<0.01$). The participants who had received breastfeeding consultancy during the COVID-19 pandemic period had a significantly higher PBSES mean score than those who had not received such consultancy ($p<0.05$, Table 2).

Table 2. Comparison of PBSES Total Scores of the Participants Based on Their Thoughts about Breastfeeding

		PBSES		
	n	**$\bar{X}$ ± SD**	**test**	**p**
Thinks breastfeeding is beneficial				
Yes	308	79.23±13.96	U*: 1315.5	0.090
Indecisive	12	75.08±10.98		
Thinks breastfeeding has benefits for the baby				
Yes	294	80.07±12.94	U: 2284.5	0.001
Indecisive	26	67.88±18.70		
Receiving breastfeeding consultancy in the COVID-19 pandemic				
Yes	83	82.35±12.55	**t: 2.519	0.012
No	237	77.93±14.14		

*Mann-Whitney U test, **independent-samples t-test df:318

With a highly significant difference, it was found that the participants who were knowledgeable about COVID-19 had a higher PBSES mean score compared to those who were not ($p<0.001$). The participants who thought that the pandemic did not affect their pregnancy had a significantly higher PBSES mean score than those who thought otherwise ($p<0.05$, Table 3).

Table 3. The Effects of Independent Variables on PBSES Scores: Multiple Linear Regression Analysis Results

Independent Variables	n	PBSES $\bar{X}$ ± SD	test	p
Has a diagnostic test for COVID-19				
Yes	50	79.22±17.05	t*: 0.079	0.937
No	270	79.05±13.23		
COVID-19 diagnostic test result				
Positive	23	78.91±16.57	KW**: 0.886	0.642
Negative	27	79.48±17.76	(df: 2)	
Did not get tested	270	79.05±13.23		
Knowledge of COVID-19				
I have knowledge	259	81.27±11.98	t: 4.932	0.000
I have partial knowledge	61	69.79±17.22		
Information source				
Health personnel	8	79.38±9.59	KW: .673	0.714
TV	126	78.26±14.47	(df: 2)	
Social media/internet	186	79.62±13.63		
Self-isolation at home during the pandemic				
Yes	269	79.67±12.88	t: 1.393	0.169
No	51	75.98±18.04		
Complied with mask /social distancing/hygiene rules				
Yes	315	79.09±13.93	U***: 4225.5	0.214
No	5	78.20±9.93		
Emotions felt during the pandemic				
Fear	119	79.55±12.83	KW: 5.647	0.227
Haste	76	78.83±17.27	(df: 4)	
Despair	19	83.95±10.85		
Hopelessness	77	77.23±13.13		
Felt nothing/neutral	29	79.48±11.29		
Thinking that the pandemic affected her pregnancy				
Yes	157	77.32±15.00	t: 2.226	0.027
No	163	80.77±12.49		

* Independent-samples t-test, df: 318, ** Kruskal-Wallis test, ***Mann-Whitney U test

No significant relationship was found between the participants' marriage durations and their PBSES scores (r: -0.05, $p>0.05$, Table 4). A weak, negative, and statistically highly significant relationship was found between the gestational weeks of the participants and their PBSES scores (r: -0.16, $p<0.01$). As the participants were further along in their pregnancy, their PBSES scores decreased.

Table 4. Relationship between the Marriage Durations and the Gestational Weeks of the Participants and Their PBSES Scores

Independent Variables	PBSES Total Score	
	r*	p
Marriage duration (years)	-0.05	0.341
Gestational week	-0.16	0.005

* Pearson's correlation analysis

A multiple linear regression analysis (backward method) was conducted to evaluate the overall effects of 13 independent variables determined to affect the PBSES scores of the participants in the univariate analyses. No high-level autocorrelation was found among the independent variables included in the regression model based on the correlation analysis and the multicollinearity statistics (Table 5). Among the independent variables included in the regression model, five independent variables, namely employment status, thinking the pandemic had an effect on one's pregnancy, partner's educational level, desired sex of the baby, and abortion history, were excluded from the regression model since they did not have significant effects on PBSES scores ($p>0.05$).

The order of the significance levels of the remaining seven variables with significant effects on the participants' PBSES scores based on the β coefficient (from the most significant to the least significant) was as follows: status of being knowledgeable on COVID-19, thinking to breastfeed is beneficial for the baby ($p<0.001$), visiting the outpatient clinic for prenatal follow-ups on time, gestational week, educational level ($p<0.01$), age, and status of having received any breastfeeding consultancy on the pandemic ($p<0.05$). These seven independent variables explained 25% of the total variance in the participants' PBSES scores (Table 3).

The PBSES scores of the participants who stated they were knowledgeable on COVID-19 were higher by 8.14 points than the scores of those who stated they were partly knowledgeable on the subject matter. The scores of the participants thinking to breastfeeding is beneficial for the baby were higher by 9.10 points than the scores of those who were indecisive about its benefits for the baby. The scores of the participants attending their prenatal follow-ups on time were higher by 6.16 points than the scores of those who did not attend their follow-ups on time. A one-unit increase in the pregnancy durations of the participants corresponded to a 0.62-unit decrease in their PBSES scores. The scores of the participants with at least a bachelor's degree were higher by 5.47 points than the scores of those who had high school or lower degrees. The scores of the participants aged 26 or older were higher by 3.49 points than the scores of those aged 25 or younger. The scores of the participants who had received breastfeeding consultancy during the COVID-19 pandemic period were higher by 3.34 points than the scores of those who had not participated in such consultancy processes.

Table 5. The Effects of Independent Variables on PBSES Scores: Multiple Linear Regression Analysis Results

Independent Variables	B	SS	β	t	p	95% Confidence Interval for B		Collinearity statistics	
								Tolerance	VIF
(Fixed)	75.61	7.44		10.165	0.000	60.97	90.25		
Knowledge of COVID-19	8.14	1.78	0.23	4.566	0.000	4.63	11.65	0.921	1.085
Thinking that breastfeeding has benefits for the baby	9.10	2.56	0.18	3.559	0.000	4.07	14.12	0.927	1.079
Prenatal follow-up on time	6.16	1.91	0.17	3.220	0.001	2.40	9.93	0.893	1.120
Gestational week	-0.62	0.20	0.16	3.158	0.002	-1.01	-0.23	0.880	1.137
Educational Status	5.47	1.75	0.16	3.122	0.002	2.02	8.92	0.870	1.149
Age	3.49	1.41	0.13	2.470	0.014	0.71	6.27	0.915	1.092
Receiving breastfeeding consultancy in the COVID-19 pandemic	3.34	1.65	0.11	2.026	0.044	0.10	6.59	0.863	1.159

4. Discussion

Breastfeeding as soon as possible after giving birth and a successful breastfeeding process is crucial. To this end, the mother should decide to breastfeed during the prenatal period, be informed on the subject matter and encouraged for it, have self-confidence, and as such, develop her breastfeeding self-efficacy. In this study, the mean total PBSES score of the pregnant women was 79.08±13.86. This means the score was reported as 73.5±8.0 in another study conducted in Turkey, 70±11.9 in a study conducted in Iran, and 51.79±11.94 in a study conducted in Spain [4, 10, 11, 12]. It was a satisfactory result that the breastfeeding self-efficacy levels of the participants of this study were high during the pandemic period. Being in a pandemic period can also be considered to increase sensitivity.

In this study, it was found that as the ages of the participants, so did their breastfeeding self-efficacy. In studies that have been conducted before the COVID-19 pandemic, it has been stated that there is a significant relationship between age and breastfeeding self-efficacy, and as age increases, so do breastfeeding self-efficacy levels, similar to the results of this study [11, 14]. As age increases, people's awareness and experiences soar as well.

It was also determined in this study that as the educational status of the participants increased, so did their breastfeeding self-efficacy. Sultana and Yasin (2021) stated that educational background had a significant relationship to awareness of breastfeeding practices during the COVID-19 pandemic period [14]. Dennis (2006) reported that mothers with high educational levels had higher breastfeeding self-efficacy levels than those with low educational levels. It was thought that people do more research about the pandemic and become more knowledgeable about it as their educational levels increase, and accordingly, they decide to breastfeed their baby; therefore, their breastfeeding self-efficacy is developed and increased [6].

It was determined in this study that the participants visiting their outpatient clinics for routine prenatal follow-ups on time had a higher PBSES mean score than those who did not visit their outpatient clinic on time. While the majority of pregnant women in Turkey stated that they visited their doctors for prenatal follow-ups before the COVID-19 pandemic [15], pregnant women participating in studies carried out during the pandemic period have stated that they do not visit their doctors for their follow-ups, postpone their follow-ups, or attend their follow-ups but not on time [16-18]. In these studies, the reason for not going to follow-ups, postponing follow-ups, or not going to follow-ups on time has been stated to be “anxiety/concern” over attending prenatal follow-ups [16, 19, 20]. Besides, precautions implemented in several countries such as curfews, limitation of social life, and social isolation practiced for protection from the disease are thought to be effective in not attending prenatal follow-ups. Thus, it was thought that the disruption of breastfeeding education, which is a component of prenatal care, affected breastfeeding self-efficacy, which is expected to develop in the prenatal period. Among the pregnant women who participated in this study, those who thought breastfeeding is beneficial for the baby had a higher mean breastfeeding self-efficacy score than those who did not think so. No participant thought breastfeeding is harmful to the baby. This result is thought to be important in that it specifies those who need to be supported for higher prenatal breastfeeding self-efficacy, indecisive women.

It was determined that the participants of this study who were knowledgeable about COVID-19 had a higher PBSES mean score than those who were not. No study on this topic has been found in the literature review that was conducted in this study. According to the data obtained in COVID-19-related studies carried out so far and the opinions of WHO, there is no evidence that COVID-19 infection can be transmitted by breast milk. In this period in which COVID-19 has spread to many countries and become a pandemic, it is crucial for breastfeeding mothers to know the important points to look out for when breastfeeding their babies to protect the baby’s health.

5. Conclusions and recommendations

In this study, it was determined that having knowledge about COVID-19, thinking that breastfeeding is beneficial for the baby ($p<.001$), attending prenatal follow-ups on time, gestational age, educational level, age, and status of having received breastfeeding consultancy during the COVID-19 pandemic period affected breastfeeding self-efficacy levels. Mothers should start and continue breastfeeding by following health protocols during the COVID-19 pandemic period. Accordingly, evaluating breastfeeding self-efficacy in the prenatal period and planning and implementing effective interventions to encourage and support the mother has gained more importance during the pandemic period. Especially young pregnant women who have low educational levels and are not experienced or knowledgeable about breastfeeding should be provided with counseling on breastfeeding and things to consider about breastfeeding during the COVID-19 pandemic period.

Ethical Statement: Before starting the study, approval was obtained from the Non-Invasive Clinical Studies Ethics Committee of the Faculty of Medicine at Necmettin Erbakan University (Decision no: 2021/3018; Date: January 8, 2021).

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Research Article

THE EFFECT OF WORKPLACE OSTRACISM ON ORGANIZATIONAL SILENCE AND WORKPLACE LONELINESS: A STUDY ON HEALTHCARE WORKERS

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Abstract: *Employees contribute to their organizations by working with many colleagues and managers. Changes in working life and competitive environment cause employees to interact more with each other. These changes and interactions cause some problems in the workplace. This study aims to examine the mediating effect of workplace ostracism on workplace loneliness and organizational silence. Individuals working in health services in public institutions in the Marmara Region constitute the study group. The study data were collected using an online survey method. This study concluded that workplace ostracism has a positive effect on workplace loneliness. Workplace ostracism and workplace loneliness affect organizational silence positively. In addition, workplace loneliness has a mediating role in the effect of workplace ostracism on organizational silence.*

Keywords: *Workplace Ostracism, Organizational Silence, Workplace Loneliness, Healthcare Workers*

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1. Introduction

Business life undoubtedly covers a large part of our lives. Within this scope, many different issues and phenomena such as positive and negative interpersonal relationships, conflicts, organizational gossip and rumors, workplace ostracism, organizational silence, and workplace loneliness can come across as a chain of problems. Efforts to survive among these problems, trying to provide for the family, and lost time in reaching career goals complicate the issues even more for the employees. In this regard, for both managers and employees, workplace ostracism, organizational silence, and workplace loneliness stand out as topics that need to be addressed.

As social and emotional beings, people tend to have healthy relationships with other people in their life [1]. However, today, individualized societies, organizations, and relationships that are getting more complex day by day can lead employees to loneliness [2]. Individuals can experience loneliness in their personal life as well as in the organization they are a member of. Workplace loneliness refers not only to feeling lonely emotionally but also to being alone due to the social environment. Workplace loneliness as a result of being alone due to the external environment, insufficient social communication, and lack of belonging to the team within the organization, is a situation that can only be resolved if there are improvements related to socialization [2].

The concept of loneliness in terms of the organization includes differences from the concept of loneliness in that an individual feels alone. The concept of loneliness is a more subjective situation that occurs in one's characteristics. This subjectivity encompasses the negative or positive effects of one's relatives, family, and personal relationships in the environment in which one lives socially. Loneliness

within the organization is the isolation of the person alone within the existing social environment. In other words, loneliness in the workplace can be expressed as a negative emotional state caused by the lack of positive relationships in the workplace [4]. According to Wright et al. (2006), workplace loneliness is the state of being alone as a result of the development of the concept of loneliness in terms of the organization, the social incompleteness of the organization, and the low quality of interaction between individuals [3].

Workplace loneliness has two dimensions: emotional loneliness and social loneliness. Emotional loneliness is the loneliness that occurs as a result of a decrease in emotional attachment that occurs as a result of open and intimate relationships [5]. Anxiety as a result of the employee not feeling peaceful in the working environment, and not being able to establish an emotional bond as a result of being away from other employees can appear as an indicator of emotional loneliness [6].

The social loneliness dimension, on the other hand, shows the number of relationships. Employees do not share their feelings and thoughts with other employees and do not participate in activities held in the same social environment [1]. In social loneliness, the person cannot be included in the social network formed within the organization and does not feel that he belongs to that environment [7]. When evaluated in terms of social companionship, it can be considered that employees are lonely if they do not participate in social activities such as picnics, meals, and sports events, due to their inability to establish a relationship with other people in their working relations. In addition, these people have difficulty finding group friends with whom they can spend time and talk during breaks at work [6].

Emotional loneliness can be characterized as weak family and friendship relations. Social loneliness is the absence of a satisfying social environment [8]. It can be stated that emotional loneliness creates a more severe trauma than social loneliness, pushes individuals more, and makes them suffer [9].

Workplace ostracism is a concept that has been the subject of academic studies since the 1970s. Workplace ostracism occurs depending on the relations and social sharing between employees, managers, and other employees in the organization. Workplace ostracism is a phenomenon with negative consequences [10]. Workplace ostracism can also be expressed as isolation in the working environment. It is the case that the employee is ignored by other employees in the working environment. In other words, it can be explained as the exclusion of the person in the process of social interaction, and the neglect of the psychological contract in terms of the organization [11]. Workplace ostracism is the feeling of losing one's self-esteem in the working environment, lack of commitment to the organization, and staying away from positive behavior. It is also the case that individuals are deprived of their expectations from their colleagues [12].

The practices of organizations trying to apply contemporary management methods to increase the positive behavior of their employees as well as examining the cases that may cause negativities and finding solutions by detecting these behaviors are essential for the success of the organization. It is important to understand workplace ostracism, which is one of these negative factors, and to exhibit solution-oriented approaches. Because workplace ostracism can lead to results that may cause individuals to decrease their job satisfaction levels, intend to quit their job, and weaken their organizational commitment [13-14].

Workplace ostracism can cause the exposed person to spend most of their energy and time in the work environment to improve relations with their colleagues, to have difficulty in fulfilling their responsibilities, and subsequently decrease their performance [11-15]. Employees who are the most important resource and wealth of the organization, hiding their ideas and thoughts as a result of exclusion and not expressing their thoughts that can create added value will reduce the efficiency of the organization and have negative effects on the future of the organization.

There are 3 different types related to the way workplace ostracism occurs. The first type of workplace ostracism is related to the individual's subjective perception, that is, the subjective character of organizational exclusion. Even if the person thinks they are excluded, it may not be a real act of exclusion. However, perceptions can create attitudes and subsequently lead to different behaviors. The second type is that workplace ostracism is an indirect and implicit phenomenon. The individual's not actively participating in the sadness or joy of his/her co-workers and not helping new employees can be given as an example in this context. The third type is whether there is intent in the occurrence of workplace ostracism. In other words, whether the exclusion of the individual occurs as a result of an action or without reason [16-17-18]. Workplace ostracism is an increasingly common and glaring phenomenon in recent times. This phenomenon is closely related to the organization, and it is important what kind of roadmap to follow to prevent negativities.

Organizational silence is the situation in which employees who have the competence to show a change in working life stand back behaviorally, cognitively, and emotionally instead of taking favorable action on issues that concern the organization, are in a state of inaction and withhold the contribution they can make to the organization. Organizational silence is the concealment of working individuals despite having sufficient knowledge and experience about the issues and problems that concern the organization [19]. Organizational silence is the attitude of employees to do nothing or do little and remain silent in the face of important problems they encounter in their organizations [20].

The answer to the question of why employees prefer to remain silent in the organizational environment is important in the essence of the concept of organizational silence. From the answer to this question, it is important to understand why and how they become silent, and who they should talk to about the problems they are facing. If it is understood why employees prefer silence, it can be understood how they remain silent. Milliken mentioned two approaches to explain why employees remain silent. The first approach is the belief that employees in the organization will face a negative outcome if they do not remain silent. They find it risky to express their thoughts about the state of the organization and prefer to remain silent. The second approach is to remain silent, believing nothing will change even if any organizational problem is discussed [21]. In addition, employees see it as a choice to remain silent because of the organizational structure, values, and norms, fear of exclusion, worry about not getting attention, and perhaps the most important result, anxiety, and fear of losing their jobs [22].

It is important to understand the concept of organizational silence. Organizational silence is a negative situation that will prevent the change and development of the organization [23]. The silence of the majority of the employees of the organization on organizational issues shows the perception of organizational silence and ultimately leads to a decrease in the support of the employee towards the organization [24]. It is among the ways that will be beneficial for managers to display supportive behavior towards their employees to prevent organizational silence and to engage in activities to create a transparent organizational culture. This benefit will support the effective and harmonious work of the employees in line with the goals of the organization and will minimize the formation of organizational silence [25].

Organizations with organizational silence are organizations that have the perception that their employees' speech will be a waste of energy and that speech may have dangerous consequences. As a result of this perception, employees do not trust their organizations, do not participate in change, and their level of job satisfaction may decrease as a result of low motivation [26]. Defines workplace loneliness as a negative situation that occurs as a result of the inadequacy of the social network of the employee in the workplace, both qualitatively and quantitatively. When examining the concept of workplace loneliness, situations such as the lack of interpersonal relationships at the desired level and

the features that prevent or hinder the quality of relationships should be taken into consideration (25-26).

In this regard, in this study the human factor emerges as an undeniable fact for the quality perception of the service to be formed by the instant service in health services, which is a type of the service sector, and for organizations to maintain their productivity, image, reputation and competitive advantage in services where labor is spent. In this study, which aimed to determine the mediating effect of workplace ostracism on organizational silence and workplace loneliness, both the human factor, which has been at the forefront recently, and what kind of roadmap organizations will follow regarding the framework of these phenomena are among the subjects that are tried to be emphasized.

2. Instructions

2.1. Materials and Methods

This study was carried out between 04 February 2022 and 15 April 2022 in the Marmara Region. The data of the study were collected using the online survey method. Ethics committee approval was obtained with decision number 23 of the Sakarya University Social Sciences Ethics Committee meeting numbered 102856/42 dated 03 February 2022, indicating that there was no ethical objection to the research and that it was appropriate.

2.2. Universe and Sample

The study universe consists of employees working in public health institutions in the Marmara Region. In the study, 391 questionnaires were collected.

2.3. Data Collection Tool

The study data were collected with an online questionnaire form consisting of four parts. The first part of the online questionnaire consists of questions about the demographic characteristics of the health workers participating in the study. The Workplace Ostracism Scale developed by Ferris et al. [11] was used in the second part of the survey. The Turkish validity and reliability study of the scale was conducted by Çalışkan and Pekkan [28]. The scale consists of 10 items in a 5-point Likert form (strongly disagree-strongly agree). The Loneliness in the Workplace scale, which consists of two factors (emotional deprivation and social companionship) and 16 items, was developed by Wright, Burt, and Strongman [3], and its Turkish validity and reliability study was conducted by Doğan et al. [1]. The organizational silence scale was developed by Dyna et al [37] and its Turkish validity and reliability study was conducted by Yıldırım and Oruç [38]. The scale consists of 3 sub-dimensions (acquiescent silence, defensive silence, and pro-social silence) and 15 items. In the analyzes performed to determine the reliability levels of the scales, Cronbach's alpha for the workplace ostracism scale was found to be α=0.953, the organizational silence scale α=0.821, and the workplace loneliness scale α=0.909, and the reliability levels of all scales were high.

2.4. Data Analysis

SPSS 25.0 and Process Macro statistical software were used in the data analysis. Correlation, regression, and mediation analyzes were performed to determine the relationships between workplace ostracism, workplace loneliness, and organizational silence. The findings were evaluated at a 95% confidence interval and a 5% significance level.

2.5. Findings

The tables containing the data obtained, the results, and the evaluations made based on the results of the study are explained below. The majority of the participants were female, 59.1% (n=231), while 40.9% (n=160) were male. The mean age of the participants was 38.74±9.66 years. In terms of education level, 19.4% (n=76) of the participants are high school graduates, 20.7% (n=81) are associate degree graduates, 44.8% (n=175) are undergraduate graduates, and 15.1% (n=59) are graduate graduates. In terms of duration of employment, 19.2% (n=75) of the participants have been working in health services for 1-5 years, 19.4% (n=76) for 6-10 years, 17.1% (n=67) for 11-15 years, and 44.2% (n=173) for 16 years and over. It was determined that 3.3% (n=13) of the participants were physicians, 13.6% (n=53) were administrative personnel, 62.7% (n=245) were health personnel, 20.5% (n=80) were other personnel.

Table1. Correlation Analysis

Variables	Mean	SD	1	2
1. Workplace Ostracism	1.567	0.657		
2. Workplace Loneliness	2.073	0.651	0.698*	
3. Organizational Silence	2.685	0.561	0.371*	0.376*

* p< 0.001

According to the results of the correlation analysis, there is a positive correlation between workplace ostracism and workplace loneliness (r= 0.698) and between workplace ostracism and organizational silence (r= 0.371). There is also a positive correlation between workplace loneliness and organizational silence (r= 0.376) (Table 1).

Table 2. Impact Analyses

Effect	β	S.E.	t	p	LLCI	ULCI
Constant	0.990	0.061	16.203	0.000	0.870	1.110
WO→WL	0.691	0.036	19.216	0.000	0.620	0.762
Effect	**β**	**S.E.**	**t**	**p**	**LLCI**	**ULCI**
Constant	1.994	0.087	22.909	0.000	1.823	2.165
WO→OS	0.181	0.055	3.270	0.001	0.072	0.289
WL→OS	0.197	0.056	3.524	0.001	0.087	0.307

WO: Workplace Ostracism, **WL**: Workplace loneliness, **OS**: Organizational Silence

It was determined that workplace ostracism positively affects workplace loneliness (β=0.691, p=0.000). In addition, workplace ostracism (β= 0.181, p=0.001) and workplace loneliness (β= 0.197, p=0.001) positively affect organizational silence (Table 2).

Table 3. Mediation Effect Analysis

Effect		β	S.E.	t	p	LLCI	ULCI
Direct Effect	WO→OOS	0.181	0.055	3.270	0.001	0.072	0.289
Indirect Effect	WO→WL→OS	0.136	0.051			0.034	0.237
Total Effect	WO→ OS	0.317	0.040	7.884	0.000	0.238	0.396

WO: Workplace Ostracism, **WL**: Workplace loneliness, **OS**: Organizational Silence

According to the results of the analysis, which can be seen in Table 3, workplace loneliness has a mediating role in the effect of workplace ostracism on organizational silence (β = 0.136), and it further increases the positive effect of ostracism on organizational silence (β = 0.317, p = 0.000).

3. Discussion and Conclusion

Organizations now take advantage of intellectual capital and attach more importance to people and knowledge to maintain their existence, increase productivity and gain superiority over their competitors. Despite this importance, negative phenomena arising from the organizational structure, managers, or employees can also be encountered. This study aimed to examine the mediating effect of workplace ostracism on workplace loneliness and organizational silence. This study determined that workplace ostracism positively affects workplace loneliness. In addition, workplace ostracism positively affects workplace loneliness and organizational silence. It was determined that workplace loneliness has a mediating role in the effect of workplace ostracism on organizational silence, and it further increases the positive effect of ostracism on organizational silence.

Uslu and Aktaş found a positive relationship between organizational silence and leave of employee behavior and intention [27]. Çalışkan and Pekkan also found a relationship between organizational silence and job performance [28].

Similar to the current study, Nartgün and Demirer investigated teachers' organizational silence and their levels of workplace loneliness. As a result of the study conducted on 102 teachers, they found that there is a significant positive relationship between organizational silence and workplace loneliness. These results are similar to the results of the present study. No significant relationship was found between demographic characteristics and organizational silence [29]. Durak, in his study on academic employees in a higher education institution, found that there was no relationship between demographic characteristics, gender, and organizational silence, while those over 40 preferred to speak more than younger employees, and academicians with the title of associate professor and professor were more willing to speak than others [30].

In a study conducted with teachers, Lam and Lau found that role performance and organizational citizenship behavior negatively affected workplace loneliness. They concluded that leading member interaction has a mediating effect between workplace loneliness and organizational citizenship behavior. In other words, they stated that employees who feel lonely at work are less likely to engage in in-role and organizational citizenship behavior [31]. Yılmaz and Aslan found a positive relationship between life satisfaction and workplace loneliness in their study with teachers [32]. Peng et al. found that workplace loneliness negatively affects creativity and the leader-member interaction plays a mediating role between these variables [33].

Halis and Demirel found a negative correlation between the dimensions of social support and workplace ostracism and determined that the phenomenon of social support affects organizational exclusion [34]. Yarmacı and Ayyıldız, in their study titled 'The Impact Employees Perceptions of Organizational Ostracism on Organizational Silence and Whistleblowing: Hotel Establishments Case', found that workplace ostracism had a moderate effect on the level of organizational silence and on explaining negative situations [35]. Yıldız and Develi found that workplace ostracism positively increases the tendency of the employee to lie [36].

Today, the awareness that the richest resource that organizations have is human resources has settled. Organizations that still fail to comprehend this are unlikely to survive in the brutal competition environment. In cases such as when the employee experiences workplace ostracism and workplace loneliness and remains silent, managers must understand very well the reason for negative organizational behaviors that will reduce efficiency in the workplace, disrupt work peace, and make it difficult for the organization to survive and should take the necessary steps for a solution.

The negative organizational behavior of individuals working in health services, both in their working relationships and in their interactions with patients and their relatives, can bring great problems. In line with all that has been said, these negative organizational behaviors may cause employees to quit their jobs, experience burnout, and decrease their commitment to the organization, as well as negative reflections of this situation in their business lives, social lives, and families. To prevent this, it will be beneficial to organize professional training so that employees do not feel alone and not excluded, organize social events that will enable employees of the organization to socialize with each other, and create a structure and climate that will allow employees to talk sincerely when they encounter a problem. This study, which was conducted with employees in institutions in the health sector in the Marmara Region, concluded that workplace ostracism has a positive effect on workplace loneliness and organizational silence. It is expected to contribute to the related literature by associating the study results and solution recommendations with managers, employees, and other studies in the related literature and by developing them further.

Ethical statement:
Ethics committee approval was obtained with decision number 23 of the Sakarya University Social Sciences Ethics Committee meeting numbered 102856/42 dated 03 February 2022, indicating that there was no ethical objection to the research and that it was appropriate.
Conflict of interest:
There is no conflict of interest in this single-authored article.
Authors' Contributions:
This study has been prepared by the author alone. No conflict of interest has been declared by the author.

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Research Article

THE ROLE OF C-REACTIVE PROTEIN AND ALBUMIN COMBINED INDEXES IN ACUTE CHOLECYSTITIS

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Abstract: *This study aimed to determine and compare the abilities of the C- reactive protein to albumin ratio, Glasgow prognostic score, and modified-Glasgow prognostic score to predict short-term mortality in patients with acute cholecystitis. This retrospective study used the examinations and data of patients who attended the Emergency Department were used. This study included patients aged ≥18 years with radiologically-, clinically-, and laboratory-confirmed acute cholecystitis diagnoses and hemogram and biochemical parameters measured and registered by the Emergency Department. This study included 269 patients aged 58.3±17.4 years, of which 51% were women. The abilities of C-reactive protein to albumin ratio, Glasgow prognostic score, and modified-Glasgow prognostic score to predict mortality were found to be statistically significant. Their AUC values were 0.73 (0.09–0.98) for C- reactive protein to albumin ratio, with a cut-off value of 3.9 (p = 0.003), 0.72 (0.10–0.97) for Glasgow prognostic score with a cut-off value of 2 (p = 0.006), and 0.73 (0.10–0.97) for the modified-Glasgow prognostic score with a cut-off value of 2. Inflammatory markers, including C- reactive protein and albumin, can predict the expression prognosis of patients with acute cholecystitis, as in many other diseases.*

Keywords: *C- reactive protein, albumin, C- reactive protein to albumin ratio, Glasgow prognostic score, modified-Glasgow prognostic score*

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1. Introduction

Acute cholecystitis is an inflammatory disease of the gallbladder that develops within hours. In most cases, the underlying etiology is cystic duct obstruction due to an embedded stone in the gallbladder neck or cystic duct. Early diagnosis and treatment significantly decrease morbidity and mortality [1,2]. It requires constant monitoring for ongoing inflammation. Diagnosis is based on liver function tests, leukocyte levels, and C-reactive protein (CRP) values [3]. Albumin and CRP are acute-phase proteins. In addition to being an inflammation marker, albumin provides information about the nutritional status [4].

Studies have shown that the CRP to albumin ratio (CAR) reflects the general nutritional status of the patients and systemic inflammation [4-8]. CAR has been studied in patients with malignancies [4,5],

Crohn's disease [6], sepsis [7], pneumonia [8], and coronavirus disease 2019 (COVID-19) [9]. In addition, recent studies on patients with inflammatory diseases [10-12] and acute cholecystitis [13-15] suggest that the CAR, Glasgow prognostic score (GPS), and modified GPS (mGPS) are effective in evaluating acute cholecystitis prognosis in patients. It has also been reported that GPS and mGPS are effective in predicting prognosis in colorectal cancers [16,17].

GPS and mGPS are calculated using CRP and albumin values. The GPS criteria were as follows: 0 points, CRP ≥10 mg/L and albumin ≥35 g/L; 1 point, CRP ≥10 mg/L or albumin <35 g/L; 2 points, CRP >10 mg/L and albumin is <35 g/L. The mGPS criteria were as follows: 0 points, CRP ≤10 mg/L and albumin ≥35 g/L; 1 point, CRP >10 mg/L; 2 points, CRP >10 mg/L and albumin <35 g/L(13-15). GPS and mGPS are thought to reflect systemic inflammation [16,17].

This study aimed to determine and compare the abilities of the CAR, GPS, and mGPS to predict short-term mortality in patients with acute cholecystitis.

2. Materials and Methods

2.1. Ethics

This study was approved by the Ethics Committee of the University of Health Sciences and Ümraniye Education and Research Hospital (Date: 29/09/2022, Decision No: B.l0.1.TKH.4.34.H.GP.0.01/302).

2.2. Study Design

Acute cholecystitis patients aged ≥18 who attended the Ümraniye Education and Research Hospital's Emergency Department between January 1, 2019, and June 1, 2022, were included in this retrospective study.

2.3. Study Population

This study included patients aged ≥18 years with radiologically-, clinically-, and laboratory-confirmed acute cholecystitis diagnoses and hemogram and biochemical parameters measured and registered by the Emergency Department. All patients aged <18 years or with additional trauma history or missing data were excluded from this study.

2.4. Data Collection

This retrospective study used the examinations and data of patients who attended the Emergency Department were used. These data included: demographic characteristics, background information (hypertension, malignancy, diabetes mellitus, hypothyroidism, coronary artery disease, chronic obstructive pulmonary disease, heart failure, chronic renal failure), laboratory test results (hemoglobin, hematocrit, white blood cell [WBC], lymphocyte, neutrophil, monocytes, basophil, mean corpuscular volume, red blood cell distribution width [RDW], platelets, mean platelet volume, creatinine, aspartate aminotransferase, alanine aminotransferase, CRP, and albumin values), CAR, GPS, mGPS, and hospital stay length. Ancillary radiological examinations were mostly ultrasound; it was rarely diagnosed with computerized tomography. The patients were divided into two groups—survivors and non-survivors—based on their status in Turkey's National Death Notification System. Hospital stay length and intensive care unit admission rates were recorded using the hospital's data system.

2.5. GPS

The GPS criteria were as follows: 0 points, CRP ≥10 mg/L and albumin ≥35 g/L; 1 point, CRP ≥10 mg/L or albumin <35 g/L; 2 points, CRP >10 mg/L and albumin is <35 g/L.

2.6. Modified GPS

The mGPS criteria were as follows: 0 points, CRP ≤10 mg/L and albumin ≥35 g/L; 1 point, CRP >10 mg/L; 2 points, CRP >10 mg/L and albumin <35 g/L.

2.7. Statistical Analysis

The Statistical Package for Social Sciences (SPSS) software (v.20; Chicago, IL, USA) was used for all statistical analyses. The normality of continuous data was assessed using the Shapiro–Wilk test. Continuous variables are presented as median (range), categorical variables as number (percentage), and quantitative variables as median (interquartile range; 25th-75th percentile). Categorical data were compared using Fisher's exact and Chi-square tests. Continuous data were compared pairwise using Mann–Whitney tests. This analysis calculated the area under the receiver operating characteristic curve (AUC) for parameters, tested them for mutual significance with the DeLong quality test and assessed their accuracy, specificity, sensitivity, and 95% confidence interval data. All results with $p < 0.05$ were considered statistically significant.

3. Results

This study included 269 patients aged 58.3±17.4 years, of which 51% were women. Age was significantly positively correlated with mortality ($p < 0.001$). In addition, hospital stay length was significantly longer in non-surviving than surviving patients ($p < 0.001$). Moreover, a coronary artery disease history was significantly more common in non-surviving than surviving patients ($p < 0.001$). The relationships between demographic characteristics and comorbid diseases and mortality are shown in Table.1.

Table 1. Relationship between demographic characteristics, comorbidities, and mortality

	Survivor (n=259)	Non-survivor(n=10)	Total (n=269)	p-value
Age				
Mean ± SD	57.6 ± 17.2	77.5 ± 12.4	58.3 ± 17.4	< 0.001
Range	19.0-90.0	54.0-96.0	19.0-96.0	
Sex				
Male	127.0 (49.0%)	3.0 (30.0%)	130.0 (48.3%)	0.2372
Female	132.0 (51.0%)	7.0 (70.0%)	139.0 (51.7%)	
LOS (day)				
Mean ± SD	5.3 ± 3.7	14.4 ± 14.9	5.7 ± 4.9	< 0.001
Range	1.0-31.0	2.0-37.0	1.0-37.0	
Comorbidities				
Hypertension	117.0 (45.2%)	7.0 (70.0%)	124.0 (46.1%)	0.1222
Diabetes mellitus	63.0 (24.3%)	2.0 (20.0%)	65.0 (24.2%)	0.7542
Malignancy	10.0 (3.9%)	0.0 (0.0%)	10.0 (3.7%)	0.5272
Hypothyroidism	6.0 (2.3%)	0.0 (0.0%)	6.0 (2.2%)	0.6262
Chronic obstructive pulmonary disease	18.0 (6.9%)	2.0 (20.0%)	20.0 (7.4%)	0.1232
Coronary artery disease	40.0 (15.4%)	6.0 (60.0%)	46.0 (17.1%)	< 0.001
Heart failure	16.0 (6.2%)	3.0 (30.0%)	19.0 (7.1%)	0.0042
Chronic renal failure	14.0 (5.4%)	0.0 (0.0%)	14.0 (5.2%)	0.4502

(LOS: length of hospital stay)

Mortality was significantly correlated with the laboratory test parameters for neutrophils ($p = 0.035$), monocytes ($p = 0.031$), and lymphocytes ($p = 0.017$). In addition, hemoglobin and hematocrit were negatively correlated with RDW and mortality ($p = 0.001$, $p = 0.001$, $p = 0.002$, respectively). Moreover, mortality was negatively correlated with albumin levels ($p = 0.024$) but positively correlated

with CRP levels (p = 0.042). Furthermore, CAR, GPS, and mGPS were significantly higher in non-surviving than surviving patients (p = 0.012, p = 0.006, and p = 0.006, respectively). The relationships between mortality and laboratory test parameters, CAR, GPS, and mGPS are shown in Table 2.

Table 2. Relationship of laboratory tests, CAR, GPS, and MODFGPS with mortality

Characteristic		Survivor	Non-survivor	Total	p-value
WBC	(10^3µ/L)	12.8 (10.0-17.0)	18.6 (10.9- 25.0)	12.8 (10.0- 17.2)	0.077
Neutrophil	(10^3µ/L)	10.2 (7.3-14.1)	17.2 (8.7- 22.7)	10.3 (7.3-14.4)	0.035
Monocyte	(10^3µ/L)	0.7 (0.5-1.0)	1.0 (0.8-1.2)	0.7 (0.5-1.0)	0.031
Lymphocyte	(10^3µ/L)	1.6 (1.1-2.2)	0.9 (0.7-1.6)	1.6 (1.1-2.2)	0.017
Basophil	(10^3µ/L)	0.0 (0.0-0.0)	0.0 (0.0-0.1)	0.0 (0.0-0.0)	0.906
Hemoglobin	(g/dl)	13.3 (11.9-14.6)	11.1 (9.6-12.1)	13.2 (11.8-14.6)	0.001
Hematocrit	(%)	40.2 (36.7-44.1)	33.0 (29.2- 36.9)	39.9 (36.5-44.0)	0.001
MCV	(fl)	87.6 (84.0-91.2)	87.9 (80.5- 90.4)	87.7 (83.9-91.0)	0.334
RDW	(fl)	13.9 (13.2-15.4)	17.1 (14.6-19.1)	13.9 (13.2-15.5)	0.002
Platelet	(10^3µ/L)	260.0 (218.0- 312.0)	237.0 (213.5- 342.5)	259.0 (218.0-313.0)	0.646
MPV	(fl)	9.3 (8.5-10.3)	9.2 (7.3-9.7)	9.3 (8.4-10.3)	0.502
ALT	(IU/L)	25.0 (16.0-79.0)	21.5 (12.2- 42.0)	25.0 (16.0- 72.0)	0.425
Albumine	(g/dL)	41.0 (36.0-44.0)	34.5 (26.8- 38.5)	41.0 (36.0- 44.0)	0.024
AST	(IU/L)	28.0 (19.0- 63.5)	47.0 (22.0-66.8)	29.0 (19.0-64.0)	0.667
CRP	(mg/L)	51.1 (9.5-153.8)	148.8 (108.0-168.5)	59.0 (11.1-161.0)	0.042
Creatinine	(mg/dL)	0.8 (0.7-1.0)	1.0 (1.0-1.8)	0.8 (0.7-1.0)	0.026
CAR		1.3 (0.2-4.3)	4.2 (2.6-6.6)	1.4 (0.3-4.4)	0.012
GPS	(Mean±SD)	0.9 ± 0.6	1.5 ± 0.5	1.0 ± 0.6	0.006
	(Range)	0.0-2.0	1.0-2.0	0.0-2.0	
mGPS	(Mean±SD)	0.9 ± 0.6	1.5 ± 0.5	0.9 ± 0.6	0.006
	(Range)	0.0-2.0	1.0-2.0	0.0-2.0	

WBC, white blood cell; MCV, mean corpuscular volume; RDW, red cell distribution width; MPV, mean platelet volume; ALT, alanine aminotransferase; AST, aspartate aminotransferase; CRP, C-reactive protein; CAR, CRP/albumin ratio; GPS, Glasgow prognostic score; mGPS, Modified Glasgow prognostic score.

The abilities of CAR, GPS, and mGPS to predict mortality were found to be statistically significant. Their AUC values were 0.73 (0.09–0.98) for CAR with a cut-off value of 3.9 (p = 0.003), 0.72 (0.10–0.97) for GPS with a cut-off value of 2 (p = 0.006), and 0.73 (0.10–0.97) for mGPS with a cut-off value of 2 (p = 0.006; Table.3).

Table 3. ROC analysis for CAR, GPS, and MODFGPS for 30-day mortality

	Cutpoint	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)	AUC	p value
CAR	3.9	70%	73.75%	9.33%	98%	0.73	0.003
GPS	2	50%	83.01%	10.20%	97.73%	0.72	0.006
mGPS	2	50%	83.01%	10.20%	97.73%	0.73	0.006

CAR, CRP/albumin ratio; GPS, Glasgow prognostic score; mGPS, Modified Glasgow prognostic score.

In the binominal logistic regression analysis with age, lymphocyte, hemoglobin, and RDW and indices; Regression analysis with CAR was named model 1, regression analysis with GPS as model 2, and regression analysis with mGPS as model 3. (Table.4)

Table 4. Binominal Logistic regression analysis

	Model 1(p value)	Model 2(p value)	Model 3
Yaş	0.021	0.034	0.035
Lymphocyte	0.669	0.686	0.685
Hemoglobin	0.204	0.192	0.193
RDW	0.828	0.930	0.928
CAR	0.301		
GPS		0.334	
mGPS			0.332

RDW, red cell distribution width; CAR, CRP/albumin ratio; GPS, Glasgow prognostic score; mGPS, Modified Glasgow prognostic score

Accordingly, age, lymphocyte, hemoglobin, RDW, CAR, GPS and mGPS in our model, which was created with these parameters to predict mortality together, had an AUC value of 0.90, sensitivity was 99%, specificity was 11%, and accuracy was 97%. (The jamovi Project 2021. Jamovi version 2.2)

4. Discussion

This study found that CAR, GPS, and mGPS could predict mortality at a good-to-moderate level in patients with acute cholecystitis. This finding shows that combined CRP and albumin indices can be used as prognostic indicators in patients with acute cholecystitis. In addition, we found that these three indices performed similarly. As expected, high neutrophil and low lymphocyte, hemoglobin, and hematocrit levels also significantly affected mortality. We observed significant independent relationships between mortality, low albumin, and high CRP levels. However, in the multivariate analysis performed with age, lymphocyte, hemoglobin, and RDW, we found that CAR, GPS and mGPS together could predict mortality well. Using CAR as an inflammation marker has previously been assessed in patients with malignancies [5]. In addition, studies have reported that CAR may be a poor prognostic marker in Crohn's disease [6] and sepsis [7]. A retrospective study examining 958 pneumonia patients found that CAR significantly predicted mortality and hospitalization [8]. However, another study found that CAR was not predictive of poor prognosis in COVID-19 patients or superior to CRP [9]. These studies [5-8] generally performed on inflammatory diseases showed that CAR is associated with mortality, while albumin and CRP also have significant independent relationships with mortality, consistent with this study.

Like CAR, GPS and mGPS have been assessed as inflammation markers, especially in patients with malignancies [10-12]. Terazawa et al. studied head and neck cancer patients and found a significant relationship between survival, low albumin, and high CRP. However, mGPS failed to predict poor prognosis in this patient group [10]. Siyu et al. reported that GPS and mGPS could act as poor prognostic indicators in patients with ovarian cancer [11]. Similarly, a meta-analysis by Nie et al. indicated that GPS and mGPS could act as poor prognostic markers in gynecological cancers [12]. In this study, GPS and mGPS were able to predict mortality, and as in many malignancies, the hospital stay was significantly longer in patients with mortality. There was also a significant relationship between age and mortality.

While acute cholecystitis is an inflammatory disease that leads to CAR, GPS, and mGPS examinations, there have been limited studies on it [13-15]. This study determined prognosis according to 30-day mortality, and CAR, GPS, and mGPS were evaluated and compared. Therefore, we believed it would contribute to the body of evidence on this topic. Karakaş et al. found no significant difference in CRP, albumin, WBC, monocytes, neutrophils, and lymphocytes in patients with complicated compared to uncomplicated acute cholecystitis. However, GPS was significantly higher in patients with

complicated cholecystitis (p = 0.020) [13]. Another study found that WBC, neutrophil, and CRP levels were significantly higher in acute cholecystitis patients with poor prognoses, while albumin was significantly lower. The same study reported that GPS could predict poor patient prognosis [14]. A retrospective study on 260 patients with acute cholecystitis found that WBC, high neutrophils, low lymphocytes, CAR, GPS, and mGPS were significant determinants of poor patient prognosis [15].

5. Conclusions

Inflammatory markers, including CRP and albumin, can predict the prognosis of patients with acute cholecystitis, as in many other diseases. Meta-analyses must confirm our results on CAR, GPS, and mGPS in patients with acute cholecystitis to minimize their mortality and improve their treatment.

Limitations

This study examined the 30-day mortality of patients. Therefore, whether a new attack developed after 30 days remains unknown. Our patient's postoperative data were not collected. Initial examinations were taken in the Emergency Department. The number of patients was limited to access the data fully.

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Informed Consent

Informed consent was obtained from all individual participants included in the study.

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Ethical statement

This study was approved by the Ethics Committee of the University of Health Sciences and Ümraniye Education and Research Hospital (Date: 29/09/2022, Decision No: B.l0.1.TKH.4.34.H.GP.0.01/302).

Conflict of interest

The authors declare that they have no conflict of interest.

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