Mesude Duman
Nursing Science
(Dicle University, School of Health, Turkey) mesudeduman@hotmail.com

Milton Hasnat
Epidemiology, Diabetes, Health Services Research, Drinking Water
(The University of Newcastle, Priority Research Centre for Health Behaviour, Australia)
milton.hasnat@newcastle.edu.au

Nato Zosidze
Geriatrics, Genetic Epidemiology, Dentistry, Cell Biology
(Batumi Shota Rustaveli State University, Dep. of Dentistry, Georgia)
nato.zosidze@bsu.edu.ge

Neşet Hikmet
Healthcare Systems and Policies
(University of South Carolina, Director, Health Information Technology Consortium, USA)
nhikmet@cec.sc.edu

Rusudan Khukhunaishvili
Cell Biology, Molecular Biology, Genetics
(Batumi Shota Rustaveli State University, Faculty of Natural Science and Health Care,
Georgia) rusudan_kh@yahoo.com

Sophiko Tskvitinidze
Pathology, Haematology, Human Biology, Transfusion Medicine
(Batumi Shota Rustaveli State University, Department of Biology, Georgia)
tskvitinidze.s@gmail.com

Trevino Pakasi
Nutrition, Tuberculosis, Family Medicine, Preventive Medicine
(University of Indonesia, Community Medicine Faculty of Medicine, Indonesia)
tpakasi_commed@fk.ui.ac.id

Yılmaz Demirhan

Political Science and Public Administration
(Dicle University, Faculty of Economics and Administrative Sciences, Turkey)
yilmaz.demirhan@dicle.edu.tr

Zeljko Vlaisavljevic
Nursing Science, Hepatology, Nursing Management
(Clinic for Gastroenterology and Hepatology, Belgrad, SERBIA) kcszeljko@gmail.com

CONTENTS

Research Articles

Research Article

NURSES' PERCEIVED AND ACTUAL PREPAREDNESS FOR DISASTERS

Bahadır TERCAN*[1]   *Saime ŞAHİNÖZ*[2]

¹Erzincan Binali Yıldırım University, Health Services Vocational School, First and Emergency Department, Erzincan, Turkey
²Gümüşhane University, Faculty of Health Sciences, Department of Emergency and Disaster Management, Gümüşhane, Turkey
* Corresponding author; bhdr_24@hotmail.com

***Abstract:** This study aimed to determine the preparedness and preparedness perception of nurses against disasters. This study was carried out in the hospitals of Gümüşhane Provincial Health Directorate between 01/11/2014 - 24/11/2015 as a cross-sectional study. The universe of the study consisted of 226 nurses working in the clinics of Gümüşhane Public Hospitals Association affiliated hospitals. The entire universe was included without using any sampling method. The study was completed with 171 nurses and response rate was 75,67 %. "Personal Information Form and "Perception of Disaster Preparedness Scale in Nurses" were used to collect data. Data were collected between December 2014 - January 2015. Nurses had moderate perception according to the perception of disaster preparedness scale. It was found that those who had the highest perception in the disaster response phase were the nurses working in the intensive care + operating room. Besides, preparedness perceptions of nurses participating in disaster drills were found to be higher than non-participants. It was concluded that the nurses' perceptions of disaster preparedness were moderate. It is recommended that nurses' perceptions of preparedness against disasters must be kept high by providing adequate and regular training and drills on disaster preparedness.*

***Keywords**: Disaster, Disaster Management, Nursing, Perception, Preparedness*

1. Introduction

Natural, human or technological disasters that cause loss of life and property occur almost every day in the world [1]. In our country, it is known that natural disasters such as earthquakes, floods, and landslides are frequent and especially earthquakes cause loss of life and property [2]. Due to the insufficient preparedness for disasters in the Marmara earthquake which is a turning point for our country in terms of disaster management, the loss of life and property has reached very serious dimensions, which has increased the awareness of the state and society in particular. With the establishment of the Disaster and Emergency Management Presidency (AFAD) as of 2009, significant developments have been experienced in disaster management and preparedness for disasters has shown a reduction of the loss of life and property after disasters [3].

Successful disaster management depends on effective disaster preparedness [4]. Disaster preparation is a process in which sustained and sustainable situations such as planning, training, drilling, setting up early warning systems, raising public awareness about disasters, and periodically reweaving emergency stock supplies are carried out before disasters occur [5,6].

Nurses, which constitute the largest professional group in health services, are one of the most important resources of the society with their disaster preparedness, their effective role in participating in disaster management, and the care they will provide to maintain the health and welfare of the society [7-9]. Many studies in the international literature show that nurses are aware of their role in disaster management [10-14]. When we look at our country, it is seen that the terms "Nurse" and "Disaster" are used together in a few recent studies [15,16].

Disasters in the 21st century have led to a significant change in the role of professional nursing in disaster management [17-19]. Nurses have to follow current education and technology to provide quality health care to individuals, families, and communities during and after the disaster [20]. If nurses and other health professionals have sufficient knowledge and equipment to prepare for disasters; much faster planning can be done in the crisis period and health services can be provided efficiently. In light of this information, our research was carried out to determine the preparedness of nurses against disasters and to measure their perceptions of preparedness before, during, and after the disaster.

2. Material and Methods

2.1. Aim and Type of Research

This cross-sectional study was conducted to determine the preparedness of nurses against disasters in disaster management and to measure their pre-disaster, disaster sequence, and post-disaster preparedness perceptions.

2.2. Place and Time of Study

This study was carried out in Gümüşhane State Hospital, Kelkit State Hospital, and Şiran State Hospital of Gümüşhane Provincial Health Directorate between 01/11/2014 - 24/11/2015.

2.3. Universe and Sample of the Study

The universe of the study consisted of nurses working in Gümüşhane State Hospital, Kelkit State Hospital, and Şiran State Hospital of Gümüşhane Provincial Health Directorate. 154 nurses work in Gümüşhane State Hospital, 58 nurses in Kelkit State Hospital, and 14 nurses in Şiran State Hospital. It was aimed to reach the whole universe and no sampling method was used. The study was completed with 171 nurses (response rate: 75.67 %). A total of 55 nurses who were on leave (annual and maternity leave) and those who had health reports and those who refused to participate in the study were excluded from the study.

2.4. Data Collection Tools

"Personal Information Form" was used to get demographic information about participants. "Disaster Preparedness Perception Scale in Nurses" developed by Özcan and Erol in 2015 was used to collect data [21].

2.4.1 Personal Information Form and Disaster Preparedness Perception Scale in Nurses

The first part of this form, which was developed by the researcher in the light of literature information, consisted of 18 questions consisting of the descriptive characteristics of the nurses (age, gender, education level, questions related to disaster preparedness). Disaster Preparedness Perception Scale in Nurses (DPPSN) consists of 20 questions to measure nurses' perceptions of disaster preparedness. The scale was categorized under three headings as the preparation stage (questions 1-6), intervention stage (questions 7-15), and post-disaster stage (questions 16-20). The items of the scale are arranged in a 5-point Likert type (1-Strongly disagree, 2- Disagree, 3-Partly agree, 4-Agree, 5-Strongly

agree) scale, and the perception of disaster preparedness increases as the score obtained from the scale increases. In the study of Özcan and Erol (2013) the Cronbach α values of the scale for 3 dimensions were respectively determined as 0.87, 0.88 and 0.87. In this study; Cronbach α values for the 3 dimensions were found to be 0.90, 0.84, and 0.82 respectively [21].

2.5. Data Collection

Data were collected between December 2014 - January 2015. "Personal Information Form" and "Disaster Preparedness Perception Scale in Nurses" were used in the data collection. The data were collected by applying the questionnaire by face to face interview technique with the nurses who accepted to participate in the research on the days when the researcher was available (Monday, Wednesday, Friday). The average duration of a questionnaire was 5 minutes.

2.6. Ethical Principles of the Study

Before starting the research; Written permission was obtained from Gümüşhane Provincial Health Directorate (Date: 30/09/2014, Number: 6190) and Erzincan Binali Yıldırım University Ethics Committee (Date: 19/01/2015, Number: 01/09). In addition, all nurses were informed about the research, and volunteer information form was read and those who voluntarily agreed to participate in the study were included.

2.7. Limitations and Generalizability of the Study

Only nurses working in Gümüşhane State Hospital, Kelkit State Hospital, and Siran State Hospital clinics of Gümüşhane Provincial Health Directorate and accepted to participate in the study were included in the study. No sampling method was used because it was aimed to reach the whole universe. Therefore, the results can be generalized to the universe.

2.8. Data Analysis

In the analysis of the data, SPSS (Statistical Package for Social Sciences) 23.0 statistical program was used. In the analysis of the data, number, percentage, arithmetic mean, standard deviation, and chi-square test were used to evaluate the descriptive characteristics of nurses. Besides, Student's t-test, One-way Anova and Kruskal-Wallis test were used to evaluate the relationship between the descriptive characteristics and the disaster preparedness perception scale in nurses.

3. Results

Nurses participating in the study; 69.9% were employed in Gümüşhane State Hospital and 36.3% worked in internal clinics, 80.1% were women, 63.7% were married, 39.2% were university graduates, 29.8% were in the 24-28 age range and 53.2% had a working period of fewer than 5 years (Table 1).

Table 1. Distribution of the identifying characteristics of nurses (n=171)

Identifying Characteristics	N	%
Which Hospital They Work		
Gümüşhane State Hospital	119	69.6
Kelkit State Hospital	37	21.6
Şiran State Hospital	15	8.8
Which Clinics They Worked		
Internal Clinic	62	36.3
Surgical Clinic	30	17.5
Emergency Clinic	21	12.3
Intensive Care + Operating Room	36	21.1
Pediatric Clinics	7	4.1
Obstetrics and Gynecology+Delivery Room	15	8.8
Gender		
Female	137	80.1
Male	34	19.9
Marital status		
Married	109	63.7
Single	62	36.3
Educational level		
High School	57	33.3
Vocational School	43	25.1
University Graduate	67	39.2
Master's Degree	4	2.3
Age		
23 and under	44	25.7
24-28	51	29.8
29-33	22	12.9
34-38	39	22.8
39 and above	15	8.8
Working Time		
Less than 5 years	91	53.2
5-9 year	29	17.0
10 years and over	51	29.8
Total	171	100.0

The nurses participating in the study; 67.3% of them have received disaster-oriented training during their nursing education, 67.8% have never been exposed to disaster before, 55.6% have participated in disaster-related drills, 68.4% are aware of a disaster plan of the hospital they work for and 56.7% of them were partially prepared for disaster. In addition, of these nurses; 49.7% participated in the fire drill, 88.9% thought that the nurse had a role in the post-disaster period, 86% thought that the nurse had a caring role in the event of a disaster, 99.4% describe the concept of disaster as natural disasters such as earthquakes, landslides, and landslip and it was determined that 50.5% of the nurses who were aware of the disaster plan belonging to the hospital they worked had read the plan (Table 2).

Table 2. Disaster information status of nurses (n=171)

Disaster Information	N	%
Education Status		
Trained	115	67.3
Untrained	56	32.7
Did You Experience Disaster?		
Yes	55	32.2
No	116	67.8
Participation in Disaster Drills		
Participated	95	55.6
Not participated	76	44.4
Awareness of Disaster Plan		
Yes	117	68.4
No	3	1.8
I do not know	51	29.8
Disaster Preparedness Status		
Ready	33	19.3
Not Ready	41	24.0
Partially Ready	97	56.7
Total	171	100.0
Participated Drills*		
Fire	85	49.7
Earthquake	46	26.9
The Roles of Nurses in Disasters*		
Pre-Disaster Period	99	57.9
Disaster Period	151	88.3
Post-Disaster Period	152	88.9
Roles*		
Consultant	103	60.2
Caregiver	147	86.0
Coordinator	98	57.3
Trainer	107	62.6
Manager	72	42.1
Disaster Definition *		
Natural disasters such as earthquakes, landslides, and landslips	170	99.4
The outbreak of highly contagious diseases such as swine flu and avian	119	69.6
influenza	135	78.9
Terrorist acts with biological, chemical or explosive agents	146	85.4
Human losses due to collapse in coal and gold mines	113	66.1
All		
Disaster Plan Reading Status **		
Read	59	50.5
Not read	58	49.5

* More than one answer.
** Percentage is taken from those who say there is a disaster plan.

The mean scores of the DPPSN of the nurses included in the study were 3.68 ± 0.53 for the total scale score, 4.19 ± 0.75 for the preparatory stage, 3.40 ± 0.68 for the intervention stage and 3.58 ± 0.72 for the post-disaster stage (Table 3).

Table 3. Distribution of DPPSN and Subdimension Scores (n=171)

DPPSN and Subdimensions	Mean±Sd	Min.	Max.
Total Scale	3.68±0.53	1.0	5.0
Preparatory Phase	4.19±0.75	1.0	5.0
Intervention Phase	3.40±0.68	1.0	5.0
Post-Disaster Phase	3.58±0.72	1.0	5.0

As is seen in Table 4, there were statistically significant differences between some characteristics of the participants and the mean scores of DPPSN and sub-dimensions in terms of participation in the disaster drills (t=2.67, p<0.01) and the clinic nurses worked (KW=12.84, p<0.05).

Table 4. Distribution of the mean scores of DPPSN and subgroups according to some characteristics of the participants (n=171)

Some Characteristics	DPPSN	Preparatory Phase	Intervention Phase	Post-Disaster Phase	Statistical Analysis
Gender					
Female	3.69±0.52	4.22±0.69	3.38±0.68	3.59±0.71	
Male	3.66±0.60	4.06±0.94	3.47±0.71	3.52±0.78	t=0.23
	p=0.81	p=0.27	p=0.48	p=0.59	
Clinic					
Internal Clinic	3.67±0.54	4.26±0.66	3.34±0.69	3.54±0.81	
Surgical Clinic	3.58±0.56	4.00±0.88	3.32±0.67	3.54±0.66	
Emergency Clinic	3.68±0.60	4.07±0.86	3.51±0.65	3.50±0.77	
Intensive Care + Operating Room	3.89±0.48	4.25±0.75	3.70±0.59	3.81±0.56	KW=9.65
Pediatric Clinics	3.42±0.46	4.45±0.46	2.84±0.89	3.25±0.71	
Obstetrics and	3.58±0.41	4.22±0.717	3.17±0.68	3.54±0.69	
Gynecology+Delivery Room	p=0.08	p=0.63	p=0.02*	p=0.43	
Educational level					
High School	3.76±0.53	3.51±0.64	3.68±0.73	3.75±0.53	
Vocational School	3.64±0.48	3.37±0.68	3.57±0.69	3.64±0.48	
University Graduate	3.65±0.57	3.31±0.71	3.51±0.73	3.65±0.57	KW=1.95
Master's Degree	3.57±0.57	3.41±0.69	3.45±0.73	3.57±0.57	
	p=0.58	p=0.46	p=0.49	p=0.52	
Working Time					
Less than 5 years	3.70±0.52	4.23±0.77	3.42±0.67	3.59±0.65	
5-9 year	3.71±0.67	4.10±0.75	3.54±0.80	3.57±1.00	F=0.44
10 years and over	3.62±0.47	4.18±0.70	3.28±0.62	3.57±0.66	
	p=0.64	p=0.71	p=0.25	p=0.98	
Did You Experience Disaster?					
Yes	3.64±0.55	4.17±0.83	3.34±0.70	3.54±0.84	t=-0.001
No	3.70±0.53	4.20±0.71	3.42±0.71	3.60±0.71	
	p=0.48	p=0.78	p=0.47	p=0.60	
Participation in Disaster Drills					
Participated	3.74±0.54	4.18±0.79	3.46±0.68	3.71±0.71	
Not participated	3.61±0.52	4.21±0.69	3.32±0.68	3.42±0.69	t=1.53
	p=0.12	p=0.76	p=0.18	p=0.008**	

It was found that those who had the highest perception in the disaster response phase were the nurses working in the intensive care + operating room, and those who had the lowest perception were

nurses working in pediatric clinics. Besides, the mean scores of the nurses participating in the disaster drill were found to be higher than the scores of those who did not participate in the disaster drill (t=1.53; p<0.01) (Table 4).

4. Discussion

Disaster preparedness requires all risk analyses and multidisciplinary management strategies [22]. While all these plans are being made, health workers, especially nurses, who have a great place in the health community, should be actively involved in this planning and be prepared for disasters. The findings of this study, which was conducted to determine the preparedness of nurses against disasters and to measure perceptions of preparedness before, during and after disasters, were discussed in the relevant literature with the findings of the study conducted to determine the readiness of health workers or nurses against disasters.

Disasters are an emergency that occurs at an unexpected time. It was found that 32.2% of the nurses participating in the study had experienced a disaster before. In the study conducted by Inal et al. it was determined that 18.8% of the students experienced a disaster [23]. In the study conducted by Şen and Ersoy, it was determined that 18.6% of the hospital disaster team experienced a disaster [24]. There is a similarity between the results of our research and the results of the studies.

Individuals with disaster training and drill experience work more effectively and efficiently at the time of a disaster. It was determined that 67.3% of the nurses participating in the study received training on disasters and 55.6% participated in disaster drills. In the study conducted by Özpulat and Kabasakal, it was determined that 67.8% of the student nurses received disaster training [25]. In the study conducted by Al Khalaileh et al.; 61% of the nurses received disaster training and 53% participated in the drills related to disasters [26]. There are similarities between the results of our research and the results of this study. It is thought that the addition of applied disaster education to the nursing curriculum or performing in-service training in hospitals will make nurses feel more experienced and ready.

It is very important that health workers working in hospitals intervene, give care for the wounded during and after the disaster. Therefore, planning should be made before disasters occur. It was found that 68.4% of the nurses included in the study were aware of the disaster plan of the hospital they work and more than half of those who were informed read this plan. In the study conducted by Vatan and Salur, it was determined that 83.4% of the executive nurses were aware of the disaster plan of the hospital where they worked [27]. In the study conducted by Çakmak et al., it was determined that 76.1% of 112 Emergency Aid personnel were aware of the disaster plan of the institution they work [28]. In the study conducted by Fung et al., it was determined that 61% of the nurses read the hospital disaster plan [29]. There is a similarity between the results of these studies and the results of our research.

Nurses need to know their role to fully fulfill their duties and responsibilities in disaster management. In this context, 88.9% of the nurses included in our study stated that they had roles in the post-disaster period and that these roles were mostly related to caring for the victims. In the study conducted by Şensoy and Nahcivan, 99.5% of the nurses stated that they believed that the role of nurses was after the disaster [30]. In the study conducted by Taşkıran and Baykal, 95.6% said that nurses had a role after the disaster [31]. In the study conducted by Basal and Ahmed, 58.5% of nurses stated that they have a role to provide care services in disasters [32]. It is seen that there is a similarity between the results of our research and the results of these studies.

Although an emergency or disaster that is experienced, encountered, or seen by people is considered a concept of disaster, there is a widely accepted concept of disaster by the United Nations Humanitarian Organization. In this regard, 99.4% of the nurses included in our study defined the concept of disaster as natural disasters such as earthquakes and landslides. In a study conducted by Taşkıran and Baykal, it was determined that nurses evaluated all types of disasters as very probable or probable and

especially they see the earthquakes which are seen more and more often very probable [31]. The results of this study and the results of our study are similar. Furthermore, the reason that natural disasters such as earthquakes or landslides are considered as disasters, is thought to be associated with the occurrence of such disasters in our country, especially in the North of Eastern Anatolia and Eastern Black Sea region.

The mean scores of the DPPSN of the nurses included in the study were 3.68 ± 0.53 for the total scale score out of 5 points. Besides, 56.7% of nurses have stated that they were partially prepared for disasters at the Personal Information Form. These results indicate that nurses who participated in the study perceived their preparedness for disasters at a moderate level. In line with our study, some studies in the literature have shown that nurses have a moderate perception of disaster preparedness [4,7,33,34].

In this study, as seen in Table 4, it was examined whether there was a statistically significant difference between some variables and the DPPSN and subscale scores, and there was only a difference between the variables worked clinic and participating disaster drills.

When we look at the findings based on the clinic that they work, it is seen that the perception of all nurses is high during the intervention phase and statistically significant. In a study conducted by Al Khalaileh et al. and Özcan and Erol, it is determined that the perception of all nurses is high during the intervention phase and statistically significant [21,26]. There is a similarity between the results of these studies and the results of our research. In the intervention stage, it was found that the highest level of preparation perception belonged to the nurses working in the intensive care unit + operating room, and the nurses working in pediatric clinics had the lowest perception of preparation. The second place with the highest level of preparedness perception in the intervention phase is in the emergency department. This is an expected result, which means that nurses who have the most experience to intervene in acute situations have high perceptions.

When we look at the preparedness perceptions of the nurses included in the research according to their participation in the disaster drills, the perceptions of the participants who participated in the disaster drills were high (post-disaster stage 3.71 ± 0.71); whereas those who did not participate in the disaster, drills were low (post-disaster stage 3.42 ± 0.69). In the literature supporting our research, some studies have shown that the perception of disaster preparedness of health personnel who have gained disaster experience by having training on disasters or participating in drills is high [7,10,35]. According to the results we will draw from this, it is seen that taking applied disaster education throughout nursing education and working life increases nurses' perceptions of preparedness against disasters.

5. Conclusion and Recommendations

It was concluded that the nurses' perceptions of disaster preparedness were moderate. It has emerged that nurses have more post-disaster roles and the role of caring for the victims is more important. Disaster preparedness perceptions of the nurses participating in disaster drills were higher than those who did not participate in the drills. It is recommended that nurses' perceptions of preparedness against disasters must be kept high by providing adequate and regular training and drills on disaster preparedness. It is also recommended that different studies should be conducted on this issue.

Ethical Declaration: This work was approved by the ethics committee of Erzincan Binali Yıldırım University (Date: 19/01/2015, Number: 01/09).
Conflict of interest : The authors declare that they have no conflict of interest.
Authors' Contributions: The authors declare that their contribution to the work is equal.
The compliance to the Research and Publication Ethics: This study was carried out in accordance with the rules of research and publication ethics.

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Research Article

RISK ASSESSMENT FOR WORK HEALTH AND SAFETY: A UNIVERSITY DINING HALL

*Kübra ÖZDEMIR[1] *Ayşe ÖZDEMIR[2]*

[1]Uşak University, Graduate Education Institute, Occupational Health and Safety Department, Uşak/TURKEY
[2]Uşak University, Faculty of Medicine, Medical Biochemistry Department, Uşak/TURKEY
Corresponding author; ozdemirkubra987@gmail.com

Abstract: *With the development of working life, work health and safety has become an area of great importance. Currently preventing occupational diseases and work accidents that may occur as a result of the work environment or work conditions, and protecting the health, and ensuring the full well-being of working individuals are among important topics. The increase in work accidents linked to the intense workload, rapid growth, and increased employment in the dining hall sector is emerging as a large problem. This research was performed to take precautions to solve problems emerging in terms of work health and safety in the dining hall sector, completed risk analysis to determine hazards and risks in a university dining hall. Precautions and implementations taken about the topic were evaluated within the framework of the Occupational Health and Safety Law No. 6331 by investigation in terms of work health and safety for accidents, risks, and occupational diseases that may occur in the dining hall. This research was performed using the L-type matrix (5 x 5 matrix table) method. The identified hazards and risks were classified according to risk level (significant level of risk: 15, moderate level of risk: 32, the acceptable level of risk: 3). Precautions were determined as a result of the risk assessment in order to make work conditions healthier and safer. With this study, experiences of work accidents and occupational diseases will be prevented contributing to protecting employee health, while benefits will be provided by ensuring awareness in other workplaces. Additionally, it is considered that adopting proactive approaches within the scope of work health and safety is an important factor in terms of popularizing work safety culture in working areas.*

Keywords: *Dining Hall, Work Safety, Risk Assessment, Work Health*

1. Introduction

Work safety and protecting the health of employed individuals comprise an important dimension of working life and legislation. If appropriate precautions are not taken about technological developments, the increasingly competitive environment, and the rapid operation of industrial life and mechanization in developed and developing countries, effects may be induced which disrupt the health integrity of employed individuals. The definition of work health and safety emerged with the aim of removing or reducing health problems and occupational diseases that employees are exposed to as a result of changing conditions in the workplace [1-2]. Work health and safety is an area encompassing all processes of the work performed. It involves many disciplines and studies were performed about work health and safety in many disciplines [3-4].

The risk assessment process forms the basis of work health and safety activities. Risk assessment is the process of predicting the probability of certain unwanted events occurring, identifying harm and damage that may occur, and making a value judgment by noting the significance of the outcomes. It

encompasses the decision-making process about whether risks are acceptable or not by noting the available checks and controls [5-6].

Studies provide many methods for the analysis of hazards and risks in work environments. At a minimum, the risk assessment to be applied should include systematic processing of data to define hazards in workplaces and to predict the levels of effect on individuals who will be affected as a result of the risk [7].

The main methods of risk assessment in the name of determining hazards and risks in workplaces are as follows [3]:

- Preliminary hazard analysis
- Primary risk analysis
- Risk mapping
- Work safety auditing
- Work safety analysis
- Risk analysis
- What-if analysis
- Hazard and operability analysis
- Failure modes, effects, and criticality analysis
- Failure tree analysis
- Event tree analysis
- Cause-outcome analysis
- Human error analysis
- Human error definition
- Human reliability assessment
- Technique for human error rate prediction
- Hierarchical duty analysis
- Kinney model
- Risk assessment tables
  a) L-type matrix
  b) X-type matrix

Differences in the method used to identify risks are the most important point differentiating risk analysis methods. Some risk assessment methods are used for processes and basic technical systems, while some are used to analyze hazards in the work environment due to the operation of the work [8]. Some risk assessment methods were developed according to certain industries. According to the topic of focus, risk assessment methods may be classified as technical-focused methods, human-focused methods, task-focused methods, management-focused methods, and rough analysis methods [9]. The most commonly used risk analysis method is the L-type decision matrix (5 x 5) [10].

One of the most important points in work safety is to prevent the occurrence of work accidents and occupational diseases with proactive approaches [11]. Risk analysis should be performed as a preventive activity before any accident occurs. The significance of the risks is determined according to the outcomes of the risk analysis. Accordingly, decisions are made to check the precautions that are present and to implement new precautions. It is important for employed individuals and employers to fulfill responsibilities in the stage of ensuring the safety of work conditions with risk analysis [6-10].

Demand for the food sector is increasing in the world and Turkey. The dining hall sector, the topic of our study, is a work area involving many hazards and risks and involves intense labor. There is an increase in the amount of employment in the dining hall sector linked to the increased service areas. It is listed among the least hazardous workplaces according to legislation. However, accidents like injuries,

cuts, and falls are frequently experienced due to problems like rapid work, the use of cutting-incision tools and machines, floor problems, inexperience, and lack of required personal protective equipment. Additionally, while negative physical factors and equipment used to cause work accidents to occur, they also cause reductions in employee performance and effects on health. If work safety precautions are inadequate or don't exist, it may cause occupational diseases, employee loss, and costs [12]. The most important point in the dining hall area is to determine risks and take precautions.

There are many risk areas in the dining hall area including the kitchen, eating areas, and entryways as employees, administrative personnel and students use the dining hall. This study encompasses the whole dining hall area attempted to determine hazards and risks with the aim of preventing the occurrence of possible work accidents and occupational diseases.

2. Material and Method

Due to the Occupational Health and Safety Law No. 6331 published in the Official Gazette on 30 October 2012, businesses are legally mandated to implement and audit work health and safety precautions. This study performed a risk analysis of the working environment for dining hall employees by noting the relevant details of the requirements, obligations, and implementation of the Occupational Health and Safety Law No. 6331. The aim was to offer recommendations about creating a healthier and safer working environment for dining hall employees [13].

The research began by receiving permission to perform a risk assessment from the university. This research was designed with the observational method as a quantitative data collection tool and a risk assessment was created as a result of these observations [14]. The research included general information, operating processes, types of equipment used, occupational groups in the area, work accidents experienced, and occupational diseases for the dining hall where the risk assessment was performed.

The research was completed using the L-type matrix (5 x 5 matrix diagram) risk assessment method. It is used to analyze the relationships between two or more variables. The matrix risk assessment method ensures convenience in terms of applicability while allowing the opportunity to use observations of the study area and records and statistics kept by the business to quantify a variety of risks [15]. The L-type matrix method can be used in the dining hall sector due to having important features like applicability to all sectors, simple and easily understood structure, and comprehension by employees [10-16]

The implementation of the risk analysis performed within this scope followed these stages [17]:

1st Step: Identification of hazards

Working areas involve many hazards and risks due to working conditions or the work done. Identification of hazards present in the workplace is the first step when performing a risk assessment. After determining the job descriptions of individuals employed in workplaces, work and activities are observed. For identification of hazards, all sections of the dining hall were carefully assessed.

2nd step: Assessment of risks

Risk assessment is the most complicated stage of analyzing risks. Any hazards and risks in the workplace are identified and attempts are made to determine how much harm may come to employed individuals. After assessing possible effects that may occur, the degree of damages and hazards that may occur is determined.

3rd step: Rating of risks

Rating of risks in the workplace reveals harm that may occur to the working area and employed individuals. The risks within the structure of the business are grouped as low, moderate, and high risks. Risks determined to be low level do not require emergency action plans, while moderate risks are significant for the workplace and should have interventions performed in the earliest possible duration.

High risks require the creation of emergency action plans and immediate intervention for these risks is important. After grouping the risks, control precautions against these risks are determined [18].

4th step: Planning control precautions

When determining control precautions to be taken, priority should be given to removing the risks. In areas where this is not possible, attempts should be made to reduce the risk level as much as possible. Appropriate control precautions were planned in the risk assessment for the dining hall [10].

In the study, the probability of an event and damage caused was rated with the L-type matrix method [19]. In the L-type matrix method for risk assessment, the risk is calculated with the following formula:

$$Risk = Probability \; x \; Severity$$

The probability of an event occurring (Table 1) was rated from 1 to 5 as very low, low, moderate, high, and very high probability for the identified hazards.

Table 1. Probability Rating

Points	Probability	Rating
1	Very low	Nearly none
2	Low	Very infrequently (once a year), only in abnormal circumstances
3	Moderate	Infrequently (several times a year)
4	High	Frequently (once a month)
5	Very high	Very frequently (once a week, every day)

A numerical value from 1 to 5 is given in order of severity of damage that may occur from very mild, mild, moderate, serious, and very serious (Table 2). According to damage outcomes, emergency stoppage decisions, loss of labor, and effect on employees are determined for the job.

Table 2. Severity Rating

Points	Outcome	Rating
1	Very mild	No work time lost, requires first aid
2	Mild	No work time lost, no permanent effect, outpatient treatment, requires first aid.
3	Moderate	Mild injury requires admission for treatment
4	Serious	Serious injury, long-term treatment, occupational disease
5	Very serious	Death, permanent incapacity

The risk score matrix table includes the probability on one side and the severity on the other. These two values are multiplied in an attempt to determine the risk value. The horizontal rows in the matrix table give the probability values, while the vertical columns state the severity values (Table 3).

Table 3. Risk score matrix table

		SEVERITY				
		1 (very mild)	2 (mild)	3 (moderate)	4 (serious)	5(very serious)
PROBABILITY	1 (very low)	1 Insignificant	2 Low	3 Low	4 Low	5 Low
	2 (low)	2 Low	4 Low	6 Low	8 Moderate	10 Moderate
	3 (moderate)	3 Low	6 Low	9 Moderate	12 Moderate	15 High
	4 (high)	4 Low	8 Moderate	12 Moderate	16 High	20 High
	5 (very high)	5 Low	10 Moderate	15 High	20 High	25 Unacceptable

According to the acceptability status of the determined risk level, decisions are made about the tolerability of the risk, requirements to stop work, and prioritization of suitable safety precautions that should be taken (Table 4).

Table 4. Acceptability values for outcomes

Acceptability value	Precautions to take
Unacceptable risk 25	Work should not begin until the determined risk is lowered to acceptable levels and if activities continue, they should be stopped immediately. If the risk does not reduce with precautions, the activity should be canceled.
Significant level risk 15-16-20	If there are continuing activities they should stop without delay. Work should not begin until the determined risk reduces. If the risk is related to the continuation of work, precautions should be taken rapidly and the decision made on whether to continue according to the results of precautions.
Moderate level risk 8-9-10-12	Precautions should begin to lower the risk. Time may be taken for precautions taken to lower risk.
Acceptable risk 2-3-4-5-6	There may be a need for additional control processes to eliminate risk. However, current controls should be maintained and these controls should be audited.
Insignificant level risk 1	There is no need to plan control processes for determining risk and there is no need to preserve records of activities that will occur.

In the research, the hazards and risks in the dining hall area were identified. These hazards and risks were individually stated and appropriate assessments were made about precautions to be taken, degree of severity, risk scores, and acceptability values.

3. Findings and Comments

The creation of risk assessment tables is an important and necessary stage. The tables include hazards, risks, people who will be exposed or affected, probability, severity, risk value, significance value and precautions to be taken to lower the risk to an acceptable level. It is important that the table structure is understandable to ensure easy comprehension of the risk assessment by employees.

Sections of the risk assessment table are:

1. **Hazardous event/situation:** States the source or situation which may cause injury to employees, damage to property or the workplace, or both together.
2. **Risk:** States the outcomes that may occur if the hazardous event happens.
3. **Exposed or affected people:** States the people who will be affected or exposed in accident situations that may occur in the working area.
4. **Probability:** States the probability of the hazardous event or situation occurring.
5. **Severity:** Expresses the harm that will be caused by the occurrence of the event.
6. **Risk value:** Expresses the risk number based on multiplication of the probability and severity concepts.
7. **Precautions to lower risk to acceptable levels:** States the solution methods that may be used to remove the risk or lower it to acceptable levels in the workplace.

In this study, the determined hazards and risks were grouped according to risk levels (significant risk: 15, moderate level risk: 32, acceptable risk: 3). These groups are given in Tables 5, 6, and 7.

Risks at a significant level have a risk score from 15 to 20 with a multiplication of the severity and probability values. In the presence of a significant level of risk, work should not begin until the risk status passes or should continue by taking appropriate precautions. Precautions should be taken at the source, in the environment, or by the employee. Risks at a significant level are shown in Table 5. Numbers 1-4 show risks with a risk score of 20, while numbers 5-15 show those with a risk score of 16.

Table 5. Significant level Risk ($15 \leq R \leq 20$)

No	Threat	Risk	Corrective and Preventive Actions
1	Use of cutting implements	Finger injury due to not using protective equipment	Employees using cutting implements should use appropriate protective equipment. Reports should be made of any injuries.
2	Electric cables not placed within protective cable channels	Electrical shock, injury, and death	All electrical cables should be placed in protective channels. There should be no cables on the floor and they should be stored appropriately.
3	Lack of electrical warning signs	Electrical shock, injury, and death	Areas with electrical danger should be noted with appropriate signage and unauthorized people should be prevented from entering the area.

Table 5 continued

No	Threat	Risk	Corrective and Preventive Actions
4	Lack of insulating mats in front of electrical panels	Electrical shock, injury, and death	Insulating mats should be placed in front of electrical panels. There should be warning labels and signs on the panel. Maintenance and examination should be performed and personnel should use appropriate personal protection when working.
5	Stoves used in the dining hall	Injury, fire, work accident	Stoves should be used by authorized people and appropriate training should be given. Employees should use appropriate protection against danger.
6	Lack of warning signs on machinery	Work accident	All machinery and equipment used should have appropriate warning signs and labels.
7	Biological risks and hygiene training	Unaware working and infectious disease	Employees should be informed about biological risks that may be encountered. Hygiene training should be planned and given.
8	Pest control and spraying	Infectious disease	Pest control and spraying should be performed in the workplace regularly. Implementations should be recorded.
9	Lack of cleaning and maintenance of cooking hoods	Fire	Hoods should have periodic cleaning and maintenance performed and recorded.
10	Locking of cold storage	Freezing due to remaining locked	Employees should not enter the cold storage alone, there should be a watcher at the door.
11	Lack of cold storage warning system	Freezing due to remaining locked	There should be a light and sound warning within the cold room and it should be operational.
12	Hot surfaces	Burns	If employees have to be in contact with hot surfaces due to work, they should use heat-resistant gloves.
13	Potlids on hot foods should not be opened without checking	Work accident	Lids on pots should not be opened without checking. Contact of steam with the body should be prevented.
14	Untrained employees should not use cutting tools	Unaware use and work accident	Training should be provided to employees using cutting implements. Employees should be informed about possible dangers while working with these tools.
15	Care should be taken of height and balance factors when placing materials and tools	Material falls and injury	Care should be taken of height and balance when placing tools and materials on top of each other. They should be placed to prevent falls or topples.

Moderate level risks have risk scores between 8 and 12 due to the multiplication of severity and probability values. Precautions should be taken rapidly to reduce risk. Moderate level risks are shown in Table 6. Numbers 1-22 are risks with a score of 12, numbers 23-25 have a risk score of 10, numbers 26-30 have a risk score of 9, and numbers 30-32 have a risk score of 8.

Table 6. Moderate level Risk ($8 \leq R \leq 12$)

No	Threat	Risk	Corrective and Preventive Actions
1	Slippery floor	Slips, falls and injury	Slippery floor areas due to spills of liquids like water and oil should be determined and warning signs placed. Entry of people to the area should be prevented before cleaning.
2	Personnel wearing large and baggy clothing	Work accidents	Large and baggy clothing should not be allowed in the workplace. If hair is long it should be tied up, and accessories like rings and bracelets should not be used.
3	Joking	Work accidents	One of the factors causing work accidents is dangerous behavior. This type of behavior should be avoided in workplaces.
4	Thermal comfort	Discomfort, overwhelm	Suitable thermal comfort conditions should be ensured. Regular maintenance should be performed on ventilation equipment.
5	Irregular stacking of materials	Material falling and injury	Materials should be stacked suitably. Preventive steps should be taken to prevent falls from shelves.
6	Passageways not regular or clear	Tripping, falling, injury	Passageways should be clean and maintained. The material being left in corridors and passageways should be prevented.
7	Fractured and broken floor	Falls and injury	Fractured and cracked floors should be removed.
8	Handbasins and toilets	Infectious disease	Cleaning should be performed at appropriate periods, there should be sufficient ventilation, and cleaning materials that may react with each other should not be used. Cleaning personnel should use gloves, masks, and protective clothing.
9	Noise	Work accidents, occupational disease, hearing loss	Measurements should be repeated annually. Before limit values for dining hall environments are passed, firstly the source, then the environment, and finally personal precautions should be taken.
10	Carrying heavy weights by hand	Muscular and skeletal system disease, disability	Heavy loads should not be carried by hand. Carrying equipment should be available for this work.

Table 6 continued

No	Threat	Risk	Corrective and Preventive Actions
11	Ergonomic problems	Muscular and skeletal system disease	Activities should be performed according to instructions. Suitable areas for ergonomic work should be developed, employees should be given ergonomic training.
12	Unsuitable physical measurements of equipment like chairs, counters	Muscular and skeletal system disease	The physical condition of equipment used by employees and students should be appropriate. Counters should ensure a suitable working area for employees.
13	Fire extinguishing devices not fixed to the wall	Late intervention for fires	Appropriate fire extinguishers should be provided according to the Regulation on Protection of Buildings from Fire
14	Care and maintenance of fire extinguishers	Late intervention for fires, injury, death	Care and maintenance should be performed for fire extinguishers according to the Regulation on Protection of Buildings from Fire
15	Use of latex gloves	Latex allergy	Hypoallergenic gloves should be used.
16	Inadequate ventilation	Discomfort, overwhelm	Ventilation should be provided in areas without natural ventilation. Periodic maintenance of ventilation systems should be performed.
17	Natural gas used in stoves	Gas leak, injury	Precautions should be taken against gas leaks, department heads and employees should be informed of malfunctions, malfunctions should be rapidly dealt with.
18	Communication problems between employees	Physical and verbal violence, stress	Employees should be given training about communication, stress management, and anger control. Psychological support should be provided.
19	Oven	Work accidents	Ovens should be operated by authorized personnel. Periodic checks and cleaning should be regular, employees should use oven gloves.
20	Waste and waste containers	Infectious disease	Waste should be removed appropriately at the end of work. Bags in waste containers should be single-use and lids of containers should be kept closed.
21	Dining hall cleaning	Work accidents, unaware use, poisoning	Care should be taken of warnings concerning the use of cleaning materials. In case of contact, hands and eyes should be washed with lots of water.
22	On-the-job training	Work accidents, occupational disease	Newly starting personnel should be given on-the-job training. Information should be given about working areas and activities.

Table 6 continued

No	Threat	Risk	Corrective and Preventive Actions
23	Lack of safety net in stairwells	Falls and injury	Stairwells should have safety nets installed. The integrity of nets should be checked at suitable intervals.
24	Obstacles in front of fire extinguishers	Delayed intervention for fires and injury	Obstacles in front of fire extinguisher cabinets should be removed.
25	Vibrations	Muscular and skeletal system disease, a circulation disorder	Maintenance should be performed on devices that may cause vibration. Contact between moving parts should be prevented, employees should take regular breaks.
26	The messiness of work area	Injury	After finishing activities, materials should be put in their place. Apart from the equipment used, the material should not be left in the work area.
27	Inadequate lighting	Trips, falls, collisions	Natural and artificial lighting should be at sufficient levels. Apparatus used for lighting should be appropriate for lighting requirements.
28	Drain grids	Trips, slips, falls	Drain grids and floors should be on the same level. Drain grids should be made of a material that is not slippery. Grid intervals should abide by standards.
29	Doors and entries	Injury, confusion	Doors and entryways should be organized according to the Regulation on Health and Safety Measures to be Taken in Workplace Buildings and Extensions
30	No use of personal protective equipment	Work accidents and injury	Based on the quality of the work, appropriate personal protective equipment should be used. Employees should be given training about equipment.
31	Cabinets not secured.	Injury due to toppling cabinets	Cabinets should be secured against toppling.
32	Raw vegetables and fruit	Infection, transmission	Care should be taken of hand hygiene. Employees should be informed of infection risk.

Acceptable level risks have a risk score between 2 and 6 due to the multiplication of severity and probability values. In the presence of acceptable risk, current checks should be maintained without the need for additional control processes. Acceptable level risks are shown in Table 7. Numbers 1-2 have a risk score of 6, while number 3 has a risk score of 3.

Table 7. Acceptable level Risk ($2 \leq R \leq 6$)

No	Threat	Risk	Corrective and Preventive Actions
1	Trays and containers used to carry food	Poisoning, infectious diseases	Trays and containers should be able to be cleaned and disinfected. They should be kept clean and in good condition to prevent the transmission of harmful material in food.
2	Accumulation of materials	Tripping and falling	All materials should have their own storage area. They should not be stacked.
3	Chipped and fractures plates used in the dining hall, construction of tables	Cut injuries, health problems	Tables should be easy to clear, chipped and fractured plates should be separated from intact ones.

4. Discussion

This study determined the hazards and risks encountered in the dining hall environment. Risks at a significant level in dining hall environments can cause serious harm, like injuries, disability, permanent incapacity for work, or death to individuals. Risks at a significant level are caused by electricity, use of cutting tools, machinery and stoves, storage areas, biological factors, placement of material at high locations, hot surfaces, and hazardous behavior and situations. Risks at a moderate level in dining halls appear to be due to the working environment, floor, thermal comfort conditions, carrying heavy loads, sinks, ergonomic conditions, cleaning, chemical use, doors and columns, and fire extinguishers. Risks at acceptable levels emerge due to trays and containers used, use of fractured or chipped equipment, and accumulation of material.

According to the findings obtained in our study, while some hazards and risks are due to the material and equipment used in dining halls, some are due to the quality of the work performed. Lack of initial work related to the job and general training, intense work tempo, and deficient use of personal protective equipment increase risk levels.

There is no study in the literature performed in a university dining hall, the topic of our study, though there are parallel studies available.

A study stated that muscular and skeletal system diseases are frequently observed due to causes such as carrying heavy loads and standing for long durations in dining hall working areas [20]. Other studies revealed that hazards and risks like slippery floors, equipment used, distribution of workload, time anxiety, stress, chemical, and biological factors caused work accidents. Burns and injuries were frequently experienced due to hot surfaces and liquids [21]. In these studies, it was concluded that providing training related to the job and using personal protective equipment would reduce or resolve the hazards and risks. Ensuring work health and safety conditions and increasing awareness of safety leads to the steps that need to be taken to prevent work accidents and occupational diseases. Another study in a dining hall area was performed using the Fine-Kinney method [11]. In this study, training was given related to the job and it was concluded that the use of personal protective equipment reduced or removed hazards and risks.

5. Conclusion and Recommendations

Great changes brought by technology in working life have made life more convenient for humans and ensured the development of social welfare. However, in addition to these technological developments, the use of chemical materials and mechanization have led to many diseases and hazards. The emergence of occupational diseases, work accidents, and environmental problems have led to the need for work health and safety precautions and made them mandatory.

The dining hall in the research is an area where food material is brought, stored, distributed and collected, and cleaned after consumption. University dining halls are working environments with intense workflow in order not to disrupt the dining requirements of students. Due to the labor-intensive working environment, work health and safety gain great importance in order for employed individuals to do their jobs. The dining hall environment involves many physical, biological, chemical, ergonomic, and psychosocial hazards and risks. This study aimed to reveal the hazards and risks present and to determine precautions that should be taken in the dining hall area. Some of these hazards and risks are encountered due to structural problems, use of machinery, use of cutting tools, damaged or degraded equipment, and errors in use.

The L-type matrix method used for risk analysis in the research is easy to apply and understand. The advantages of the L-type matrix method ensure ease of use compared to other risk analyses. Additionally, the probability is an important factor in the L-type matrix method. However, apart from the probability variable in order not to encounter surprise work accidents, processes are each informational probability estimates (identification of hazard, severity variable, who will be affects, tolerability of risk, precautions, work stoppage, etc.). From this aspect, the reliability of probability estimates for all processes should be investigated [15].

This study identified the present and potential risks in a dining hall environment to ensure benefits in preventing work accidents or occupational diseases among employees. Employees and authorized persons taking precautions against the determined risks will prevent potential injury, disability, or death. The risks determined in the dining hall area should be removed or reduced by taking precautions at the source, in the environment, or in person.

An important step in ensuring work health and safety conditions is to provide information and training about hazards and risks that may be encountered due to the job and working environment to dining hall employees. All employed individuals should be informed about work health and safety culture. Appropriate policies should be determined with the aim of ensuring health and safety-related to activities. Employed individuals should be supported in psychological terms to provide full well-being. Work accidents, occupational diseases, injuries and near-miss events experienced in the workplace should be recorded. The most appropriate personal protective equipment for the job should be determined and employees should be trained about its use. Periodic maintenance and checks of machinery, equipment, tools, and materials used in the workplace should be performed and recorded. Abiding by the precautions taken will ensure the creation of a healthier and safer working environment.

Ethical Statement: In this study, biological material belonging to humans or animals was not used. The research did not require ethics committee permission as it was a risk analysis study.

Conflict of interest: There is no conflict of interest.

Authors' Contributions :

K.O.: Conceptualization, Methodology, Formal analysis, Writing - Original draft preparation, Investigation (%50).

A.O.: Conceptualization, Methodology, Resources, Investigation (%50).

All authors read and approved the final manuscript.

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Research Article

THE SYMPTOMS AND CO-MORBIDITIES OF COVID-19 PATIENTS AT HOME ISOLATION IN INDIA

Sujata MURARKAR[1] 🆔 *Sudhanshu MAHAJAN*[2] 🆔 *Jayashree GOTHANKAR[3]* 🆔

[1]Dept. of Community Medicine, Bharati Vidyapeeth (Deemed to be University) Medical College, Pune, India.
[2*]Dept. of Community Medicine, Bharati Vidyapeeth (Deemed to be University) Medical College, Pune, India.
[3]Dept. of Community Medicine, Bharati Vidyapeeth (Deemed to be University) Medical College, Pune, India.
*Corresponding Author; sudhavaibhav1311@gmail.com

Abstract: Indian Government has issued the guidelines on home isolation for very mild/pre-symptomatic COVID-19 cases based on a proposal of the Directorate of Public Health and Preventive Medicine. This has originated when COVID-19 designated hospitals started to shift asymptomatic and stable patients to quarantine facilities to reserve beds for those in need of treatment. To determine the prevalence of symptoms and co-morbidities of COVID-19 positive patients at home isolation OPD. This cross-sectional study was conducted at a designated COVID-19 tertiary care hospital in Pune, India, which had included all COVID-19 positive patients enrolled for the home isolation care from the 15th July to 15th August 2020. There were total 639 adults out of which 362 were males and 277 females. The most common presenting symptom present in 49.4% cases was fever. Hypertension was the most prevalent comorbidity noticed in 10% of patients followed by Diabetes in 6.7%. The maximum time lag of positive COVID-19 test to registration for home isolation OPD of 8 days was observed in only 1 patient. The significant association was seen between symptom of fever with the adults (males) and in the age group of 31-50 years(p<0.05). Home isolation could be considered a classic model for COVID-19 patients in resource constrained situation. Home isolation can substantially reduce health care expenses for the asymptomatic and mild symptomatic COVID-19 multitude.

Keywords: COVID-19, Home isolation, Co-morbidities

1. Introduction

A breakout of pneumonia of unknown aetiology was reported in Wuhan City, China, in December 2019 which was eventually traced to the Huanan Seafood Wholesale market.[1] On February 11, 2020, WHO gave the authorized name COVID-19 for this disease caused by SARS-Cov2, a novel virus genetically related to the corona- virus responsible for the 2003 SARS outbreak.[2] Afterwards, on March 11, 2020 COVID-19 was declared a worldwide health pandemic.[3] It has further caused a huge economic catastrophe everywhere on the World.

WHO recommends that all persons with suspected COVID-19 who have severe acute respiratory infection be triaged at the first point of contact with the health care system and based on disease severity emergency treatment should be started.[4] Those presenting with mild illness, hospitalization may not be possible because of the burden on the health care system, or required unless and until there is concern about rapid deterioration.[5] The patients with only mild illness can be cared and followed up by family members.

The Indian Ministry of Health and Family welfare has issued guidelines for home isolation of very mild and asymptomatic COVID-19 patients in which a patient can stay at home however must be in contact continually with the District Surveillance Officer and a registered hospital and has to sign an undertaking. [6] It involves telecommunication with the doctors and self-monitoring of health by the patients and their relatives while staying in home isolation.

Current study has undertaken at Pune in the Maharashtra state, India, with the following objectives:

1. To assess the prevalence of common symptoms and associated co-morbidities of COVID-19 patients at home isolation OPD.

2. To determine the time lag from test positive to registration for home isolation of COVID-19 patients

3. To find out the association of common symptoms with age and gender of COVID-19 patients.

2. Material and Methods

This cross–sectional observational study was undertaken in a Home Isolation Out Patient Department (OPD) at a designated COVID-19 tertiary care hospital in Pune, India, for a period of 1 month from 15th July to 15th August 2020 after obtaining approval from the Institutional ethics committee. Total 639 COVID-19 laboratory confirmed positive patients were recruited in this study. Informed written consent was procured from all the patients. The study tool was a predesigned and pretested questionnaire filled by the investigators by interview method. Before enrolling patients to home isolation programme, parameters like SPO2 level, pulse, blood pressure and temperature of each patient were recorded. Based on these readings if Spo2 level is 95% and above, after a three-minute walk test, pulse, blood pressure and temperature readings are within normal limit then the patient was enrolled for home isolation programme. After that as per Indian government guidelines, infrastructure triage form, undertaking for home isolation form were filled by patients/relatives. Home isolation eligibility form was filled by investigators after taking detailed interview of each patient.

Those patients with SPO2 level below 95% after 3 minutes' walk test, patients with random blood glucose level more than 150 and patients with systolic hypertension more than 150 mmHg and less than 80 mmHg were not eligible for home isolation and so were excluded from the study.

Home isolation period was of 17 days. Out of this 17 days, during first 10 days' patients were received a phone call daily from doctor to enquire about health of the patients. During this phone call, patients could tell about his or her temperature, pulse rate, oxygen saturation and new symptoms if any. Between days 11 to 17 patients were requested to self-monitor and call doctor only if patient had any health issues. On the 17th day, the patient could collect their discharge cards from the home isolation OPD.

Patients enrolled at home isolation OPD was provided "Home isolation kit" incorporated with digital thermometer, portable pulse oximeter, mask, gloves, disinfectant tablets and hydroxychloroquine tablets. This kit was explained by the doctors to the patients. Patients/care giver were requested to keep a watch for any of the following symptoms- difficulty in breathing, chest pain or discomfort, bluish discoloration of lips or nails, feeling confused or excessive sleepiness, shortness of breath after 3-minute walk, fever > 100F slurred speech weakness or tingling in face or limb. In case of any warning signs or emergency at any time, the patients were given an emergency contact number and asked to come immediately at the hospital's flu OPD which was open 24X7. In addition to the above, in children excessive irritability, crying or lethargy were considered to be danger signs.

Data analysis was performed using SPSS statistical software version 25. The results were presented in tabular format. For qualitative data, various rates, ratios and percentages (%) were

calculated. Chi-square test was used to find out the association of common symptoms of COVID-19 with sociodemographic variables of COVID-19 patients.

2.1. Ethical Statement:

This study was approved by Institutional Ethics Committee of BHARATI VIDYAPEETH Medical College (Deemed to be University), Pune, India. (Date: 06/07/2020; Ref: BVDUMC/IEC/3)

3. Results

Total 639 patients were enrolled in home isolation OPD. Out of these, 362(56.7%) were males and 277(43.3%) females. Details are given in Table 1.

Table 1. Age and gender wise distribution of patients enrolled at home isolation OPD

	n	%
Age		
1-10	47	7.4
11-20	60	9.4
21-30	132	20.7
31-40	184	28.8
41-50	112	17.5
51-60	74	11.6
>60	30	4.7
Gender		
Male	362	56.7
Female	277	43.3
COVID-19 symptoms		
Present	340	53.2
Absent	299	46.8
Total	639	100

The mean age of the diagnosed patients was 34 years. By seeing the age-wise distribution of patients, it is clear that young and reproductive age group constituted a significant percentage. Approximately 5% of the COVID-19 patients belonged to geriatric age group.

Table 2. Symptom wise distribution of patients enrolled at home isolation OPD

Symptoms[a]	n	%
Fever	168	49.4
Cough	160	47.1
Cold	45	13.1
Headache	46	13.5
Loss of smell	36	10.6
Loss of taste	19	5.6
Throat pain	42	12.4
Generalized weakness	61	17.9
Loose motions	22	6.5
Nausea, vomiting	12	3.5
Decreased appetite	1	0.3
Body ache	36	10.6
Co-morbidities		
Diabetes	43	6.7
Hypertension	64	10.0
Hypothyroid	19	3.0
Angioplasty	6	0.9

[a]Multiple responses

Table 2 shows co-morbidities and symptoms wise distribution of patients enrolled at home isolation OPD. Fever was the most common presenting symptom being present in 168 (49.4%) cases, followed by cough and generalized weakness in 160 (47.1%) and 61 (17.9%) patients, respectively. Only 1 patient presented with decreased appetite. Cold was encountered in 45 (13.2%) patients. Hypertension alone was present in 64 (10%) of the patients and 43(6.7%) had diabetes.

Table 3. Distribution of COVID-19 patients according to Infrastructure triage

Infrastructure triage	Number	%
Lives within 5-10 km from tertiary care hospital hospital	619	96.9
Has a lift/elevator in the building	366	57.3
Has a 24/7 care giver available	615	96.2
Has a place to quarantine other family members	573	89.7

Table 3 conceded that approximately 96% of the patients had a 24/7 care giver available at their home. Approximately 58% of the patients stated that they had at least one lift in their place of residence, varying from 3 to 15 floors. Majority of the patients (96.9%) were located from 5 to 10 km away from the tertiary care hospital.

Table 4. The time lag from COVID-19 test positive to registration for home isolation of Covid 19 patients

Time lag in days	n	%
0	326	51.0
1	233	36.5
2	54	8.5
3	19	3.0
4	1	0.2
5	3	0.5
6	2	0.3
8	1	0.2
Total	639	100

Maximum patients, 51%, came on the same day to registered themselves in the home isolation OPD after they found positive followed by 37% came on the next day. (Table 4)

Table 5. Association of gender with symptoms of COVID-19 patients at home isolation OPD

Symptoms	Male (209)	Female(131)	p
Fever	114	54	**0.017[a]**
Cough	93	67	0.232
Cold	28	17	0.911
Headache	27	19	0.677
Loss of smell	22	14	0.963
Loss of taste	14	5	0.260
Throat pain	24	18	0.538
Weakness	33	28	0.192
Loose motion	16	6	0.262
Nausea, vomiting	6	6	0.406
Decreased appetite	0	1	0.206
Generalized body ache	21	15	0.683

[a] Statistically significant at p<0.05 level according to Chi-Square test results

As per Table 5 fewer was the most common presenting symptom reported by 114 of males as compared to females (p<0.05). There was not a significant difference between male and female groups according in presence of cough, cold or other symptoms reported by patients with symptoms of COVID-19 patients at home isolation OPD. According to the results of the study males, compared with females, more often reported cough, cold, headache, loss of smell and loss of taste as a presenting symptom, but this finding was not statistically significant (p>0.05).

Table 6. Association of symptoms with age (in years) of COVID-19 patients at home isolation OPD

Symptoms	1-10	11-20	21-30	31-40	41-50	51-60	>60	p value
Fever	13	11	31	39	39	26	9	0.001 [c]
Cough	3	16	28	56	32	19	6	0.217
Cold	4	1	6	15	10	6	3	0.31
Headache	1	3	12	14	12	3	1	0.581
Loss of smell	0	0	10	19	5	1	1	0.017 [b]
Loss of taste	0	0	7	6	5	1	0	0.295
Throat pain	1	3	13	12	7	6	0	0.483
Weakness	0	2	17	17	16	8	1	0.105
Loose motion	1	2	6	5	3	3	2	0.764
Nausea, vomiting	1	2	2	4	1	2	0	0.788
Decreased appetite	0	0	0	1	0	0	0	0.905
Generalized bodyache	0	0	8	18	7	2	1	0.092

[b] Statistically significant at p<0.05 level according to Chi-Square test results; [c] Statistically significant at p<0.01 level according to Chi-Square test results

As per Table 6 fewer was the most common presenting symptom reported by 31-40 and 41-50 age groups and this finding was statistically significant according to chi-square test results (p<0.01) . According to the results of the study, loss of smell was higher in 21-30 and 31-40 groups as a representing symptom of COVID-19 patients at home isolation OPD, and this finding was statistically significant (p<0.05). Dry cough, cold along with headache and generalized weakness were all common in the age groups 21 to 50 years, but this finding was not statistically significant according to chi-square test results.

4. Discussion

The novel Corona Virus Disease 2019 is the paramount public health burden in the world. Due to this disease, the morbidity and mortality of the worldwide community is definitely increasing every now and then. Owing to the sudden witnesses widespread Coronavirus contamination cases in several major government and private hospitals, there has been shortage of hospital beds and quarantine facilities. Therefore, for a large number of people who have tested positive for COVID-19 but showed no or mild symptoms, the Union Health Ministry has given the option for home isolation OPD.

The present study represents a study about clinical manifestations and co morbidities in the confirmed Covid-19 patients attending home isolation OPD.

The common COVID-19 symptoms are fever, sore throat, dry cough, blocked nose, shortness of breath and loss of smell and taste. [7] In our study we found that, the prevalence of fever is 49%. An observational study of 1420 patients by European Centre for Disease Prevention and Control also reported fever by 45.4%.[8] A study conducted by Chaolin Huang, et al in China[9] concluded that fever

and cough were the most common symptoms. This observation is in line with our findings whereas a large meta-analysis and systemic review of 148 studies from 9 countries [10] also confirmed that fever and cough were the most prevalent symptoms of adults infected by SARS-CoV-2. Lu et al. [11] conducted a study to look for non-respiratory symptoms in COVID-19 patients and described that out of 72,314 COVID-19 patients, 889 had no symptoms at all. Some patients had mild urticarial.

Italy and Spain were the world's two hardest hit countries in European nations by the COVID-19 pandemic. [12] Maximum of the COVID-19 deaths in Italy were male while in Spain about twice as many men as women have died. [13]

The present study suggests that there were 56.7% males and 43.3% of females were affected by COVID-19, which is similar to the figures reported in the systemic review and meta-analysis of clinical characteristics of COVID-19. [14] The existing findings are because of the gender life style behaviour such as high level of smoking and drinking among men as compared to women. Moreover, the females have more responsible attitude towards the prevention of any disease.

Depending on current information and clinical expertise, it was observed that comorbidities increase the chances of COVID-19 infection. [15] Based on the random effect model after the inclusion of 7 studies including 1576 infected patients which is published in 2020 concluded that hypertension is the most prevalent co-morbidity followed by Diabetes in the confirmed COVID-19 patients. [16] This study supports our findings. A meta-analysis study of total 1786 COVID-19 patients conducted by Adekundle Sanyaolu et al [15] identified hypertension was the most common comorbidity. People with underlying uncontrolled medical conditions such as diabetes; hypertension; lung, liver, and kidney disease; cancer patients on chemotherapy; smokers; transplant recipients; and patients taking steroids chronically are at increased risk of COVID-19 infection.

A narrative review conducted by Daneil P Oram [17] on prevalence of asymptomatic SARS-CoV-2 infection concluded that approximately 40% to 45% of those infected with SARS-CoV-2 remained asymptomatic. In our study also we found that 46% of the COVID-19 patients were asymptomatic.

The present study revealed that majority i.e. 51% of the COVID-19 patients registered themselves on the same day in the home isolation OPD after they found positive. This shows improved awareness about COVID-19 among the patients and being a responsible citizen. Social platforms especially for social distancing and home quarantine played the crucial role during the COVID-19 outbreak.

Home isolation was not the best strategy in Wuhan and all the patients should be brought to a hospital for further line of treatment said by the Chinese government. [18] They did not try the classic model of home isolation due to a hypothetical risk of secondary transmission of the infection to other family members at home. But home isolation can substantially reduce health care expenses for the masses while utilising expertise of physicians in treating patients with moderate to severe disease. There were few limitations of our study. We didn't consider secondary attack rate among household contacts and the details of how many patients didn't enrol due to unavailability of triage. From the present study, it can be concluded that home isolation for asymptomatic and mild symptomatic COVID-19 patients is possible both for the medical health care sector and the patients.

Ethical Statement: This study was approved by Institutional Ethics Committee of BHARATI VIDYAPEETH Medical College (Deemed to be University), Pune, India. (Date: 06/07/2020; Ref: BVDUMC/IEC/3)

Conflict of interest: All authors declare that they do not have any conflict of interest.

Authors' Contributions:

Dr Sujata Murarkar prepared methodology, had continuous interaction with home isolation team of Bharati Hospital Pune, collected the data and written the original draft. Dr Sudhanshu Mahajan was involved in study design, collection of data and analysis of the data. Dr Jayashree Gothankar collected the data and critically reviewed the manuscript.

Dr. Sujata Murarkar: Conceptualization, Methodology, Formal analysis, Writing - Original draft preparation (50%)

Dr. Sudhanshu Mahajan: Conceptualization, Methodology, Resources, Draft preparation (30%)

Dr. Jayashree Gothankar: Conceptualization, Draft preparation (20%)

All authors read and approved the final version of manuscript.

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IJHSRP

Research Article

REPRODUCTIVE OUTCOMES FOLLOWING FROZEN-THAWED EMBRYO TRANSFER IS SUPERIOR WITH THE TRANSFER OF BLASTOCYSTS EXPANDED ON DAY 5 THAN ON DAY 6

*Serkan ORAL[1] Aytek ŞIK[*2] Özkan ÖZDAMAR[3] Yaşam Kemal AKPAK[4]*
Yılda Arzu ABA[5]

[1]Department of Obstetrics and Gynecology, Istanbul Halic University, Faculty of Medicine, Istanbul, Turkey
[2]Department of Obstetrics and Gynecology, Şişli Kolan International Hospital, Istanbul, Turkey
[3]Department of Obstetrics and Gynecology, Istanbul Medeniyet University, Faculty of Medicine, Istanbul, Turkey
[4]Department of Obstetrics and Gynecology, University of Health Sciences, Tepecik Training and Research Hospital, Izmir, Turkey
[5]Bandirma Onyedi Eylul University, Faculty of Health Sciences, Balikesir, Turkey
*Corresponding Author: bulataytek@hotmail.com

Abstract: *To compare pregnancy and live birth rates between D5 and D6 transfer of frozen-thawed blastocysts in women undergoing 'freeze-all' cycles. Our study, designed as a retrospective cohort study, evaluates single frozen thaw embryo transfer in 209 patients. The cohort group included in the study was divided into two according to the day of becoming blastocyst: (i) D5 blastocysts and (ii) D6 blastocysts. A 'freeze-all' strategy was adopted using GnRH antagonist cycles and vitrification as the method of freezing. The pregnancy rate was higher in the D5 group than the D6 group, although it was not statistically significant (72.6% vs. 59.6%, respectively, p=0.078). Live birth rate was significantly higher in the D5 group than in the D6 group (66.9% vs. 48.1%, respectively, p=0.015). The rates of abortus, biochemical pregnancy, and preterm birth were comparable between the groups. Live birth rate is superior when blastocysts expanded on D5 are used in frozen-thawed cycles, compared to those expanded on D6. The day of the blastocyst expansion appears to be an important predictor of pregnancy outcome and, thus, taken into account as well as D5 embryos should be given the priority in frozen-thawed transfer cycles.*

Keywords: *frozen embryo transfer; live birth rate; day 5 versus day 6; blastocyst vitrification.*

1. Introduction

A conventional in vitro fertilization (IVF) cycle involves several consecutive steps, starting from the controlled ovarian stimulation (COS) with gonadotropins and ending with the transfer of the best quality embryo(s) at the cleavage or blastocyst stage. However, in certain circumstances, a fresh embryo transfer cannot be completed due to either some medical concerns such as premature progesterone (P4) elevation at the time of hCG triggering or increased risk of ovarian hyperstimulation syndrome (OHSS) or parental desire to pursue preimplantation genetic testing for aneuploidy (PGT-A). Thus, the entire cohort of viable embryos is cryopreserved, a strategy referred to as 'freeze-all' [1-4].

On the other hand, COS aims to obtain an appropriate number of competent oocytes with the minimum risks for the woman [5]. Many cohort studies have shown the relationship between the number of oocytes collected and live birth rates, and it has been proven that the higher the number, the higher

the live birth rate [6-7]. However, as the national reproductive health care policies continue to endorse limiting the number of embryos transferred and single embryo transfer has been adopted as the standard care in many countries, freezing more surplus embryos for use in subsequent cycles has become a standard approach [8-9].

Several achievements in the optimal embryo culture, laboratory procedures, and imaging systems allowed ART physicians to prefer embryo transfers at the blastocyst stage. A substantial number of clinical studies have shown that the likelihood of live birth after fresh blastocyst stage (Day 5-6; D5-6) embryo transfer is higher than after fresh cleavage stage (Day 2-3; D2-3) transfer [10-12]. Moreover, a recent Cochrane review has revealed that fresh D5-6 embryo transfer is associated with superior reproductive outcomes compared to D2-3 [13]. However, the rate of blastulation is not the same for all embryo cohort. As some embryos reach blastulation by D5 and others not until D6 or even D7, comparison of embryos with different blastulation rates has been performed in several studies, and the chance of pregnancy was reported to be significantly reduced if a fresh embryo transfer is performed on D6 compared to D5 [14-17], a result largely attributed to endometrial-embryonic asynchrony [18]

The hormonal preparation of endometrium in frozen embryo transfer (FET) cycles aims to optimize pregnancy rates by synchronizing the ET stage with that of endometrial receptivity [19]; therefore, no difference in pregnancy rates is expected between D5 and D6 blastocysts in FET cycles. However, there exists inconsistency concerning reproductive outcomes for D5 versus D6 cryopreserved blastocyst transfers, as some studies reported that D6 embryos are outperformed by D5 embryos [20-23], while others revealed similar ART outcomes for D5 and D6 thawed blastocyst transfers [16, 24-27]. It is noteworthy to express that not all these studies report live birth rates and are heterogeneous in terms of the number of blastocysts transferred.

Thus, in the present study, we aimed to present our results and compare reproductive outcomes in pregnancy and live birth rates between D5 and D6 transfer of frozen-thawed blastocysts in women undergoing 'freeze-all' cycles.

2. Materials and Methods

The present is a retrospective cohort follow-up study that included all autologous frozen-thawed blastocyst transfers performed after ovarian stimulation between January 2014 and December 2017 in the ART unit of our institution.

Ethical Considerations: The study was approved by the local ethic committee of Istanbul Yeni Yuzyil University (07 May 2018; 2018/5).

2.1. Patient Selection

In our study, 209 patients who were applied only all freezing protocols were included. According to our inclusion criteria; Patients aged 40 years and younger who underwent ICSI and subsequently underwent autologous frozen-thawed embryo transfer. Our exclusion criteria are poor-responder patients, patients with preimplantation genetic screening or preimplantation genetic diagnosis, and natural endometrial preparation cycles. Reproductive outcomes of groups were compared based on the development day of blastocyst expansion (i) D5 blastocysts (157) and (ii) D6 blastocysts (52). A total of 209 blastocyst transfers were analyzed during the study period. Only one cycle of the patients included in the study was included in the study.

2.2. Stimulation Methods

Recombinant FSH was used in all patients for controlled ovarian hyperstimulation (Gonal-F, Merck Serono, Germany), and treatment was started on the second day of the menstrual cycle.

Gonadotropin dose was adjusted according to the patient's age, body mass index, and antral follicle count. GnRH antagonist (Cetrotide; Merck-Serono, Switzerland) was used for pituitary down-regulation. The decision to start an antagonist was made when the leading follicle size reached 12-13 mm. Trigger decision was made for final maturation when the leading follicle reached 17 mm in patients with a low ovarian reserve and when at least three follicles reached 17 mm in patients with normal or high reserve. For this, highly purified hCG (Choriomon 5000 IU, IBSA) was used in patients with a low ovarian reserve and normal reserve, GnRH agonist, triptorelin acetate, and 0.2 mg Gonapeptyl were used to prevent OHSS in cases with high ovarian reserve for final maturation. (A serum E2 level above 3000 pg/dl was adopted as high-risk for OHSS, and, in this case, oocyte maturation was triggered using GnRH agonist). Oocyte retrieval was performed 35-35.5 hours after the trigger. After all the collected oocytes were applied to intracytoplasmic sperm injection (ICSI), pronucleus control was performed at the post-OPU 20th hour. All blastocysts formed after embryo culture were frozen by the vitrification method.

2.3. Insemination, Embryo Quality Assessment, and Cryopreservation

Single-step media was used as culture media for the incubation of all embryos. (LifeGlobal®). The embryos in the group called Group 1 reached full blast characteristics on the 5th day and were vitrified on the 5th day. However, nonexpanded embryos, those in morula or cavitating morula stages, are kept until the 6th day and vitrified if they gain full blast characteristics, which was named Group 2, and embryos that did not develop blastocysts were discarded. All embryos in both groups were monitored under the same conditions and using the same media until the day of vitrification. One hundred fifty-seven blastocysts evaluated in group 1 were vitrified in D5, and 52 blasts in group 2 were vitrified in D6. The embryo scoring was conducted according to the grading scale proposed by Gardner & Schoolcraft (28). Embryos were graded from 1 to 6 according to the level of expansion and hatching. The inner cell mass (ICM) was scored according to the number of cells as follows; It was accepted as best grade (A) if the ICM cells were large in number and closely monitored as a package. If some of the ICM cells were observed in loose groups, it was considered grade B. Those with the worst grade (C) were those with few and loose ICM cells.

Similarly, in trophectoderm (TE) scoring, it was considered the best grade (A) if most TE cells were in the form of multiple epithelial layers. Few TE cells consisting of a loose epithelium were defined as grade (B); if very few TE cells were represented, it was the worst grade (C). From blastocysts expanded both on D5 and D6, only those with quality ≥3BB, namely 'good quality,' were selected and transferred.

According to the manufacturer's instructions, the vitrification method used was the Irvine Scientific Freeze Kit (Cat. 90133-SO; Irvine Scientific, Santa Ana, CA, USA) with HSV straws.

2.4. FET Endometrial Preparation and Embryo Transfer

In all patients included in the study, the artificial cycle was preferred as the endometrial preparation method. Ovarian suppression and possible pathologies (ovarian cyst, fibroid, polyp) were eliminated with transvaginal ultrasonography and baseline hormonal measurements performed in the second menstruation period after OPU. E2, P4, and LH levels were measured in all patients at the beginning of the endometrial preparation. E2 levels >80 pg/ml, P4 levels >1.2 ng/ml or sonographic evidence of ovarian cysts, ET was canceled, and the patient was re-evaluated for the onset of the following menstrual cycle.

Endometrial preparation is initiated on the 2nd or 3rd day of the FET cycle with oral estrogen (Estrofem 2 mg tablet, Novo Nordisk, Bagsvaerd, Denmark) supplementation at a dose of 2 mg daily and titrated to 10 mg daily to allow for endometrial development. In addition to P4 and E2

measurements, a transvaginal ultrasound assessment was made on the 12th day of the cycle. Once the endometrium reached a thickness >7 mm, vaginal progesterone (Crinone 8% vaginal gel; Merck Serono, Bedford, England) supplementation began on the 15th day to achieve endometrial differentiation. Endometrial thickness <7 mm was counted as an exclusion criterion from the study. Embryos (day 5/6) in both groups were thawed and transferred on the 6th day of progesterone addition. Embryos in both groups were thawed 2-4 hours before the transfer, and survival was checked after 30 minutes. After 2 hours of the thawing process, a second control was made, and they were evaluated for hatching, re-expansion, and extensive cytoplasmic granulation. Eligible blastocysts were transferred on the same day. The embryo transfer was performed under abdominal ultrasound guidance using a full bladder and a 5 MHz transabdominal probe (GE Voluson S6 General Electric, Wauwatosa, USA). Cook transfer catheter (Cook Medical, Indiana, and USA) was used as the transfer catheter. In the dorsal lithotomy position, the external catheter was inserted into the cervix after gentle cleansing of the cervical mucus with saline solution. Embryos were then transferred to approximately 1-1.5 cm from the surface of the fundal endometrium in the upper part of the endometrial cavity. The catheter was checked under a microscope for embryo retention or the presence of blood.

Vaginal progesterone gel and estradiol tablets were used to support the luteal phase until the day of the BhCG test. Biochemical pregnancy was determined by measuring serum β-hCG levels 12 days after the transfer. Estradiol supplementation was discontinued when the pregnancy test result became positive, while vaginal progesterone supplementation was not stopped until the 9th gestational week. Spontaneous abortus cases were also recorded and indicated with the term 'abortus'. The detection made the clinical diagnosis of pregnancy of the gestational sac in the transvaginal ultrasonography performed five weeks after the transfer.

2.5. Statistical Analysis

Data analysis was performed using the NCSS (Number Cruncher Statistical System, 2007, Kaysville, UT, USA). Continuous data were reported as mean+ standard deviation (SD) or median (range) as appropriate. Student t-test, Pearson's chi-square test, and Fisher's exact test were used for continuous or categorical variables, respectively. Non-parametric comparisons were performed using the Mann-Whitney U test, and categorical data were evaluated using the χ2 test. A p-value <0.05 was considered statistically significant.

3. Results

A total of 209 blastocysts ETs were analyzed, as 157 (75.1%) and 52 (24.9%) embryos were vitrified on D5 and D6, respectively. Serum E2 levels on the 2nd day of the FET cycle did not significantly differ between the groups (p=0.953). Serum P4 levels on the 2nd day of the FET cycle did not significantly differ between the groups (p=0.426).

Basic demographic characteristics and cycle outcomes are presented in Table 1. Mean patient ages and infertility periods did not significantly differ between D5 and D6 groups (p=0.104 and 0.192, respectively). Mean endometrial thickness by transvaginal sonography on the 12th day of the FET cycle was comparable between the groups (p=0.541).

Table 1. Comparison of the demographic and clinical characteristics between the groups

	Group 1 (n=157)	Group 2 (n=52)	Overall (n=209)	p-value
Age at retrieval	3.50±4.94	32.83±5.43	31.83±5.09	0.104[a]
BMI, kg/m^2	2.96±5.04	24.60±3.62	24.87±4.72	0.578[a]
Smoking, n(%)	48 (30.6)	17 (32.7)	65 (31.1)	0.775[b]
Infertility period, y	4.49±3.38	4.67±2.50	4.54±3.17	0.192[c]
Endometrial thickness at 12th day, mm	9.32±1.68	9.36±1.72	9.20±1.54	0.541[a]
Estradiol, pg/ml	42.51±24.29	39.75±15.27	41.13±19.78	0.953[c]
Progesterone, ng/ml	0.29±0.20	0.26±0.18	0.27±0.19	0.426[c]

Data are presented as mean±standard deviation (SD), [a]Student's t-test, [b]Chi-square test, [c]Mann Whitney U test. BMI: Body Mass Index.

In the overall patient cohort, in 45.5% of the ET procedures, a single embryo was transferred, whereas two embryos were transferred in 54.5% of the cycles. The number of transferred embryos, 1 or 2, was not statistically significantly different between D5 and D6 groups (p=0.397). The pregnancy rate was 69.4% in the total cohort. This rate was higher in the D5 group than the D6 group, although not statistically significant (72.6% *vs.* 59.6%, respectively, p=0.078). Live birth rate was 62.2% in the overall cohort and was significantly higher in the D5 group than in the D6 group (66.9% vs. 48.1%, respectively, p=0.015). However, the rates of abortus, biochemical pregnancy, and preterm birth were comparable between the groups. The number of pregnancies and the number of live birth rates, either 1 or 2 newborns, were comparable between the groups (p=0.408 and 0.244, respectively) (Table 2).

Table 2. Comparison of the reproductive outcomes between the groups

	Group 1 (n=157)	Group 2 (n=52)	Overall (n=209)	p-value
Transferred embryo number, n (%)				0,397[d]
1 embryo	74 (4.1)	21 (40.4)	95 (45.5)	
2 embryos	83 (52.9)	31 (59.6)	114 (54.5)	
Pregnancy, n (%)	114 (72.6)	31 (59.6)	145 (69,4)	0.078[d]
Live birth, n (%)	105 (66.9)	25 (48.1)	130 (62.2)	0.015[d]
Abortus, n (%)	6 (3.8)	3 (5.8)	9 (4.3)	0.693[e]
Biochemical pregnancy, n (%)	3 (1.9)	3 (5.8)	6 (2.9)	0.165[e]
Preterm birth, n (%)	1 (0.6)	1 (1.9)	2 (1.0)	0.437[e]
Pregnancy outcome n(%)				0.408[d]
1 baby	89 (78.1)	22 (71.0)	111 (76.6)	
2 baby	25 (21.9)	9 (29.0)	34 (23.4)	
Live birth number n (%)				0.244[e]
1 baby	85 (81.0)	23 (92.0)	108 (83.1)	
2 baby	20 (19.0)	2 (8.0)	22 (16.9)	

Data are presented as numbers and percentages, n (%). [d]Chi-square test, [e]Fisher's Exact Test

4. Discussion

IVF treatment methods have improved significantly since Louise Brown in 1978, but infertile couples with previous unsuccessful treatments are still among the main challenges facing IVF centers [28]. Also, several studies have shown a decrease in implantation rates after repeated unsuccessful IVF

treatments [29]. One of the main reasons for this is that embryos are transferred to the uterus on day 2 or 3 of the cleavage stage [28]. Two ways have been proposed to treat low implantation rates among couples having multiple previous failed IVF treatment attempts: Placing more than two embryos in the endometrium during the cleavage stage or transferring the embryos at a stage other than the cleavage stage.

Improvements in embryo culture media, promoting embryonic growth through genome activation, blastocele development, and embryonic expansion, allowed selection of embryos with the best implantation potential and led to an increase in the practice of embryo transfer at the blastocyst stage [29–31]. With blastocyst transfer, higher pregnancy, implantation, and live birth rates have been achieved than embryo transfers in the early cleavage stage [32–33]. In previous studies [29, 30, 32, 33], embryo transfer has been recommended on the 5th day after egg retrieval, as the higher implantation associated with blastocyst transfer has a pregnancy live birth rate. The possible cause of these high pregnancy rates may be the more advanced developmental stage of the blastocyst [30, 34, 35].

Multiple pregnancies have been a major concern for infertile couples, physicians, and public health. Maternal mortality and morbidity are important in infant mortality, morbidity, and costs on the community health system. Blastocyst transfer allows the selection of better quality embryos and has been proposed as a method that reduces the possibility of multiple pregnancies [36].

Reducing the number of transferred embryos to prevent multiple pregnancies and complications caused by multiple pregnancies should be the most important goal of assisted reproductive technology (ART) programs. The best way to achieve this is to select and transfer the single embryo with the highest implantation success [33].

According to the results of our cohort study, live birth rates are significantly higher when blastocysts expanded on Day 5 (D5) are transferred in FET cycles compared to those expanded on Day 6 (D6). However, although higher in cycles that employ blastocysts vitrified on D5, the difference in pregnancy rates does not reach statistical significance.

Previous studies reported compromised reproductive outcomes when embryos reached blastulation by day 6 compared to day 5 in fresh transfer cycles [15, 37]. However, literature data regarding the clinical implications of the transfer of embryos with a delayed rate of blastulation in vitrified-thawed blastocyst transfer cycles is controversial. Some studies concluded that delayed blastocyst development has no impact on the pregnancy outcomes of the FET cycle [16, 38]. In support of this, Capalbo et al. [39] demonstrated that euploidy rates in faster-growing blastocysts (D5) were similar to those in slower-growing ones (D6). In 2010, Sunkara et al. [40] published a meta-analysis involving 15 studies and reported a significantly higher clinical pregnancy rate and ongoing pregnancy and live birth rate with D5 than D6 frozen-thawed blastocyst transfers. However, sensitivity analysis revealed no differences in ongoing pregnancy and LBR after D5 versus D6 thawed blastocyst transfer with the same morphological blastocyst quality on the day of the cryopreservation. Kaye et al. [27] compared clinical and ongoing pregnancy rates in cycles with single embryo transfer of blastocysts cryopreserved on D5 or D6. However, their cohort comprised cryopreservation by both slow freezing and vitrification. Their results suggested comparable outcomes between D5 and D6 blastocyst groups for both the overall and vitrified blastocyst cohorts.

Conversely, Haas et al. [22] compared the pregnancy outcomes of 537 and 254 cycles, including blastocysts vitrified on D5 and D6, and, consistent with our results, reported significantly lower clinical pregnancy rates with blastocysts vitrified on D6 compared to blastocysts vitrified on D5, even when the D6 vitrified blastocyst morphology was at least as good as that of blastocysts vitrified on D5. Their thawing protocol differs from ours. They thawed D5 blastocysts 20–24 hours before the embryo transfer, whereas D6 blastocysts were thawed 2–4 hours before the transfer, which confers the heterogeneity between the cohorts thawed on different periods, and this is in contrast to our protocol, in which both

D5 and D6 vitrified blastocysts were thawed 2–4 hours before the transfer. Tubbing et al. [41] compared clinical outcomes between D5 and D6 vitrified blastocysts, and their results favored D5. In 2018, another study compared Live birth Rate (LBR) after frozen-thawed D5 and D6 blastocyst transfers in 1347 single autologous cycles [22]. Their results suggested that LBR following thawed blastocyst transfer was significantly lower when D6 vitrified blastocysts were used than D5 blastocysts, regardless of their quality. Our results are consistent with those reported by Ferreux et al., as we demonstrated the superiority of D5 blastocyst transfer in terms of live birth rates. Also, Ferreux et al. [23] evaluated potential confounders and reported that blastocyst expansion at D6 was independently associated with a significant decrease in LBR compared to D5 expanded-blastocysts.

Our study has some limitations. Clinical outcomes, such as pregnancy rates and live birth rates, might be influenced by many factors in freezing and thawing and the transfer process. These factors are not adjusted in the study. Another limitation might be morphological assessment in the embryo selection in both blastocyst groups, as this approach has been associated with poor predictive value [42]. Moreover, a pre-implantation genetic screening has not been performed in our study, although the significant difference between the two groups might be conceivably attributed to the embryo aneuploidies. One of the study's strengths is that all included cycles employed vitrification as the method of freezing. Thus, our data exclude the possible impact of the freezing method on the outcomes as it does not contain slow-freeze cycles. The thawing process also was performed 2–4 hours before the embryo transfer, which excludes any possible methodological heterogeneity between embryo cohorts thawed on different periods. Another strength of this study is the use of artificial endometrial preparation in both D5 and D6 blastocyst cohorts, eliminating the possible endometrial receptivity factor.

5. Conclusion

Based on the present study results, we suggest that transferring blastocysts expanding at D5 is associated with a significantly higher likelihood of pregnancy and live birth than those expanding at D6 in frozen-thawed embryo transfer cycles, even when D6 blastocysts are good-quality. Thus, the day of the blastocyst expansion appears to be an important predictor of pregnancy outcome and, thus, should be taken into account as well as D5 embryos should be given priority in frozen-thawed transfer cycles.

Conflict of Interest: The authors confirm that they have no interests that might be perceived as posing a conflict or bias.
Ethical Consideration: The study was approved by the local ethic committee of Istanbul Yeni Yuzyil University (07 May 2018; 2018/5).
Research and Publication Ethics: This work was carried out by obeying research and ethics rules.
Author Contributions: All of the authors declare that they all have participated in the design, execution, and analysis of the paper and approved the final version.

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Research Article

DETERMINING THE PREDICTIVE RELATIONSHIP BETWEEN FEAR OF CORONAVIRUS AND COMPLIANCE WITH ISOLATION PRECAUTIONS IN NURSES

Hamide AYGOR*[1]   *Aliye CAYIR[2]*

[1] Necmettin Erbakan University, Dep. of Labor and Women Disease Nursing, Fac. of Nursing, Konya, Turkey
[2] Necmettin Erbakan University, Department of Nursing Education, Faculty of Nursing, Konya, Turkey
* Corresponding author; hamidedindas@hotmail.com

Abstract: *Nurses, who spend a long time with the patient to meet their care needs and have the most contact with them, are one of the riskiest occupational groups in terms of COVID-19. This study was planned to determine the predictive relationships between fear of coronavirus and compliance with isolation precautions in nurses. An online survey was conducted with 243 nurses in July 2020. The data of the study were collected by using an Information Form and the Compliance with Isolation Precautions Scale and the Fear of COVID-19 Scale. Our study result showed that the compliance of the nurses with isolation precautions was on a good level and coronavirus fears of the nurses were moderate. The fear of coronavirus variable significantly affected compliance with isolation precautions. Nurses, who spend more time with patients by staying in the frontlines of the COVID-19 pandemic, are at great risk in terms of transmission of infection. This is why isolation precautions and discussing and improving the factors that affect isolation precautions are vitally important for nurses.*

Keywords*: Coronavirus; COVID-19; Fear of coronavirus; Isolation precautions*

1. Introduction

The COVID-19 virus was seen for the first time in China in December 2019 and has led to a pandemic by spreading to the entire world in a few months. This virus is a coronavirus that leads to severe acute respiratory failure [1-3]. COVID-19 is mainly transmitted through droplets. Droplets that are spread onto r surfaces by infected individuals by respiration infect people. In the study which determined viruses in infected individuals' nasal and throat smears, droplets, and aerosols that they spread by Leung et al. [4], the RNA virus was identified in the aerosols spread by some patients although they were not coughing. The study reveals the probability of viruses being transmitted by aerosols and the importance of using facemasks. Standard droplet and contact isolation measures need to be taken in all cases suspected for COVID-19. Additionally, in contact with a confirmed/potential COVID-19 case from a distance shorter than one meter, gloves, non-sterile gowns, surgical masks, face shields, and goggles need to be used. It was reported that 2055 healthcare workers were infected in China from the beginning of the pandemic to 24 February 2020 [5]. Especially nurses, who spend a long time with the patient to meet their care needs and have the most contact with them, are one of the riskiest occupational groups in terms of COVID-19. It is highly important for nurses to take isolation measures to protect themselves against infectious agents and also prevent other patients from getting affected [6]. Nurses have a key role in the prevention of transmission from patient to patient and from patient to healthcare personnel. For them to be able to realize these roles, the psychological and mental health of nurses is

highly important [7,8]. The fact that COVID-19 is a very new infection, it has several unknowns, and it has turned into a pandemic in a short time has led to a worldwide fear. Many studies reported significant relationships between the COVID-19 pandemic and situations such as depression, anxiety, and fear, as well as psychological and mental health [8,9,10]. For this reason, the effects of fear of COVID-19 on nurses' work life, especially their isolation measures, are very important. This study was planned to determine the predictive relationships between fear of coronavirus and compliance with isolation precautions in nurses' instructions.

2. Materials and Methods

The study was planned as a relational screening type.

2.1. Study Universe and Group

The population of the study consisted of all nurses working at public hospitals in the province of Konya in Turkey. Participation in the study was voluntarily, no sample was selected, and the study was completed with 243 nurses who filled out the questionnaire form completely.

2.2. Data Collection

Questionnaire forms of the data were collected online on the web, using Google Forms. The data were collected between 19 and 30 July. An online questionnaire link was shared through social media tools (such as WhatsApp, Facebook), information was provided about the research, and nurses were invited to fill in the questionnaire. The data of the research were collected based on self-report. Incompletely filled-out questionnaires were not included in the study.

2.3. Data Collection Tool

The data of the study were collected by using an Information Form developed by the researchers in line with the literature [1,9,11,12,13], the Compliance with Isolation Precautions Scale, and the Fear of COVID-19 Scale. The Information Form consisted of 23 questions on the sociodemographic characteristics and COVID-19 related qualities among the nurses. Compliance with Isolation Precautions Scale was developed in 2011 by Tayran and Ulupınar, and its cronbach's alpha value was determined as 0.85. It is a 5-point likert-type scale consisting of 18 items. The minimum and maximum scores on the scale are respectively 18 and 90. A high score indicates high compliance with isolation precautions [14]. In this study, cronbach's alpha value of the scale was found as 0.94.

The Fear of COVID-19 scale was developed by Ahorsu et al [15] and its Turkish validity and reliability study was conducted by Haktanır et al [16]. The cronbach's alpha value of the scale was determined as 0.86. The single-factor scale is a 5-point likert-type scale consisting of 7 items. The minimum and maximum scores on the scale are respectively 7 and 35. Higher scores indicate higher levels of fear of COVID-19 [16]. In this study, the cronbach's alpha value of the scale was found as 0.89.

2.4. Data analysis

The analyses of the data obtained in the study were conducted using SPSS 21 statistical analysis program (Chicago, IL, USA). In data analysis, descriptive statistics of frequencies, percentages, means, and standard deviations were used. The suitability of the numerical variables with normal distribution was tested by the Kolmogorov-Smirnov test (0.004-0.000), and it was determined that they were not normally distributed. In the comparison of the mean scores in the Compliance with Isolation Precautions Scale based on the independent variables (COVID-19-related characteristics), Mann Whitney U test was

used in independent groups with variables in two groups based on the size of the sample, and the Kruskal Wallis test was used in independent groups with variables in three or more groups (Bonferroni method for post hoc analyses).

Structural Equation Modelling was used to test the model consisting of the relationships between fear of coronavirus and compliance with isolation precautions in the nurses. Structural Equation Modelling is a method that is used to establish a statistical cause-effect connection [17]. To reduce the standard errors in measurements in the scales in the model consisting of one dimension and increase reliability [18], the parceling method was used. Considering its internal consistency values, the Fear of COVID 19 Scale was divided into three parcels. The obtained model was tested by using the AMOS software. The significance level was accepted as p<0.05.

2.5. Ethical Considerations

Before the start of the study, permission was received from the Scientific Research Platform of the Ministry of Health of Turkey and from the Ethics Board of Necmettin Erbakan University (Number and date: 2020/2624; June 19, 2020). All subjects provided informed consent electronically before registration. The informed consent page presented two options (yes/no). Only subjects who chose yes were taken to the questionnaire page, and subjects could quit the process at any time. The questionnaire does not include questions containing the contact information or any special information of the participants.

2.6. Limitations of the study

The fact that the study was carried out with a web questionnaire constituted the main limitation of the study. This study was conducted within one province of the country; the exclusion of nurses from other provinces may affect the generalisability of the findings.

3. Results

The sociodemographic characteristics of the nurses are shown in Table 1.

Table 1. Sociodemographic characteristics of nursing

Characteristics (n= 243)	X̄± SD	Min-Max
Age	31.07±7.79	20-53
Working Years	8.82±7.68	1-32
	n	**(%)**
Gender		
Female	195	80.2
Male	48	19.8
Marital Status		
Married	135	55.6
Single	108	44.4
Educational Status		
High School	33	13.5
Two-year college	33	13.5
Four-year college	141	58.2
Postgraduate	36	14.8
Working Unit		
Surgical	60	24.7
Internal	144	59.3
Other (Management, Education, Infection, Polyclinic, Laboratory)	39	16.0

While 74.1% of the nurses had provided care for the patient with diagnosed a contagious disease before, 55.6% had provided care for the patient diagnosed with COVID-19. When the situations with difficulty while nursing care during the COVID-19 pandemic was questioned, the first places included working with personal protective equipment (41.6%), staying away from family (13.6%), and working for long hours (11.5%). 86.4% of the nurses stayed at home during the COVID- 19 pandemic, whereas 52.7% got diagnostic tested for COVID-19, and 6.4% of those who got tested turned out to be positive. When whether or not they had received any training regarding COVID-19 was questioned, while 67.1% of the nurses stated that they had received training, 52.8% said they received this training from an Infection Control Committee Nurse. Most nurses (53.5%) partially thought the pandemic could not be controlled. When they were asked about the emotions they felt during the pandemic process, the first three places included fear (32.9%), sadness (23.9%), and hopelessness (14.8%) (Table 2).

Table 2. Nurses qualities related to COVID-19

Qualities (n: 243)	n	(%)
Previously provide care for patients with a contagious disease		
Yes	180	74.1
No	63	25.9
Status of having provided care for patients diagnosed with COVID-19		
Yes	135	55.6
No	108	44.4
When the situations with difficulty while nursing care during the COVID-19 pandemic		
Working with personal protective equipment	112	46.1
Staying away from family	33	13.6
Working for long hours	28	11.5
Isolation precautions	22	9.1
Cleaning of personal items such as stethoscope and phone	17	7.0
Evaporation of protective glasses	15	6.2
All	16	6.6
Place of residence during the pandemic process		
Stayed at home	210	86.4
Locations provided by the institution (hospital student dormitories, guest houses)	13	5.3
Other places (hotels, friends)	20	8.2
Diagnostic test for COVID-19		
Yes	128	52.7
No	115	47.3
COVID-19 diagnostic test result (n=128)		
Positive	7	6.4
Negative	121	94.6
Status of having received training on COVID-19		
Yes	163	67.1
No	80	32.9
Source of training on COVID-19 (n=161)		
Infection Control Committee Nurse	85	52.8
Infection Control Committee Doctor	29	18.0
Education Nurse	47	29.2

Table 2. Nurses qualities related to COVID-19 (Continued)

Qualities (n: 243)	n	(%)
Status of thinking that the COVID-19 pandemic cannot be controlled		
I thought so	71	29.2
I partially thought so	130	53.5
I did not think so	42	17.3
Emotions felt during the pandemic process		
Fear	80	32.9
Sadness	58	23.9
Hopelessness	36	14.8
Worry	31	12.8
Anger	18	7.4
Other (I felt it all from time to time, boredom, hope)	20	8.2

The mean total Compliance with Isolation Precautions Scale score of the nurses was 74.91±15.12, and our research result showed that the compliance of the nurses with isolation precautions was on a good level. While their mean total Fear of COVID-19 Scale score was 17.20±5.91, our research result showed that the coronavirus fears of the nurses were on a moderate level.

The effects of fear of coronavirus on compliance with isolation precautions were tested by structural equation modeling. Every path shown in the model was found statistically significant. The fit indices of the obtained model showed a good fit. These fit indices were found as χ^2/df =2.01, RMSEA= 0.06, AGFI=0.92, IFI =0.93, CFI=0.93 and GFI =0.97 (Figure 1). It was understood that, in general, the model had a desirable level of fit values [17,19,20,21]. The single-factor model that was tested is shown in Figure 1. All paths shown in the model were significant at the level of 0.001. These values showed that the established structural model was within acceptable ranges. The standardized beta, standard error, and significance values of the model are shown in Figure 1.

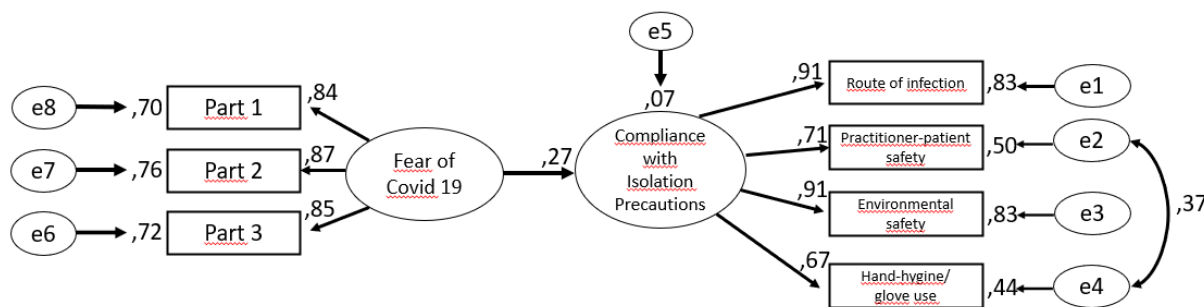**Figure 1**. Path Analysis of the Structural Equation Model Between Fear of COVID-19 and Compliance with Isolation Precautions

According to these findings that were obtained, the fear of coronavirus variable significantly affected compliance with isolation precautions. The correlation coefficient regarding this factor was found as β=0.27. Positive effects were found in all paths of the model (Table 3).

Table 3. Predictive Relationship Model for Predictive Relationships Between Fear of Coronavirus and Compliance with Isolation Precautions Score

Predictor Variable	The Dependent Variable	Standardized β	Standard Error	Critical Value
Fear of COVID-19 Scale Score	Compliance with Isolation Precautions Scale Score	0.27	0.17	2.70**

**p <0.01

As per Table 4 there were statistically significant differences in the mean Compliance with Isolation Precautions Scale scores based on the nurses' status of having received training on COVID-19, the status of having provided care for patients diagnosed with COVID-19, place of residence during the pandemic process, and status of thinking that the COVID-19 pandemic cannot be controlled ($p<0.05$). No significant difference was found in the mean Compliance with Isolation Precautions Scale scores based on the emotions felt by the nurses during the pandemic process ($p>0.05$).

The mean Compliance with Isolation Precautions Scale score of the nurses who had received training regarding COVID-19 was significantly higher than those who had not ($p<0.05$).

The mean Compliance with Isolation Precautions Scale score of the nurses who had provided care for patients diagnosed with COVID-19 was significantly higher than those who had not ($p<0.05$).

A significant difference was determined in the mean Compliance with Isolation Precaution Scale scores of the nurses based on their place of residence during the pandemic process. According to the results of the further analysis conducted to determine the groups causing the difference, the mean Compliance with Isolation Precautions Scale scores of the nurses who stayed at locations provided by the institution (hospital student dormitories, guest houses) and other places (hotels, friends) were significantly higher than those who stayed at their homes ($p<0.05$).

A significant difference was found in the mean Compliance with Isolation Precautions Scale scores based on the nurses' statuses of thinking that the COVID-19 pandemic cannot be controlled. According to the results of the further analysis conducted to determine the groups causing the difference, the mean score of the nurses who responded as "I partially thought so" was significantly higher than those who responded as "I did not think so" ($p<0.05$). There was no significant difference between other groups ($p>0.05$).

The differences in the mean Fear of COVID-19 Scale scores of the nurses were significant based on their statuses of thinking that the COVID-19 pandemic cannot be controlled and the emotions they felt in the pandemic process ($p<0.05$). There was no significant difference in terms of the other variables ($p>0.05$).

A significant difference was found in the mean Fear of COVID-19 Scale scores based on the nurses' statuses of thinking that the COVID-19 pandemic cannot be controlled. According to the results of the further analysis conducted to determine which groups caused this difference, the mean score of the nurses who responded as "I thought so" was significantly higher than those who responded otherwise. Additionally, the mean score of those who responded as "I partially thought so" was significantly higher than those who responded as "I did not think so" ($p<0.05$).

A significant difference was found in the mean Fear of COVID-19 Scale scores based on the emotions that the nurses felt during the pandemic process ($p<0.05$). According to the results of the further analysis conducted to determine the source of the difference, those who felt fear had significantly higher scores than the others ($p<0.05$).

Table 4. Comparison of Nurses' Compliance with Isolation Precautions Scale and Fear of COVID-19 scores and some COVID 19-related features (n= 243)

	Compliance with Isolation Precautions Scale score $\bar{X}\pm SD$		Fear of COVID-19 scores $\bar{X}\pm SD$	Test p
Status of having received training on COVID-19				
Yes	75.99±14.98	U=52.64* **p=0.015**	16.81±6.20	U=57.63 p=0.141
No	72.73±15.26		18.00±5.24	
Status of having provided care for patients diagnosed with COVID-19				
Yes	76.55±14.10	U=61.55 **p=0.037**	16.79±6.21	U=66.70 p=0.254
No	72.86±16.13		17.72±5.51	
Place of residence during the pandemic process				
Stayed at home	74.07±15.44	χ^2=8.725 **p=0.013**	17.740±5.87	χ^2=8.725 p=0.116
Stayed at locations provided by the institution (hospital student dormitories, guest houses)	82.07±6.02		18.00±4.54	
Other places (hotels, friends)	79.05±14.29		14.55±6.71	
Status of thinking that the COVID-19 pandemic cannot be controlled				
I thought so	75.39±14.81	χ^2=6.278 **p=0.043**	19.75±5.74	χ^2=30.590 **p=0.000**
I partially thought so	75.73±15.10		16.95±5.71	
I did not think so	71.54±15.58		13.69±4.87	
Emotions felt during the pandemic process				
Fear	73.68±17.50		19.98±5.34	
Worry	76.12±14.06		17.67±5.91	
Anger	76.50±8.48	χ^2=1.032** p=0.960	15.00±5.49	χ^2=36.171 **p=0.000**
Hopelessness	74.22±13.55		17.27±5.39	
Sadness	75.12±15.97		14.82±5.55	
Other (I felt it all from time to time, boredom, hope)	76.25±11.81		14.10±5.87	

* Mann Whitney U test, ** Kuruskal-Wallis test

4. Discussion

As in the entire world, the COVID-19 pandemic has also deeply affected Turkey. Without a doubt, the profession of nursing has been at the top of those most affected by this situation. Unknowns about

the virus and uncertainties in the times of the virus' elimination and contagiousness in patients have not only induced fear in nurses but also made their feelings of protecting themselves, their patients, and their families with isolation measures prominent. In this process, nurses have provided and are continuing to provide the necessary care for suspected or confirmed COVID-19 patients, usually under difficult conditions.

While 74.1% of the nurses had previously provided care for patients with a contagious disease, 55.6% had provided care for an individual diagnosed with COVID-19 (Table 2). Like in the finding of this study, a study conducted in China [9] found that 54.5% of healthcare workers (nurses or doctors) had provided care for an individual with a contagious disease, while 55.6% had provided care for an individual diagnosed with COVID-19. In another study in Turkey conducted in the same province, 29.8% of nurses had provided care for a patient diagnosed with COVID-19 [1]. This situation may be explained by that, while the number of COVID-19 diagnosed patients tended to decrease in April when the study by Erkal Aksoy and Koçak [1] was conducted, as July when our study was conducted corresponded to one month after the normalization process, the number of cases, and therefore the number of nurses providing care had increased. Additionally, at the dates when this study was conducted, the province where it was conducted was among the top five provinces with the highest numbers of cases, and the occupancy rate of hospitals was very high. The finding that most of the nurses who participated in the study had previous experience providing care for a patient with a contagious disease was an important finding regarding the care of patients diagnosed with COVID-19.

When the situations with difficulty while providing nursing care in the pandemic process were questioned, the first three places included working with personal protective equipment (41.6%), staying away from family (13.6%), and working for long hours (11.5%) (Table 2). In a case report in Turkey, an intensive care nurse stated that they had difficulty in breathing, hearing, and communicating in nursing practices such as providing care for patients and applying treatments wearing protective equipment for long times during work hours, they could not wipe their sweat when they sweated, they could not drink enough water, and they could not go to the toilet when they wanted to [22]. According to a study conducted in Singapore, de novo personal protective equipment-associated headaches developed in 81% of healthcare workers (nurse, doctor, and paramedical staff) [23]. Nurses have worked and are working selflessly by trying to cope with many situations while they have been aiming to perform nursing care during the pandemic process.

Among the nurses in this study, 52.7% were diagnostically tested for COVID-19, and 6.4% of those who got diagnostic tested turned out to be positive (Table 2). A study in China reported that 3.5% of all patients were healthcare workers [20]. As opposed to the finding of this study, a study conducted in Iran found that none of the participants were tested for COVID-19, and none were infected [7]. It was considered that the differences in the findings of the studies were caused by the fact that the number of cases was low in March when the study in Iran was carried out.

When asked about whether or not they had received any training on COVID-19, 67.1% of the nurses in this study responded as they had, while 52.8% stated that they received this training from an Infection Control Committee Nurse. In a study conducted in China, 64.63% of the sample (psychiatrists and psychiatry nurses) stated that they had completed training on COVID-19, and most (64.63%) stated the source of the training as the internet [10]. In another study in China, 97.8% of healthcare workers (nurse or doctor) stated that they had received training on COVID-19 [11]. The low rate of having received training on COVID-19 in our study in comparison to other studies suggested that considering the sources of receiving training, training might have meant in-person training for the participants. In the pandemic period, training related to COVID-19 has been mostly provided as online training or in very small groups. In this case, low rates of personal training are an expected result. About half of the nurses (53.5%) partially thought that the pandemic cannot be controlled (Table 2).

In a study conducted in China, most healthcare workers (67%) thought the pandemic would never be controlled [25]. The fact that COVID-19 is a new infection, it has several unknowns, and it has turned into a pandemic in a very short time might have led to this thought. When the emotions felt in the pandemic process by the nurses were asked, the first three places included fear (32.9%), sadness (23.9%), and hopelessness (14.8%) (Table 2). In the study by Aksoy Erkal and Koçak [1] conducted in the same province of Turkey, the participating nurses stated their most intensely felt emotions as anxiety (36.3%), uneasiness (31.3%), and fear (19.4%). When the study by Aksoy Erkal and Koçak [1] was conducted in April 2020, it had been only two months since Turkey was introduced to the infection. For this reason, COVID-19 is a highly novel infection with too many unknowns. This novelty and uncertainty may have led to feelings of anxiety, uneasiness, and fear in nurses. In July when our study was conducted, the increased number of cases with the normalization process may have led fear, sadness, and hopelessness to become prominent.

The mean total Compliance with Isolation Precautions Scale score of the nurses was 74.91±15.12, which may be considered good. COVID-19 is a highly contagious infection. This is why compliance of nurses with isolation measures for prevention of transmission from patient to patient and patient to healthcare personnel is highly important. This is why the result of this study was pleasing. The mean total Fear of COVID-19 Scale score of the nurses was 17.20±5.91, which could be considered moderate. In similarity to the finding of this study, a study conducted in China reported that most (43.9%) medical staff (doctors and nurses) felt moderate levels of fear [25]. Indifference to the finding of this study, a study conducted in the Philippines found the mean total Fear of COVID-19 Scale score of nurses as 19.92±6.15 and interpreted it as above moderate [23]. According to another study in China, 63.2% of frontline nurses felt severe fear, and getting infected and death was determined as the source of this fear [27]. It was thought that these differences in the findings of studies may have been related to the infection spreading rate and number of cases at the times when these studies were conducted.

According to the obtained findings, fear of COVID-19 significantly affected compliance with isolation precautions. It may be stated that fear of COVID-19 had a promoting role in compliance with isolation measures. Nurses are on the frontlines in the pandemic process, and their risk of being infected is higher in comparison to other individuals. They also have a high risk of infecting the patients for whom they provide care, their families, and their social environment. Considering this aspect, fear of COVID-19 positively affects nurses in terms of isolation precautions.

The mean Compliance with Isolation Precautions Scale score of the nurses who had received training on COVID-19 was significantly higher than those who had not received training (p<0.05, Table 4). It may be stated that the compliance of nurses who receive information in training on the infection, especially on the contagion and ways of protection, with isolation precautions is better.

The mean Compliance with Isolation Precautions Scale score of the nurses who had provided care for patients diagnosed with COVID-19 was significantly higher than those who had not (p<0.05, Table 4). This result was an important finding showing that the nurses complied with isolation procedures related to COVID-19.

The mean Compliance with Isolation Precautions Scale scores of the nurses who stayed at accommodations provided by the institution and other places were significantly higher than those who stayed at their homes. All those who stayed at locations provided by the institution were healthcare personnel. This may have been related to the thoughts of the nurses to not harm their colleagues by thinking of themselves as infected and their feelings of an obligation to stay healthy in terms of providing care for patients.

The mean Compliance with Isolation Precautions Scale score of the nurses who responded as they "partially thought" that the COVID-19 pandemic cannot be controlled was significantly higher than those who responded as "I did not think so" (p<0.05, Table 4). It was considered that event the partial

thoughts of the nurses that the pandemic cannot be controlled increased their compliance with isolation precautions.

The mean Fear of COVID-19 Scale score of those who stated they "thought" that the COVID-19 pandemic cannot be controlled was the highest (p<0.05, Table 4). It was thought that the thoughts of the nurses that the pandemic cannot be controlled increased their fear.

The mean Fear of COVID-19 Scale score of those who responded as "fear" regarding their emotional status during the pandemic process was significantly higher in comparison to the other groups (p<0.05, Table 4). The moderate levels of the scores in the Fear of COVID-19 Scale and the finding that the most frequently felt emotion was fear were important in terms of showing the consistency of the study's data.

5. Conclusions

Consequently, this study showed a significant relationship between fear of COVID-19 and compliance with isolation precautions. As the fear of COVID-19 in the nurses increased, their compliance with isolation measures also increased. COVID-19 is a highly contagious disease. Nurses, who spend more time with patients by staying in the frontlines of the COVID-19 pandemic, are at great risk in terms of transmission of infection. This is why isolation precautions and discussing and improving the factors that affect isolation precautions are vitally important for nurses. Moreover, accurate and regular updates of information regarding COVID-19 may increase the compliance of nurses with isolation precautions by reducing unknowns about COVID-19.

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Research Article

THE OPERATIVE TREATMENT OUTCOMES OF CHRONIC HINDFOOT PAIN WITH POSTERIOR ANKLE ENDOSCOPY

Şeyhmus YİĞİT[1] 🆔   *Azad YILDIRIM[2]* 🆔

[1]Dicle University Faculty of Medicine, Department of Orthopedic Surgery, Diyarbakır, Turkey
[2]Diyarbakır Training and Research Hospital, Diyarbakır, Turkey
Corresponding author; seyhmusygt@gmail.com

Abstract: The purpose of this study was to assess the outcome of hindfoot endoscopy and to show the availability of this technique by short- to mid-term outcomes on 27 consecutive patients. A case series of 27 patients, mean age 19-63 (mean37.6), 15 males and 12 females, diagnosed and treated for chronic hindfoot pain were included for the study between 2010-2016. All these patients were initially treated conservatively. If conservative treatment is insufficient to alleviate symptoms, posterior ankle endoscopy is performed. Patient data included age, gender, the location and the pattern of the foot, follow-up, the time delay from symptom onset to operation, surgeries, the length of hospitalization, the pain scores (AOFAS, VAS), time to return to work, and complications. Of the 27 patients, 8 had posterior ankle impingement syndrome, 7 had isolated flexor hallucis longus (FHL) tenosynovitis, 2 had a loose body, 3 had subtalar joint arthrosis, 1 had Achilles tendinitis and 6 had peritendinitis. Symptom duration until the operation was 6-22 months (mean 13.2 months). The patients who underwent arthroscopic surgery resumed their work a mean time of 2-6 months (mean 2.5 months) after the surgery. All patients returned to their previous lives without any limitation or recurrence. Mean follow-up 46.5 months (21-96 months). AOFAS score was preoperative 44-63 (mean 51.4) and postoperative was 92-100 (mean 96.37). The VAS score was preop 5-8 (mean 6.4) and postop 0-2 (mean 0.62). One patient had a partial arterial injury that was repaired, and four patients had mild joint stiffness. Functional and clinical evaluations following hindfoot endoscopy revealed that all patients were very satisfied. Thus, posterior ankle endoscopy is an effective and rewarding treatment method in the case of continuing chronic hindfoot pain after failed non-surgical treatment modalities.

Keywords: Hindfoot, posterior ankle, endoscopy

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1. Introduction

Acute or repeated compression of soft tissues between the tibia posterior plafond and calcaneus during plantar flexion of the ankle causes PAIS symptoms [1,2]. If there are bony parts such as the os trigonum, bony impingement occurs [1]. PAIS is a clinical disease characterized by posterior ankle pain during plantar flexion. In the forced hyper plantar flexion test, if the patient experiences pain at the moment of impaction, the test is positive. Doing the test passively by the doctor and bringing the patient's foot to hyper plantar flexion is very important for the diagnosis. Soft tissue pathologies (such as flexor hallucis longus tenosynovitis, Achilles tendinitis, retrocalcaneal bursitis), or bone and chondral defects (such as tarsal coalition, osteochondritis), or neurovascular pathologies (such as sural nerve compression and tarsal tunnel syndrome) may cause posterior ankle pain [3].

In the posterior ankle and subtalar pathologies, the two–portal posterior ankle arthroscopic approach was first described by van Dik [3]. The surgical technique quickly gained popularity among orthopedists due to its simplicity and applicability. In recent years, advances in arthroscopy have increased with the development of arthroscopic devices and the development and introduction of new thinner and more functional arthroscopic devices.

With these developments, closed approach preferences increased in hindfoot pathologies and successful series was started to be published consecutively in hindfoot endoscopy. In this study, we wanted to share the mid-term results of our patients who underwent surgery with the endoscopic hindfoot.

2. Material and Methods

Twenty-seven patients, mean age 19-63 (mean 37.6), 15 males and 12 females, diagnosed and treated for chronic hindfoot pain were included for the study between 2010-2018. In our hospital, conservative treatment methods are applied to patients as the first treatment. If conservative treatment is insufficient to alleviate symptoms posterior ankle endoscopy is performed. Patient data included age, gender, the location and the pattern of the foot, follow-up, the time delay from symptom onset to operation, surgeries, the length of hospitalization, the pain scores (AOFAS, VAS), time to return to work, and complications.

After the patients were examined, direct radiography and MRIs were taken. Patients had increased posterior and posterior medial ankle pain when the ankle was in plantarflexion. Patients with previous operations, acute cases, and patients with additional pathology of the forefoot were excluded from the study.

The patients were operated on the operating table in prone position and under spinal anesthesia. Since there was no additional pathology related to the forefoot, no portal was needed except for classical medial and lateral portals. There were no intraoperative and early postop complications. Cephalosporin was given prophylactically. Clinical and radiographic follow-up was performed routinely in all patients at the 2nd, 6th, and 12th weeks and 12th months after surgery.

In all patients, passive-active home exercises, elevation, and ice application are started from postop 1 day. Patients are included in the physical therapy and rehabilitation program starting from the 1st month based on their general condition.

Numerical data obtained in the study are shown as mean ± SD, (min-max), categorical data as frequency and percentage values.

Ethical Statements

The study was approved by the Ethics Committee of Dicle University Faculty of Medicine (325/22.10.2020). All data were obtained without a personal identification document and made in accordance with the Declaration of Helsinki regulation.

3. Results

Of the 27 patients, eight had posterior ankle impingement syndrome, seven had isolated flexor hallucis longus (FHL) tenosynovitis, two had a loose body, three had subtalar joint arthrosis, one had Achilles tendinitis and six had peritendinitis. Symptom duration until the operation was 6-22 months (mean 13.2month). The patients were discharged after an average of 1.2 days (range1-2 days) and gradual mobilization started within the first week.

The patients who underwent arthroscopic surgery resumed their work a mean time of 2-6 months (mean 2.5 months) after the surgery. All patients returned to their previous lives without any limitation or recurrence. Mean follow-up was 46.5 months (21-96 months). AOFAS score was preoperative 44-63

(mean 51.4) and postoperative was 92-100 (mean 96.37). The VAS score was preop 5-8 (mean 6.4) and postop 0-2 (mean 0.62) (Table 1). One patient was re-operated due to repeated swelling. A. Tibialis Posterior was found to be damaged and the artery was repaired. Four patients had mild joint stiffness.

Table 1. Patient and treatment data

Cases	Age	Pain full foot	SOMS time Month	AOFAS Pre op	AOFAS Final	VAS Pre op	VAS Final	Return to work	Follow up-month	COMP
1	29	R-Os Trigonum	13	55	96	6	1	2 M	54	
2	38	R-tenosynovit	15	48	98	6	0	3M	35	
3	24	L-Achilles Tendinitis	11	44	94	7	1	3M	28	
4	29	R-Os Trigonum	6	63	98	5	0	2M	47	
5	39	R-Subtalar arthrosis	8	56	98	6	0	2M	55	
6	56	R-Achilles Tendinitis	11	59	94	6	1	3M	62	
7	44	R-Os Trigonum	7	54	100	5	0	6M	37	
8	38	L-tenosynovit	7	49	94	7	2	3M	66	mild stiffness
9	22	L-Os Trigonum	14	44	100	8	0	2M	51	
10	29	L-Subtalar arthrosis	11	58	96	6	1	2M	52	
11	63	R-Os Trigonum	12	61	100	5	0	2M	39	
12	29	L-Subtalar loose body	12	48	100	7	0	2M	19	
13	61	R-tenosynovit	18	46	94	7	1	3M	47	
14	25	R- Os Trigonum	19	48	100	7	0	2M	42	
15	24	L-Os Trigonum	17	45	100	8	0	2M	43	
16	57	L-Achilles Tendinitis	13	51	94	6	1	3M	59	
17	62	R-Subtalar arthrosis	12	54	94	6	1	2M	96	
18	23	R-tenosynovit	9	53	92	5	2	3M	84	mild stiffness Arterial injury
19	33	L-Achilles Tendinitis	7	46	94	8	1	2M	76	
20	32	R-tenosynovit	11	45	94	8	1	3M	29	
21	48	R-Achilles Tendinitis	17	48	95	7	1	3M	32	

Table 1 Continued.

Cases	Age	Pain full foot	SOMS time Month	AOFAS Pre op	AOFAS Final	VAS Pre op	VAS Final	Return to work	Follow up-month	COMP
22	43	R-tenosynovit	14	44	92	8	1	2M	37	mild stiffness
23	35	R-Subtalar loose body	16	54	100	6	0	2M	21	
24	29	R-Os Trigonum	12	59	100	7	0	2M	30	
25	19	L-Achilles Tendinitis	17	55	92	6	1	3M	45	
26	41	L-tenosynovit	22	51	94	5	1	3M	49	mild stiffness
27	45	L-Os Trigonum	26	50	100	5	0	2M	22	

AOFAS: American Orthopaedic Foot and Ankle Society; VAS: visual analog scale; SOMS: Symptoms; COMP: Complications

4. Discussion

In this study, the posterior endoscopic procedure used in the treatment of PAIS gave satisfactory results. Although there is a small group of patients in our study, it contains important results data related to arthroscopic technique. A comprehensive clinical examination was performed to diagnose PAIS and diagnostic imaging was requested in all patients. Usually, isolated flexor hallucis longus tenosynovitis, Achilles tendinitis, and peritendinitis pathologies are usually treated non-operatively. When conservative treatment for PAIS failed, the traditional treatment was ankle arthrotomy. Complication rates after open surgery are higher (24%) [4]. Compared to open surgery, arthroscopic surgery has advantages such as less postoperative pain, fewer signs of infection, less rehabilitation time, and less blood loss. In the posterior ankle and subtalar pathologies, the two–portal posterior ankle arthroscopic approach was first described by van Dik [3]. We believe that endoscopic ankle surgery is easier to see and treat existing pathologies in the ankle than open surgery. Arthroscopic treatment results in PAIS lesions have been reported in many studies [5,6]. Williams and Ferkel reported good or excellent results in 86% of patients [7]. We have reached similar results in this study. In our study, all patients did not have any complications or recurrences and returned to previous ambulatory levels with satisfactory scores in all outcome measures.

Unlike other patients, athletes may need to return to sports quickly, so surgical treatment can be done at the beginning or early stage of the treatment process. In patients with FHL tenosynovitis, conservative treatment takes a long time and usually does not completely improve the patient's symptoms. Patients are operated on to excise the inflammatory soft tissue and bone protrusion, and achieve a full plantar flexion without any compression. FHL tenosynovitis is common in professions that require enforced plantar flexion, such as football and ballet dancers. It may also because FHL tenosynovitis in os trigonum, simple cysts, flexor digitorum accessories muscle and dorsal talar spurs [8]. Os trigonum is seen in 7-14% of adults [9]. The osseous part of the os trigonum may have cartilage around its circumference, making it appear smaller on radiographs than the actual size [10]. Os trigonum excision causes a decrease of FHL tenosynovitis in hindfoot endoscopy [11]. When examining FHL tenosynovitis surgically, both superomedial and inferomedial quadrants should be examined completely; otherwise, the diagnosis of tenosynovitis may be overlooked. Miyatomo et al. [1] in series of patients with posterior ankle pain in 63% of patients, Scholten et al. [12] in 63% of patients, Tahir et al.[13] observed 100% FHL tenosynovitis in their series of 60 patients. We detected FHL tenosynovitis in all

patients with os trigonum, but unlike other studies, we detected FHL tenosynovitis without os trigonum in 55.5% of the patients in our study.

Synovial osteochondromatosis (loose body) is the formation of hyperplastic cartilage nodules in the joint synovium or cavity [14]. Its classical treatment is to remove loose bodies and total synovectomy with arthrotomy. After an open surgical approach, long-term immobilization, wound problems are shown [14]. The arthroscopic approach results in fewer complications than the open technique. There were three loose body cases in our study and we performed loose body excision and total synovectomy without any complications.

In the literature, the excellent outcome rate from arthroscopic resection of osteophytes for tibiotalar arthrosis is 72 to 98% [15]. Similar to knee osteoarthritis, arthroscopy should be the first choice for patients with low-grade degenerative ankle osteoarthritis (egg, locking, effusion, bone stroke) with mechanical symptoms. van Dijk mentioned that the ongoing complaints in patients treated with arthroscopy are caused by other ankle structures that are injured after trauma [3]. In our study, there were three cases of low-grade osteoarthritis and we applied surgical treatment 100% successful outcome without any complications.

Spennacchio et al. [16] classified the complications of PAIS surgery into two groups as minor and major. Minor complications (< 7percentage) are superficial infections, temporary stiffness, temporary numbness, or paraesthesia. Major complications (<2%) are deep wound infections, permanent pain, or other problems that require reoperation. Due to the closeness of the medial neurovascular bundle to the posteromedial portal and the posterolateral portal of the sural nerve, there is a risk of neurovascular structures injury in the posterior arthroscopy. Feiwell and Frey showed that the tibial nerve was approximately 7.5 mm from the posteromedial port, and the sural nerve was 6.0 mm from the posterolateral portal [17]. Good anatomy knowledge and experience are required to reduce complications during posterior arthroscopy. Enlarged arthroscopic portal or preoperative steroid injections increase the likelihood of developing infections. Nickisch et al. found a complication rate of 8.5% in 189 patients [18]. Blázquez et al. [19] in their retrospective study, found a 12% complication rate. The complication rate of our study is 18%. In our study, no infection was observed in patients. Four of our patients had mild stiffness. The patients were taken to the physical therapy program and treated. One patient was re-operated due to repeated swelling. A. Tibialis Posterior was damaged and the artery was repaired.

5. Conclusion

Functional and clinical evaluations following hihdfoot endoscopy revealed that all patients were very satisfied. Thus, posterior ankle endoscopy is an effective and rewarding treatment method in skilled hands in the case of continuing chronic hindfoot pain after failed non-surgical treatment modalities.

Ethical Statements: The study was approved by the Ethics Committee of Dicle University Faculty of Medicine (325/22.10.2020). All data were obtained without a personal identification document and made in accordance with the Declaration of Helsinki regulation.
Conflict of interest: The authors declare that they have no conflict of interest.
Authors' Contributions: The authors declare that their contribution to the work is equal.
The compliance to the Research and Publication Ethics: This study was carried out in accordance with the rules of research and publication ethics.

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Research Article

PERCEPTIONS OF CONSCIENCE OF NURSING STUDENTS ACCORDING TO EMPATHY LEVELS

Hediye UTLİ *[1]   *Leyla ZENGİN AYDIN*[2]

[1] Elderly Care Department, Mardin Artuklu University Vocational School of Health Services, Mardin, Turkey
[2] Department of Nursing, Diyarbakir Atatürk School of Health, Dicle University, Diyarbakır, Turkey
* Corresponding author; hediyeutli@artuklu.edu.tr

Abstract: *Conscience and empathy are emotional factors affecting the caregiving levels of nurses. This research aims to determine perceptions of conscience of nursing students, according to their empathy levels. Descriptive, cross-sectional, and descriptive research designs are used in this research conducted on nursing students in third and fourth grades studying at nursing departments of two State Universities in the east of Turkey. 376 students studying in the third and fourth grades of nursing departments of the mentioned two universities, formed the population of the research. The study has been completed with 286 students accepting to participate in the research, without forming a sample group. Data have been gathered through the Student Identification Data Sheet, Empathy Quotient (EQ), and Perception of Conscience Questionnaire (PCQ). The research determined that the average age of the students was 22.43 ±1.96, 61,1% were female, 94,7% were single, 65,3% were living in cities, 50,6 %were attending a state university, 60,4% freely chose their profession and 42,8% made their choices because of family pressure. The average total EQ points of the participants are 2.76±0.66 and the average of total PCQ points is 62.52±12.87. The research determined that there is a medium-level meaningful correlation positively, between averages of total and subscale points (p<0.001) of EQ and PCQ. It also determined that there is a medium-level meaningful correlation positively, between averages of total and subscale points of social skills and cognitive empathy subscales, along with PCQ total and subscale points (p<0.05). A medium-level meaningful correlation in a positive way, between averages of emotional reaction subscales along with PCQ total and sensitivity subscale points, has also been determined (p<0.001). This research has put forward average of EQ and PCQ points of the students, were at medium level. The research has also determined that consciousness perception increased parallel to an increase in empathy levels.*

Keywords*: Empathy, Conscience, Nursing Students.*

1. Introduction

When nurses carry out caregiver roles, feelings, thoughts, problems, experiences, needs, and goals of patients and healthy individuals they establish relation with, are at the center of this relation. Empathy, being the fundamental component of the relationship between nurse and patient, also plays a significant role in interpersonal relations and communication skills [1, 2]. Nurses must have an empathic capacity to give care to patients and healthy individuals in a holistic and humanistic way. Carl Rogers described empathy in person-centered theory, as the perception of "the internal frame of reference of another with accuracy and with the emotional components and meanings which pertain thereto as if one were the person." Empathy consists of three subscales as cognitive, emotional, and behavioural scales; the emotional subscale remains to be the keystone. Additionally, the fourth subscale of empathy has been

described as the moral scale (conscience), which means the inner motivation to want to comprehend the patient [5-11].

Although health professionals aim to provide holistic, empathic, and person-centered care, their attitudes, and perceptions are affected when they face challenging situations [12]. In such challenging situations, conscience is one of the factors affecting nursing responses. Conscience is the inner voice warning ourselves about other persons. Conscience may also be described, as per professional intuition, as a source of awareness that helps to respond helplessness of humans. Nurses are the main guardians of moral, wellbeing, integrity, and caregiving ethics. It is important to emphasize part of conscience in nursing values and caregiving [13, 14]. Nurses may have negative feelings as guilt, sadness, despair, and inability if they feel a conscientious unease when fulfilling their duties. The work environment would be negatively affected if the relevant conscientious matter is not resolved. This situation may even cause the feeling of exhaustion, decreased self-esteem in nurses, moreover, may constitute a burden leading to quitting their profession [14, 15].

As nursing is a profession where much time is spent with patients, nurses must have optimal levels of conscience. Nurses to take care and watch over patients are also expected to have an improved sense of conscience. We have come across in literature, separate studies on empathy levels [3- 5, 11, 12, 16-20] and perception of conscience [14, 21, 22] of nurses or nursing students, but none examining the correlation of both. Therefore, this research is unique in this context. This research was carried out to determine the perception of conscience of the students according to their empathy levels.

Research Questions:

1. How is the empathy level of nursing students in third and fourth grade?

2. How is the perception of conscience in nursing students in third and fourth grade?

3. Is there a meaningful correlation between empathy levels and perception of conscience of nursing students in the third and fourth grades?

2. Materials and Methods

2.1. Type of the Research

The research was conducted in a cross-sectional, and descriptive design to determine the perception of conscience of nursing students according to their empathy levels.

2.2. Time and Place of the Research

The research has been carried out at the nursing departments of two state universities in the east of Turkey, between October 2019 and March 2020.

2.3. Population and Sample Group of the Research

376 students in third and fourth grades of nursing departments of the two-state universities where the research was conducted, formed the population of the research. To increase the power of the statistics, the research was completed without forming a sample group, with 286 students qualifying for being accepted to the research (76% of the population).

We can explain the reasons for including only students in the third and fourth grades in the research, as students at these grades had plenty of empathic relationship experiences with patients during their practice, and as they have taken ethics classes. Students who accepted to take part in the study, who had perfect attendance during the data gathering stage, and who responded to questions in whole and complete. Students who were absent at the specified dates and who were involuntary to participate in the research were excluded.

2.4. Data Collection Methods

Data have been collected by the researchers, by using EQ and PCQ, through "Introductory Information Form" prepared in line with literature where socio-demographic properties are demanded. Forms have been filled in by the students in class, by self-reporting in a 15-20 minute period. The students have been informed about the aim of the research before filling in the questionnaires and their oral and written consents have been obtained.

2.4.1 Introductory Information Form

Introductory information form prepared by the researchers in line with the literature, comprises eight questions on the students' age, sex, marital status, the university they attend if their professional choice was voluntary and if it was not, what the reason was [14, 15, 21, 23].

2.4.2 Perception of Conscience Quotient (PCQ)

Validation and reliability in the Turkish Language of the scale developed by Dahlqvist et al. (2007) [23], has been performed by Aksoy et al. (2019). The scale comprises 13 questions. Assessment of the scale is through a six-point Likert scale from "No, I strongly disagree" (1 point) to "Yes, I strongly agree" (6 points). The scale does not have reverse scoring. The scale consists of two factors as Factor 1: Sensitivity (items 1, 2, 3, 4, 5, 6, 7, 8, 10, 12, 13), Factor 2: Authority (items 9, 11). The lowest score available through the scale is 13, the highest is 78. The highest scores show the highest perception of conscience. The Cronbach Alpha coefficient of the scale is stated as 0.840 and this coefficient was found as 0.840 in this research.

2.4.3 The Empathy Quotient (EQ)

Validation and reliability in the Turkish Language of the scale developed by Lawrence et al. (2004) [24], has been performed by Kaya and Çolakoğlu (2015). The scale comprises three subscales and 13 questions. The scale is a five-point Likert type with subscales of social skills (items 1, 2, 3, and 5), emotional reactivity (items (6, 7, 8, and 10), and cognitive empathy (items 4, 9, 11, 12 and 13). The fifth item of the scale is reverse scored. Total average scores derived from the scale, have been determined as 1-2.33 low level, 2.34-3.67 medium level, and 3.68-5.0 high level [25]. Cronbach Alpha coefficient of the scale had been determined as 0.776. In this research, the coefficient was found as 0.883.

2.5. Data Analysis

Statistical Package for Social Sciences (SPSS) version 25.0 was used in the statistical analysis of the data obtained through the research. Number, percentage, average, and standard deviation were used in the assessment of socio-demographical properties. The accordance of continuous variables to normal distribution was measured by Kolmogorov-Smirnov test and as significance values were lower than 0.05, non-parametric tests were used. Mann-Whitney U, Kruskal-Wallis tests, and Bonferroni correction were used in assessing data unfit to normal distribution. Spearman correlation analysis was carried out to examine the relation between the average of total EQ points and the average of total PCQ points.

3. Results

The research determined that the average age of the students who took part in the research, was 22.43 ±1.96, 60,1% were female, 94,7% were single, 65,3% were living in cities, 50,6% were attending a state university, 60,4% freely chose their profession and 42,8% made their choices because of family pressure (Table 1).

Table 1. Socio-demographic properties of nursing students in the third and the fourth grade (N=286)

Variables	X̄± SD
Age	22.43 ±1.96
	n (%)
Gender	
Female	172 (60.1)
Male	114 (39.9)
Marital status	
Single	271 (94.7)
Married	15 (5.2)
Residence	
City	187 (65.3)
District	70 (24.4)
Village	29 (10.1)
University of study	
A state university	145 (50.6)
Another public university	141 (49.3)
Status of choosing the profession willingly	
Yes	173 (60.4)
No	112 (39.1)
The reason why I willingly choose the profession	
Family pressure	28 (25.0)
Assurance to be appointed	36 (32.1)
Economic reasons	48 (42.8)

The average total EQ points of students taking part in the research are 2.76±0.66 and the average of total PCQ points is 62.52±12.87 (Table 2).

Table 2. Averages of total and subscale points of nursing students in the third and the fourth grade

Scales	X̄± SD
The empathy quotient (EQ)	
Cognitive empathy	2.79±0.76
Emotional reactivity	3.02±0.82
Social skills	2.45±0.67
Total	2.76±0.66
Perception of conscience quotient (PCQ)	
Sensitivity	53.40±11.02
Authority	9.12±2.48
Total	62.52±12.87

The average of total PCQ points was 67.50 (26.00-78.00) in female students, was 59.00 (14.00-78.00) in male students, and the difference in between was statistically significant (z=-3.516, p=0.000). PCQ levels of female students are higher when compared to male students. The average of total points was 2.92 (1.00-5.00) in students who freely chose their profession and was 2.69 (1.85-4.62) in those who did not; the difference in between was found to be statistically significant (z=-2.130, p=0.033). The empathy levels of the students who freely chose their profession are higher when compared to others. A significant difference was determined between the reason the students took part in this research, for not freely choosing their profession, and the average of total EQ and PCQ ($\chi 2$= 2.227, p=0.441; $\chi 2$= =2.312, p=0.419). Corrected Bonferroni test was used to find the group that created the difference. As a result of this, the average of total EQ points of students, whose reason of not freely choosing their profession was economical, was found to be higher when compared to the reason of feeling secure about a quick appointment to a position (p=0.046). The average of total EQ points of students, whose reason for not freely choosing their profession was feeling secure about the appointment to a position, was found to be higher when compared to those, whose reason was family pressure (p=0.049). It has been determined that no significant difference existed between averages of total points of EQ and PCQ according to other socio-demographical properties of the students (p> 0.05) (Table 3).

Tablo 3. Comparison of averages of total EQ and PCQ points of the nursing students in the third and the fourth grade

Variables	EQ $\bar{X}$ (Min±Max)	PCQ $\bar{X}$ (Min±Max)
Gender		
Female	2.92 (1.77-4.69)	67.50 (26.00-78.00)
Male	2.76 (1.23-4.77)	59.00 (14.00-78.00)
Test value	z=-1.425[a], p=0.154	**z=-3.516 [a], p=0.000**
Marital status		
Single	2.84(1.23-5.00)	65.0(14.00-78.00)
Married	2.76(1.69-5.00)	62.00(37.00-78.00)
Test value	z=-0.813 [a], p=0.947	z=-0.067 [a], p=0.947
Residence		
City	2.92(1.54-5.00)	65.00(22.00-78.00)
District	2.69(1.23-4.77)	62.00(14.00-78.00)
Village	2.76(2.00-4.62)	64.00(38.00-78.00)
Test value	$\chi 2$= 1.500[b], p=0.472	$\chi 2$= 4.194 [b], p=0.123
University of study		
A state university	2.76(1.54-5.00)	64.50(26.00-78.00)
Another public university	2.92(1.23-5.00)	65.00(14.00-78.00)
Test value	z=-0.780 [a], p=0.435	z=-0.034 [a], p=0.973
Status of choosing the profession willingly		
Yes	2.92 (1.00-5.00)	66.50 (28.00-78.00)
No	2.69 (1.85-4.62)	64.50 (22.00-78.00)
Test value	**z=-2.130 [a], p=0.033**	z=-1.200 [a], p=0.230

Table 3 Continued.

	EQ	PCQ
Variables	$\bar{X}$ (Min±Max)	$\bar{X}$ (Min±Max)
The reason why I willingly choose the profession		
Family pressure	2.61 (3.23-4.54)	54.00 (47.00-75.00)
Assurance to be appointed	2.50 (2.23-4.62)	67.00 (47.00-78.00)
Economic reasons	2.80 (2.08-4.23)	61.50 (50.00-72.00)
Test value	χ2= 2.227 [b] , **p=0.041**	χ2= =2.312 [b] , **p=0.049**

[a] Mann Whitney-U test z value, [b] Kruskal Wallis test Chi-square value, EQ=The empathy quotient, PCQ=Perception of conscience quotient

The research determined that there is a medium-level meaningful correlation in a positive way, between the average of total EQ points and averages of PCQ total and subscale points (p<0.001). A medium-level meaningful correlation in a positive way, between the averages of social skills and cognitive empathy subscales and PCQ total and subscale points (p<0.05). Also a medium-level meaningful correlation in a positive way, between the averages of emotional reactivity subscale and total and sensitivity subscale points of PCQ (p<0.001).
(Table 4).

Table 4. Correlation between averages of total and subscale EQ and PCQ points of nursing students in the third and the fourth grade

Scales	EQ		Social skills		Emotional reactivity		Cognitive empathy	
	r [c]	p	r [c]	p	r [c]	p	r [c]	p
PCQ	0.403	**0.000**	0.242	**0.003**	0.290	**0.000**	0.327	**0.000**
Sensitivity	0.404	**0.000**	0.242	**0.003**	0.336	**0.000**	0.317	**0.000**
Authority	0.345	**0.000**	0.233	**0.005**	0.139	0.101	0.305	**0.000**

[c] Spearman correlation analysis, EQ=The empathy quotient, PCQ=Perception of conscience quotient

When examining the significance level corresponding to the F value in the linear regression analysis, we see that the established model is statistically significant. Considering the beta coefficient value of the independent variable, t value, and significance level, it is seen that empathy levels have a statistically significant effect on the perception of conscience (t=6.010, p<0.01) and explaining 13% of the alteration on the perception of conscience. We found that the average perception of conscience, sensitivity and authority points increase, as the empathy levels of the students increase (Table 5).

Table 5. Linear regression findings between averages of total and subscale EQ and PCQ points of nursing students in the third and the fourth grade

Variables	B	t	p
Constant	2.410	12.046	0.000
PCQ	2.710	6.010	**0.000**
Sensitivity	0.264	5.975	**0.000**
Authority	0.213	5.828	**0.005**

R= 0.379, R^2 = 0.137, F= 23.428, p=0.000, EQ=The empathy quotient, PCQ=Perception of conscience quotient

4. Discussion

Nurses should have high levels of empathy to perform compassion, value, and conscience concepts in giving care to patients. Empathy level improved by theoretical and practical courses enhances caregiving abilities of nurses [7, 10,11, 26]. Lack of skills as communication, empathy, emotional intelligence, and traits as conscience, affect patient care quality. This research aimed to determine perceptions of conscience of nursing students, according to empathy levels.

An efficient and qualified nursing care is the fundamental need of patients. In this regard, determining conscience levels of nursing students and meeting the requirements by the support of education, is required. The average of total EQ points of the students who took part in this research was found to be at a medium level; this may be attributed to having taken ethics classes last year. In literature, we did not come across studies calculating total EQ points and subscale point average in nursing students but found studies on different sample groups. The average EQ point found in the research carried out by Gorbanzadeh et al., on 68 nurses was 72.74 ±7.48, which is high as compared to this research [14]. The average of PCQ total points in the research conducted by Lak et al. on 193 nurses was found as 68.19 ± 15.12; where averages of subscale points were as follows; an average of sensitivity subscale points 21.9 ± 2.6 and the average of authority subscale points 16.8 ± 2.4 [21]. The scale used in this research was adapted to the Turkish society and had two subscales; due to this reason, averages of subscale points were found higher than usual. We determined a significant difference between the average points of the PCQ items in the research by Kadioglu et al. on nursing students (n=300) versus dentistry students (n=264) [22]. The average of total PCQ points of female students who took part in the research was found to be higher than that of male students. The reason for this situation may be the number of female students being higher (60.1%) when compared to male students who participated in this research and women having protectionist instincts. A similar result to this research is the study by Kadioglu et al. carried out on 564 students, where averages of item points of female students were found higher than those of male students [22]. Different than this research, in the research by Gorbanzadeh et al. average perception of conscience points of male nurses (75.64± 3.77) was found higher when compared to the average perception of conscience points of female nurses (72.71± 7.56) constituting a statistically significant difference [14]. On the other hand, a significant difference was not determined in the study by Lak et al. between the average of total PCQ points concerning the gender of nurses [21]. The average of total EQ points of the students taking part in the research, who willingly chose their profession, was found to be higher according to that of those who did not, and there was a significant difference in between. The study by Ustundag et al. where similar results to this research were obtained, determined that, the average of total Empathy Tendency Scale points of participants who freely chose their profession was higher when compared to that of those who did not and that there was a significant difference in between [27]. Researches with different results also exist in literature; for instance, the research by Turan et al. carried out on a group of 290 nursing students, showed an average of total Empathic Skills Scale points of students who freely chose their profession was found lower than that of those who did not, and no significant difference was found [20]. Theoretical and applied classes are intensively given in nursing education. Students take over important responsibilities in succeeding at classes, professional practice, and communicating with patients, and these processes cause exhaustion and stress in students [20]. Exhaustion and stress may decrease a student's empathy level, destroying learning desire, enthusiasm, and curiosity. The majority of the students attending this research stated family pressure as the reason for not being able to freely decide their professional choice. In this regard, individuals must be enabled to make their decisions freely, to enhance dedication to their profession.

Integrating empathy and conscience, makes nurses feel their identity more meaningful and provide higher self-respect [28]. No discussions were made since we did not encounter any studies

examining the correlation between EQ and PCQ in nursing students. In a different context, a study by Schalkwijk et al. determined adolescent criminals had lower empathic capacity and conscience levels compared to victims [29].

This research is based on students' self-reports. This research is limited to 286 nursing students.

5. Conclusion

In this research, the average of EQ and PCQ points of nursing department students were found to be at a medium level. As empathy level affects the quality of care, classes aiming to equip nursing students with skills as interpersonal relationships, establishing empathy, and helping, may be given more intensely as part of optional classes, especially in the fourth grade where the stress level is high. Perception of conscience levels having not been examined before in literature, especially in nursing students, show new studies are required in this field. In the clinic, establishing interpersonal relationships including empathy and conscience between the caregiver and the one receiving healthcare service may affect the emotional dimension of caregiving. Educating prospective nurses by suggesting to be sensitive to the emotional dimension of caregiving, may help to prevent probable stress of conscience and emotional exhaustion.

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IJHSRP

Research Article

THE EFFECT OF SPIRITUAL WELL-BEING ON SURGICAL FEAR IN PATIENTS SCHEDULED TO HAVE ABDOMINAL SURGERY

Gurkan KAPIKIRAN*¹ (ID)   *Bilsev DEMIR ²* (ID)   *Semra BÜLBÜLOĞLU ³* (ID)   *Serdar SARITAŞ⁴* (ID)

*¹Faculty of Health Sciences, Bingol University, Bingol, Turkey
²Faculty of Health Sciences, Department of Nursing, Malatya Turgut Özal University, Malatya, Turkey
³Erbaa Health Sciences Faculty, Surgical Nursing Department, Gaziosmanpaşa University, Tokat, Turkey
⁴Nursing Faculty, Inonu University, Malatya, Turkey
Corresponding author: gurkankpkrn@gmail.com

Abstract: *Abdominal surgery and the postoperative period are very risky experiences. Individuals with fear of surgery will be under high stress and in a state of depression. In this context, the state of spiritual well-being overcoming surgical fears in patients undergoing planned abdominal surgery was examined. This study was conducted to investigate the effects of the levels of the spiritual well-being of patients who are planned to have abdominal surgery on their surgical fear. The study was carried out with the participation of 150 patients at the General Surgery and Transplant clinics at a university hospital between January and May 2020. It was determined that there was a negative significant relationship between surgical fear and spiritual well-being, and the highest score for surgical fear was observed in the individuals who were 65 years old or older. The awareness of healthcare professionals about spiritual well-being should be raised, and they should provide healthcare that ensures supporting patients in spiritual and social aspects.*

Keywords: *Abdominal surgery, surgical fear, spiritual well-being.*

1. Introduction

Today, as a result of developments in anesthesia techniques and improvements in care quality and technology, surgical interventions are no longer last-resort treatment methods and have become a treatment method that is applied routinely. Although these interventions are performed on a large or small scale in an emergent or elective way to improve the quality of life of patients, they are both physiological and psychological traumas for patients [1,2].

Abdominal surgical interventions are performed on the liver, spleen, stomach, bile duct, intestines and bowels, and pancreas [3]. Laparoscopic and major (open) surgery methods are used. Laparoscopic surgery is preferred more in comparison to open surgery as it is less invasive, causes fewer complications, and shortens the duration of hospital stay [4,5]. However, in cases where a minimally invasive approach is not appropriate, open surgery is performed.

Preoperative fear is affected by information status on the procedures to be applied, previous anesthesia and surgery experience, the type of surgical intervention to be performed, and the degree of difficulty and risk. Fear is a universal reaction in humans against problem-creating situations, dangers, and threats [6]. An individual is expected to display emotional, physiological, and physical reactions in the face of situations that disrupt their well-being. Emotional reactions may manifest themselves as a

feeling of tension, nervousness, a feeling of something bad is about to happen, disturbance, worry, and intense panic attack [7,8].

As a result of the secretion of stress hormones physiologically, the autonomous nervous system gets activated, and certain physical reactions such as sweating, looking pale, crying, blushing and joggling appear [7,9]. Preoperative fear leads to postoperative depression, anxiety, the extended period of scar recovery and hospital stay, use of additional anesthetic medication, and overuse of analgesics in the postoperative period [8].

The religious well-being dimension, which is a part of spiritual well-being, may be interpreted as a spiritual connection with God or a higher power [10]. The existential dimension is a mental and social element and demonstrates who the individual is, what they did for what reason, and where they belong to [10]. The religious dimension guides us towards God, while the existential dimension leads us towards the environment and other people beyond ourselves [11]. In spiritual well-being, in situations where the individual experiences a dead-end or contradiction, they can feel such painful emotions as loneliness, depression, and deficiency and question the meaning of life. This condition requires receiving social and psychological support [10,12]. Spiritual well-being increases life expectation, energy, and motivation [13]. It gives people hope and strengthens adjustment to disease conditions [14]. Abdominal surgical intervention and the postoperative period are highly risky experiences. In this context, being under high stress, loneliness, depression, and breaking up with social environments are usually related to surgical fear. It is essential that patients have the maximum motivation and the least fear in the preoperative period. The study, it was aimed to examine the effects of spiritual well-being in patients who would undergo planned surgery on their surgical fear.

2. Methods

2.1. Design and Sample

The study was conducted with a descriptive and cross-sectional design to determine the effects of spiritual well-being in patients to have abdominal surgery on their surgical fear. The population of the study consisted of patients who would have abdominal surgery at the General Surgery clinic and Organ transplant clinics between January and May 2020 at a university hospital. The sample of the study was calculated as 150 by performing power analysis. The study was completed with the participation of 150 patients who met the inclusion criteria and agreed to participate in the study by employing the purposive sampling method. The data were collected by the researcher through the face-to-face interview method in the patient wards. The data collection form was read out to the patients, and the researcher recorded their responses on the form.

2.2. Research Inclusion Criteria

1. Having a planned abdominal surgery
2. Being 18 years old or above
3. Not having any communication problems
4. Being an in-patient at the clinic in the preoperative period and agreeing to participate in the study

2.3. Data Collection Tools

As the data collection tools, a "Personal Information Form" developed by taking expert opinion, the "Surgical Fear Scale" (SFS) and the "Three-factor Spiritual Well-being Scale" (SWBS) were used in the study. Information about the scales is presented below.

Surgical Fear Scale (SFS)

The scale, which was developed and introduced to the literature by Theunissen et al [15]. to assess the level of the fear caused by short-term and long-term consequences of surgical operations in patients scheduled to undergo elective surgery was adapted to Turkish by Bağdigen et al [16]. The 11-point Likert-type scale is composed of 8 items and scored between 0 and 10. Each item is scored in a range from 0= "not afraid at all" to 10= "very afraid." The scale consists of two subscales of fear of the short-term consequences of surgery and the long-term consequences of surgery (Items 1 to 4: fear of the short-term consequences of surgery; items 5 to 8: fear of the long-term consequences of surgery). The subscale total score is obtained by adding up the scores of 4 items in the subscales, and the total score of the scale is obtained by adding up the scores of the two subscales. The lowest score to be obtained from the subscales is 0, and the highest score is 40. The total score of the scale ranges from 0 to 80. A high score obtained from the scale indicates a high level of surgical fear.

The scale's Cronbach's alpha internal consistency coefficient was found to be 0.89, while it was 0.86 for the subscale of short-term consequences (SFS-S) and 0.87 for the subscale of long-term consequences (SFS-L) (1). In our study, the Cronbach's alpha coefficient of the scale was calculated as 0.98, and for the subscales, it was 0.97 (SFS-S) and 0.99 (SFS-L).

Three-Factor Spiritual Well-Being Scale

The Three-Factor Spiritual Well-Being Scale was developed and introduced to the literature by Ekşi and Kardaş [17], and it aims to assess how well adults' lives are compatible with their values and understanding of the ultimate meaning in terms of personal, environmental, and social aspects. During the development process of the scale, 17 experts were consulted, and the scale was given its final form. The final form of the scale consisting of 49 items was tested in a study that included 865 adults (498 females, 367 males). Following the implementation of confirmatory factor analysis, the final form of the scale consisted of 29 items and three subscales (transcendence, harmony with nature, and anomie). The scale is in the form of a 5-point Likert-type scale. The scale is scored ranging from 1= "Not applicable to me at all" to 5= "Completely applicable to me." Items "1, 4, 5, 8, 9, 12, 13, 16,17, 20, 21, 24, 25, 27 and 29" of the scale constitute the transcendency dimension, items "2, 6, 10, 14, 18, 22 and 28" form the dimension of harmony with nature, and items "3, 7, 11, 15, 19, 23 and 26" make up the dimension of anomie. While scoring the scale, the anomie dimension is inversely scored. As a result of analyses, the construct validity and reliability of the scale were empirically determined, and a scale with the goodness of fit for the spiritual well-being model was produced (KMO:951, when eigenvalue is taken as 2, the item explanation of total variance is 58.337%). The Cronbach's alpha coefficient of the scale was found to be 0.86, and the Cronbach's alpha coefficients of the subscales of transcendency (i), harmony with nature (ii), and anomie (iii) were determined as 0.95 (i), 0.86 (ii) and 0.85 (iii) [17]. In our study, the Cronbach's alpha coefficient of the scale was identified as 0.93, and for the subscales, they were 0.91 (i), 0.82 (ii), and 0.89 (iii).

2.4. Statistical Analysis

After the data were coded by the researchers, the statistical analyses of the data were performed by using the SPSS 25.0 (Statistical Package for the Social Sciences) software. Before starting the analysis, the normal distribution of the data was determined with the help of the Kolmogorov-Smirnov test. Descriptive statistics were used for the analysis of the data. Correlation analyses were employed to determine the relationships between the scales, and the effects of socio-demographic characteristics on spiritual well-being and surgical fear levels were determined by regression analyses. Descriptive PostHoc analysis was used to identify differences. In the evaluation of the data, a 95% confidence interval and p<0.05 error level were considered.

2.5. Ethical Aspect of the Study

Before the study, institutional permission was obtained from the relevant hospital, and ethics committee approval (Decision Date: 07.01.2020; Decision No: 2020/110) was obtained from the İnönü university. In accordance with the Declaration of Helsinki, the patients were informed by reading the Volunteer Information Form to them by the researcher. Patients who volunteered to participate in the study were included upon taking their verbal consent.

3. Results

In this part, the findings obtained from the study conducted to determine the effects of spiritual well-being on the surgical fear of patients who would undergo abdominal surgery are presented.

Table 1. Demographics and Identifying Characteristics of Patients (n= 150)

	$\bar{X}\pm$ SD	Min-max
Average Age	53.10±12.26	28-78
	n	**%**
Age Groups		
28-49 years old	64	42.7
50-64 years old	52	34.7
65 years old and above	34	22.7
Gender		
Female	67	44.7
Male	83	55.3
Marital Status		
Married	117	78.0
Single	33	22.0
Educational Status		
Illiterate	20	13.3
Literate	16	10.7
Elementary School	21	14.0
High School	48	32.0
University	45	30.0
Income Level Status		
Income less than expenses	56	37.3
Income equal to expenses	77	51.3
Income more than expenses	17	11.3
Body Mass Index		
18.5-24.9 kg\m^2 Normal Weight	58	38.7
25-29.9 kg\m^2 Overweight	63	42.0
30-39.9 kg\m^2 Obese	29	19.3
Additional Chronic Disease Status		
Yes	98	65.3
No	52	34.7

Table 1 Continued.

	n	%
Additional Chronic Disease Types		
HT	30	20.0
DM	48	32.0
KAH	24	16.0
SVO	7	4.7
Goiter	28	18.7
COBD	6	4.0
CKD	8	5.3
Muscular-Skeletal Disease	2	1.3
Previous Hospitalization Status		
Never	40	26.7
Once	39	26.0
More than twice	71	47.3
Previous Surgery Status		
Never	97	64.7
Once	53	35.3
The Type of Current Surgery		
Incisional Hernia	14	9.3
Gastrectomy	10	6.7
Bowel Resections	8	5.3
Hepatectomy	27	18.0
Liver Transplant	30	20.0
Cholecystectomy	8	5.3
Liver Cyst Excision	13	8.7
Colectomy	5	3.3
Pancreas/Bile Surgery	23	15.3
Laparoscopic Surgery	12	8.0

The distribution of identifying information about the individuals included in the study who underwent abdominal surgery is presented in Table 1. It was determined that 42.7% of the patients were between 28 and 49 years of age (mean 53.10±12.26, min. 28, max. 78), 55.3% were male, 78% were married, 32% had high school education, and 51.3% had income levels equal to their expenses based on their own expression. It was also identified that 42% of the patients who had abdominal surgery were overweight, 65.3% had additional chronic diseases, 47.3% had been previously hospitalized more than twice, and 64.7% had never been operated on before (Table 1).

A negative significant relationship was found between the score obtained from the Surgical Fear Scale by the individuals who underwent abdominal surgery and the score obtained from the Spiritual Well-Being Scale (Table 2).

Table 2. The Relationship Between the Patients' Surgical Fear and Their Spiritual Well-Being

	Spiritual Well-Being Scale	Surgical Fear Scale
Spiritual Well-Being Scale	1	
Surgical Fear Scale	-0.554*	1

* Statistically significant at p<0.001 level according to Pearson chi-square test results

According to the result of Pearson chi-square analysis, there is a significant relationship between spiritual well being and surgical fear scores of participants (r=-0.554, p<0.001)

In order to explain the effect of the scores obtained by the participants from the Spiritual Well-Being Scale on surgical fear, a simple regression analysis was performed.

Table 3. Regression Analysis Results of the Surgical Fear Scale for Spiritual Well-Being

Dependent Variable	Independent Variable	ß	t	p	F	Model (p)	R	Adjusted R^2
Surgical Fear	Constant	129.144	12.082	0.000				
	Spiritual Well-Being	-0.681	-8.095	0.000	65.53	0.000	0.307	0.302

When the significance level corresponding to the F value was considered, it was determined that the model was statistically significant (F=65.53; p<0.05). When Beta coefficients, t-value, and significance levels were examined, it was seen that the score level obtained from the Spiritual Well-Being Scale had a statistically significant effect on the scores obtained from the Surgical Fear Scale (p<0.005). In this context, it may be claimed that, as the score level obtained from the Spiritual Well-Being Scale increases, the score level obtained from the Surgical Fear Scale will decrease. It was determined that 30% of the change in the score obtained from the Surgical Fear Scale was explained by the scores obtained from the Spiritual Well-Being Scale (Adjusted R^2=0.302) (Table 3).

The identifying information of the participants was compared to the total mean scores obtained from the Surgical Fear Scale and the Spiritual Well-Being Scale.

Table 4. Comparison of the Patients' Identifying Information with Total Mean Scores Obtained from the Surgical Fear Scale and the Spiritual Well-Being Scale

	Surgical Fear Scale			Spiritual Well-Being Scale		
	Mean±SD	Test	p	Mean±SD	Test	p
Age						
28-49 years old (1)	34.89±19.4			130.89±11.12		
50-64 years old (2)	34.89±19.4	F:12.965	0.000	128.73±16.20	F:16.366	0.000
65 years old and above (3)	57.41±19.4			111.35±24.65		
PostHoc	1,2<3			1,2>3		
Gender						
Female	55.02±19.5	t: 6.274	0.000	123.93±17.65	t: -1.069	0.287
Male	34.22±20.6			127.16±18.98		
Marital Status						
Married	45.23±22.7	t:1.755	0.081	123.80±19.71	t:-3.373	0.001
Single	37.45±21.6			132.48±10.44		
Educational Level						
Illiterate (1)	60.65±18.8			103.35±27.65		
Literate (2)	35.43±24.8			128.56±19.16		
Elementary School (3)	37.19±21.4	F:10.663	0.000	131.52±18.02	F:12.495	0.000
High School (4)	52.45±19.8			125.15±12.60		
University (5)	32.20±18.5			132.53±8.98		
PostHoc	1>4>3>2,5			3,5>1,2,4		
Income Level status						
Income less than expenses (1)	48.30±21.3			120.12±23.50		
Income equal to expenses (2)	41.79±23.7	F:2.571	0.080	128.10±14.71	F:4.914	0.009
Income more than expenses (3)	35.58±18.7			133.29±5.56		

Table 4. Continued.

	Surgical Fear Scale			Spiritual Well-Being Scale		
	Mean±SD	Test	p	Mean±SD	Test	p
PostHoc	1>2>3			3>2>1		
Body Mass Index						
18.5-24.9kg\m^2 Normal weight (1)	35.41±21.3			129.84±18.50		
25-29.9 kg\m^2 Overweight (2)	43.25±21.0	F:13.692	0.000	126.41±16.60	F:5.971	0.003
30-39.9 kg\m^2 Obese (3)	60.31±19.8			115.93±18.98		
PostHoc	3>2>1			1>2>3		
Additional Chronic Diseases						
Yes	48.30±21.3	t:-2.398	0.018	123.43±20.36	t:2.077	0.040
No	48.30±21.3			130.02±13.14		
Previous Hospitalization						
Never	33.00±15.8			130.35±11.59		
Once	54.97±21.3	F:10.510	0.000	120.46±17.87	F:2.937	0.056
More than twice	43.15±23.7			125.99±21.10		
Previous Surgery Status						
Never	31.38±16.4	t:5.903	0.000	132.71±9.46	t:-13.550	0.009
Once	65.73±13.9			112.91±23.40		

F=One-Way ANOVA, t=Student t-test

A statistically significant relationship was identified between the individuals' age, gender, educational level, body mass index, presence of additional chronic diseases, previous hospitalization and previous surgery status, and surgical fear status (p<0.05). Again, there appeared to be a statistically significant relationship between the individuals' age, marital status, educational level, body mass index, presence of additional chronic diseases, previous surgery status, and spiritual well-being (p<0.05) (Table 4). According to the descriptive PostHoc analysis result that the highest fear of surgery and the lowest spiritual well-being were found for those 65 years old and above. In the illiterate, the fear of surgery was the highest and the level of spiritual well-being was the lowest. Similarly, surgical fear was highest in obese individuals, and spiritual well-being was lowest.

4. Discussion

Spirituality affects humans' lives greatly and involves plenty of personal and social events in it [18]. Besides, it has significant impacts on the prevention of diseases, increasing the success of treatment and recovery [19].

In the study, the mean total score obtained by the individuals from the Spiritual Well-Being Scale was determined to be the highest in the age group of 28-49 as 130.89±11.12 and the lowest in the age group of 65 years and above as 111.35±24.65. Additionally, the mean score from the Surgical Fear Scale was determined as 57.41±19.44 in the individuals at the age of 65 years and above. In a previous study, it was reported that preoperative affective disorder was observed more in elderly patients [20]. In another study, a significant relationship was identified between gaining hope and religious-spiritual coping, but it was not associated with mental wellness [21].

Some studies in the literature have associated spiritual well-being with mental wellness [10,14,22]. This situation suggests that elderly people have more spiritual accumulation due to their life

experiences, and therefore, they consider the problems they face more expectable. However, it is inferred from both the literature and the findings of this study that elderly people are more negatively affected by problems in comparison to other age groups.

In the study, a negative significant relationship was found between the mean scores obtained from the Surgical Fear Scale and the Spiritual Well-Being Scale. Surgery is an unexpected experience for everyone which puts the quality of life at risk, requires extra effort, and is highly stressful. According to the data of the study, as the individuals' spiritual well-being levels increased, their surgical fear was reduced.

In a previous study, the effects of religious coping strategies and social support systems on the physiological symptoms of stress (Serum cortisol level, C-Reactive Protein, Interleukin 6) were examined, and in the cohort study conducted with the participation of 162 patients, the postoperative results of the patients were determined to be better [22].

In another study, 335 patients were observed for 30 months, and it was identified that anxiety and depression were affected by piety on a higher level than expected. In the same study, spiritual well-being, optimism, hope, and religious practices were assessed, and it was determined that surgical experience led to higher existential growth in the psycho-spiritual development in individuals with strong spirituality [23].

The data of this study were consistent with the results in the literature. Being conducted on a single surgery patient group, being carried out at one center, observing the patients in a short time in the postoperative period may be listed among the limitations of the study.

5. Conclusion and Recommendations

Surgical fear is affected by spiritual well-being. Psychological problems caused by fear trigger physiological problems and further complicate the already stressful experience of surgery, negatively affecting the recovery process. Therefore, it is of great importance to identify and use all support systems that will make the surgical experience less stressful and be known by healthcare professionals. In this context, expectations of patients should be identified and supported to improve their spiritual well-being in the preoperative period, which is both an inexpensive and highly effective method.

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Ethical Aspect of the Study: Before the study, institutional permission was obtained from the relevant hospital, and ethics committee approval (Decision Date: 07.01.2020; Decision No: 2020/110) was obtained from the İnönü university. In accordance with the Declaration of Helsinki, the patients were informed by reading the Volunteer Information Form to them by the researcher. Patients who volunteered to participate in the study were included upon taking their verbal consent.

Authors' contributions:

All authors participated in drafting the paper and gave final approval of the version to be submitted. Study conception and design: GK %50 and BD %50; Acquisition of data: GK %75 and SB %25; Analysis and interpretation of data: SB %50 and SS %50; Drafting of the manuscript: GK %40, SB %30, BD %30; Critical revision: SS, BD.

All authors read and approved the final manuscript.

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Research Article

DETERMINATION OF THE RELATIONSHIP BETWEEN EMPATHIC SKILLS AND BURNOUT LEVELS OF NURSES WORKING IN A CITY HOSPITAL

Derya ŞİMŞEKLİ BAKIRHAN*[1]   *Sinan İRTEGÜN[2]*   *Özlem DOĞAN YÜKSEKOL[3]*

[1]Ardahan University Health Services Vocational School, Ardahan, Turkey
[2]Ardahan University Health Services Vocational School, Ardahan, Turkey
[3]Firat University, Faculty of Health Sciences, Elazig, Turkey
* Corresponding author; deryasimseklibakirhan@ardahan.edu.tr

Abstract: *Nursing is a profession that requires emphatic skills in which communication between people is important in patient care. Not being able to approach the patient and the patient family with empathy, not being able to understand others can create a perception of providing incomplete service and is one of the causes of burnout in nurses. Burnout is important as it may cause anorexia, insomnia, and lack of motivation individually in nurses, and also a decrease in the quality of nursing services. The aim of this study is to examine the association between nurses' empathic skills and their burnout levels. The study was conducted with 289 nurses working in Elazığ Fethi Sekin City Hospital between July and September 2020. The data were collected by using a questionnaire form prepared by the researchers, Empathic Skills Scale B-Form, and Maslach Burnout Inventory. The study was designed as a correlational study to find out the association between nurses' empathic skill levels and burnout levels. The mean age of the nurses in the study was 35.83±9.72. Mean working time in the profession was 12.57±9.7 years. The total mean score of nurses from the Empathic Skills Scale was 138.93±18.11, while their mean scores from Masclach Burnout Inventory were 22.8±7.2 in emotional exhaustion subscale, 9.1±4.2 in depersonalization subscale, and 20.0±6.3 in the personal accomplishment subscale. Statistically, a significant difference was found between the empathic skills scale and depersonalization subscale (p<0.05). No statistically significant difference was found between empathic skills and emotional exhaustion and personal accomplishment subscale (p>0.05). A negative association was found between the empathic skills scale and depersonalization subscale. As the empathic scale scores increase, depersonalization subscale scores decrease.*

Keywords: *Nursing, Empathy, Burnout*

1. Introduction

Empathy is a person's understanding of the feelings and thoughts of another by putting himself/herself in that person's shoes and telling the other person that he/she understands [1-5]. Empathy, a word of Greek origin was first addressed aesthetically and epistemologically. It was first introduced by Theodor Lipps with the Word ''Einfünlung''. ''Einfühlung'', which is a German word, was defined as "the process of a person reflecting on an object before him/her, feeling himself/herself in that object and thus understanding that object." [1,2,6].

Empathy is a concept that should be addressed with its cognitive, affective, and behavioural dimensions [1,2,7,8,9]. Empathy is understanding, feeling, interpreting, and reflecting what is felt and understood to the person opposite [5,10,11]. Empathy is one of the most basic elements in institutions where human relations are intense. The most important of these institutions are health institutions where

communication and human relations are the most intense [3,4,5]. The aim of health institutions is the diagnosis, treatment, prevention of disease, and providing rehabilitation services to individuals in a way that will benefit individuals the most. Nurses, an indispensable part of the health care team, are responsible for the delivery of this service [2,4,6,12].

Nurses should adopt an emphatic approach to maintain therapeutic communication in the patient-nurse relationship. Thanks to empathic communication, the patient can feel getting attention and being valued and can express his/her problems without feeling concerns and hesitations. This way, the nurse can make more appropriate planning, application, and evaluation in care and treatment [7,8,9,13]. In a patient-nurse relationship in which an empathic approach is used, the patient's compliance with care and treatment, quality of life, and satisfaction increases. However, intense therapy may cause the nurse to experience burnout [14]. Burnout was first defined by Freudenberger in 1974 as "starting to experience burnout due to excessive wishes and demands on energy, power or resources" [15]. Maslach, who became more popular by creating a burnout scale, defined burnout as "being detached from the purpose of the profession, being no longer interested in service" [8,9]. Burnout is seen especially in professions that provide service to humans [16-19]. Healthcare professionals are one of the riskiest groups in terms of burnout. Nursing is also one of the professions in which burnout is commonly seen. The reasons for these are role ambiguity, strict policies, working hours, working in shifts, time pressure, providing care and service to individuals with chronic disease, age, educational status, gender, health status, and personality [20-24]. Effective communication skills, problem-free communication between professions, high self-esteem, leadership capacity, organizational support, and job satisfaction can prevent burnout in the field of nursing [10, 14, 15]. It is thought that high burnout may be associated with low empathy in nurses [12]. For this reason, the present study was conducted to show the association between nurses' empathic skills and burnout levels.

2. Material and Method

2.1. Type, Population, and Sample of the Study

The study was conducted in Elazığ Fethi Sekin City Hospital between July and September 2020. The population of the study consisted of 860 nurses working in Elazığ Fethi Sekin City Hospital. The sample size of the study was calculated with the help of PASS (Power Analysis and Sample Size) program. Articles in literature were used for calculation [2,15,20]. The sample of the study was determined as 290 individuals with a confidence interval of 95%, error margin of 5%, and incidence of 50%, and the study was completed with 289 nurses since one nurse did not agree to participate in the study.

2.2. Data Collection Instruments

The data in the study were collected with a questionnaire form prepared by the researchers by reviewing literature [1-5], Empathic Skills Scale (ESS), and Maslach Burnout Inventory (MBI). The Questionnaire form included 16 questions prepared to find out the socio-demographic features of the participants.

ESS is a scale prepared by Dökmen (1988) to evaluate the cognitive components of empathy. The scale consists of two forms, as A and B, in ESS-A form, the participants were asked questions including six different problems they may encounter in daily life. ESS-B form includes 12 different response sentences that can answer the six problems created, there are 12 response sentences in total (One of the responses is irrelevant and it is included to test the participants' attention). The form is applied by asking the participant to choose 4 response sentences that are suitable for the participant for each of the problems. The minimum score one can get from ESS is 63, while the maximum score is 219. Reliability

and validity of the scale were conducted by Dökmen (1988) and test-retest reliability was found as 0.91[1]. Cronbach alpha value of the scale was found as 0.73(Table 1).

MBI was developed by Maslach and Jackson. The scale consists of 22 items created to find out the burnout levels of the participants. The 5-Likert type scale is scored from zero to four. The option "never" is scored as 0, while the option "always" is scored as 4. While evaluating the scores of the scale, subscales are evaluated separately and there is no total scale score. The scale consists of three subscales as emotional exhaustion (0-36 points), depersonalization (0-20 points), and personal achievement (0-32 points). Emotional exhaustion and depersonalization subscales include positive statements, while personal achievement includes negative statements [16,17,18]. Reliability of the scale was conducted by Ergin and reliability coefficients were found as α.82, α.60, and α.80, respectively [25]. In the present study, reliability coefficients of the subscales were found as α.0.86, α.0.67, and α.0.83, respectively (Table 1).

Table 1. Reliability Analysis Results

Variables	Number of Items	X̄±SD	Cronbach Alpha
Empathic skills	24	138.54±16.52	0.73
Emotional Exhaustion	9	22.82±7.23	0.86
Depersonalization	5	9.12±4.20	0.67
Personal Achievement	8	19.01±6.32	0.83
Masclach Burnout Inventory(general)	22	51.01±15.01	0.90

2.3. Ethical Considerations

Written permission was obtained from Fırat University Non-invasive Research Ethics Committee and Elazığ Fethi Sekin Hospital Chief Physician and verbal permission was obtained from the participants before starting the study. (Date: 06/07/2020; Number: 97132852/050.01.04/400073)

2.4. Statistical Analysis

The data were evaluated with SPSS 20 package program and frequency distribution was made in data analysis. In order to examine the effects of sociodemographic and professional features of the participants on emphatic skills and burnout, a t-test was conducted for normally distributed two variables, ANOVA test was conducted for more than two variables, Mann Whitney-U test was conducted for two variables that were not normally distributed and KrussKall Wallis test was conducted for more than two variables that were not normally distributed. Kolmogorov-Smirnov test was first conducted to find out the relationship between emphatic skills and burnout levels and Pearson correlation analysis was conducted for normally distributed ($p > 0.05$) variables, while Spearman analysis was conducted for variables that were not normally distributed ($p < 0.05$). Post Hoc analysis was performed to determine in which groups there was a significant difference between groups in more than three independent variables. For post Hoc analysis, firstly, the homogeneity of variances was examined

with Levene Test, Bonferroni test was performed for variables with homogeneous distribution, and Tamhane T2 Test was used for variables without homogeneous distribution.

2.5. Limitations

Generalization cannot be made since the sample is limited to the hospital the study was conducted in.

3. Results

The average age of the nurses in the study was 35.83±9.72, 58.8% of hate nurses were female and 66.1% were married, 46% were undergraduates, 65.7% lived in a city and 73% had a nuclear family. In addition, it was found that 62.3% of the participants had higher income than expenses (Table 2). When the data of the participants related to the profession were examined, it was found that their average total working time in the profession was 12.57±9.7 years, average total working time in their service was 6.37±6.40 hours and their average weekly working time was 56.18±14.68 hours. It was found that 57.4% of the participants worked in surgical services, 64.7% worked in shifts, 53.3% worked by Law no. 657, and 689% chose the nursing profession willingly (Table 3).

The mean emphatic skills score of the participants was 138.5±16.5, mean emotional exhaustion subscale score was 22.8±7.2, mean depersonalization subscale score was 9.1±4.2, and mean personal achievement subscale score was 19.0±6.3 (Table 1).

When the emphatic skills and mean burnout subscale scores of the nurses in the study were compared in terms of their demographic features, age, marital status, and income status were found to affect burnout subscale mean scores significantly (p<0.05). In the depersonalization sub-dimension of the Maslach Burnout Scale, a relationship was found between the 19-27 age group, the 38-47 age group, and the 48-57 age group. In the depersonalization sub-dimension, a relationship was found between the 19-27 age group and the 28-37 age group, and the 48-57 age group. In the personal achievement sub-dimension, a relationship was found between the 19-27 age group and the 48-57 and over 58 age group, the 28-37 age group and the 48-57 age group, and the 38-47 age group with the 48-57 age group (p <0.05) (Table 2).

When the nurses' emphatic skills and burnout mean scores were compared in terms of their professional features, it was found that total working time, working time in the service, weekly working time, service nurses worked in, type of working, and working status were found to affect exhaustion. Depersonalization and personal achievement subgroup mean scores of those who worked 40 hours a week were found to be higher than those who worked more than 40 hours (p <0.05). The empathic skill scores of the nurses who work in shifts are significantly higher than those who work overtime (p <0.05). In the personal achievement sub-dimension, one of the burnout scale sub-dimensions, the average personal achievement score of employees working overtime is statistically significant (p <0.05). In the emotional exhaustion and personal achievement sub-dimension, a relationship was found between those who worked for a total of 1-9 years and those who worked more than 30 years (p <0.05). A statistically significant difference was found between the services where the nurses work according to the total scores of the empathic skill scale. This difference was found to be between internal and surgical services (p <0.05). There was a difference between the internal service nurses and the nurses working in the intensive care unit in the mean scores of the Maslach Burnout subscale of emotional exhaustion sub-dimension (p <0.05). In terms of empathic skills mean scores, it was found that the nurses who worked in internal medicine services, those who worked in shifts, and those who had to choose the nursing profession unwillingly had higher empathic skills mean scores than the mean scores of other groups (p<0.05) (Table 3).

As a result of the correlation analysis, a negative and statistically significant association was found between emphatic skills total score and burnout inventory depersonalization subscale total score (p<0.05). No statistically significant association was found between the groups in terms of emphatic skills scale total score and emotional exhaustion and personal achievement subscales total scores (p>0.05)(Table 4).

Table 2. Comparison of mean empathic skills and burnout scores of nurses in terms of their demographic features (n= 289)

Variables	n	%	Empathic skills X̄±SD	Masclach Burnout Inventory		
				Emotional Exhaustion X̄±SD	Depersonalization X̄±SD	Personal Achievement X̄±SD
Gender						
Female	170	58.8	138.20±16.28	22.96±7.35	9.35±4.20	19.17±6.08
Male	119	41.2	139.13±17.05	22.74±7.15	8.74±4.24	18.81±6.59
Test and p			U:-0.81	U:-0.50	U: -1.00	U:-0.21
			p>0.05	p>0.05	p>0.05	p>0.05
Age						
19-27 years of age(1)	51	17.6	140.88±14.54	18.17±8.45	7.47±4.54	16.58±6.73
28-37 years of age(2)	128	44.3	137.98±17.74	23.62±6.08	9.60±3.78	19.10±5.91
38-47 years of age(3)	67	23.2	139.29±16.70	23.37±7.29	8.52±4.36	18.67±6.87
48-57 years of age(4)	31	10.7	135.48±14.83	26.00±6.08	10.96±4.35	22.41±4.87
>58 years of age(5)	12	4.2	139.25±16.36	24.00±8.33	9.25±4.53	21.83±2.88
Test and p			KW:3.41	KW:25.30	KW:14.41	KW:18.00
			p>0.05	**p<0.01(1-2.1-3.1-4)**	**p<0.05(1-2.1-4)**	**p<0.01(1-4. 1-5.2-4.3-4)**
Marital Status						
Married	191	66.1	138.46±16.58	23.90±6.65	9.56±4.01	20.02±5.82
Single	98	33.9	139.02±16.64	20.87±7.99	8.21±4.50	17.08±6.73
Test and p			U:-0.30	U:-3.11	U:-2.82	U:-3.61
			p>0.05	**p<0.01**	**p<0.05**	**p<0.01**
Educational Status						
Secondary	64	22.1	138.12±16.42	22.54±7.84	8.62±4.53	19.92±6.32
Associate degree	84	29.1	141.32±15.91	21.91±7.70	8.74±3.92	18.42±6.13
Undergraduate	133	46.0	136.81±16.81	23.41±6.72	9.53±4.34	18.84±6.32
degree	8	2.8	143.52±18.54	26.72±6.13	9.52±3.12	22.41±7.72
Graduate degree			F:1.51	F:1.41	F:0.90	F:1.51
Test and p			p>0.05	p>0.05	p>0.05	p>0.05
Level of income						
Income<expense(1)	180	62.3	136.91±16.83	23.83±6.66	9.36±4.32	19.22±6.42
Income=expense(2)	96	33.2	141.01±16.12	21.24±7.74	8.43±4.25	18.74±5.92
Income>expense(3)	13	4.5	143.82±12.82	22.12±9.75	9.84±3.24	9.12±7.53
Test and p			KW:5.20	KW:7.70	KW:2.91	KW:0.60
			p>0.05	**p<0.05(1-2)**	p>0.05	p>0.05

Table 3. Comparison of mean empathic skills and burnout scores of nurses in terms of their Professional features (n= 289)

| Variables | n | % | Empathic skills X̄±SD | Masclach Burnout Inventory | | |
				Emotional Exhaustion X̄±SD	Depersonali zation X̄±SD	Personal Achievement X̄±SD
Total years of working						
1-9 years(1)	135	46.7	139.32±16.33	21.28±7.45	8.51±4.01	17.82±6.35
10-19 years(2)	89	30.8	137.21±16.95	23.72±6.84	9.62±4.12	19.44±5.91
20-29 years(3)	34	11.8	142.70±17.52	24.71±6.22	9.01±4.83	20.12±6.83
>30 years(4)	31	10.7	134.51±15.02	25.44±7.23	10.02±4.41	21.81±5.02
Test and p			KW:5.00	KW:16.61	KW:4.61	KW:14.12
			p>0.05	**p<0.01(1-4)**	p>0.05	**p<0.01(1-4)**
Years of working in the unit						
1-6 years(1)						
7-13 years(2)	185	64.0	137.61±16.92	22.32±7.31	8.82±4.02	18.12±6.12
14-20 years(3)	69	23.9	140.41±16.11	23.81±7.11	9.62±4.32	20.14±6.41
21-27 years(4)	26	9.0	140.53±16.94	25.13±6.43	9.63±4.94	20.82±6.22
>27 years(5)	3	1.0	138.32±6.62	25.01±8.12	10.01±2.14	23.04±2.01
Test and p	6	2.1	137.61±14.71	18.32±9.24	8.34±7.04	24.05±3.53
			KW:1.51	KW:8.52	KW:2.81	KW:14.63
			p>0.05	p>0.05	p>0.05	**p<0.01(1-2.1-3.1-5)**
Weekly working time						
40 hours	110	38.1	136.51±16.50	23.32±7.63	9.51±4.52	20.91±5.32
>40 hours	179	61.9	139.82±16.53	22.64±7.01	8.83±3.92	17.84±6.51
Test and p			U:-1.32	U:-1.32	U:-3.91	U:-2.00
			p>0.05	p>0.05	**p<0.01**	**p<0.05**
Service nurses worked in						
Internal(1)	98	33.8	141.64±14.62	23.24±7.72	8.92±3.92	19.70±6.45
Surgical(2)	166	57.4	136.45±17.61	23.44±6.42	9.42±4.36	18.71±6.23
Intensive care(3)	25	8.7	141.25±14.62	18.12±8.93	7.81±4.73	18.31±6.42
Test and p			F:3.42	F:6.21	F:1.42	F:0.80
			p<0.05(1-2)	**p<0.05(1-3)**	p>0.05	p>0.05
Working type						
Regular	102	35.3	136.26±16.30	23.40±7.88	9.21±4.52	20.91±5.53
Shift	187	64.7	139.81±16.62	22.56±6.97	9.01±4.02	18.01±6.42
Test and p			U:-2.00	U:-1.62	U:-0.21	U:-3.71
			p<0.05	p>0.05	p>0.05	**p<0.01**
Working status						
4B	135	46.7	139.80±16.72	21.90±7.21	8.91±3.94	18.51±6.23
657	134	53.3	137.51±16.42	23.62±7.21	9.21±4.42	19.52±6.32
Test and p			U:-1.50	U:-2.31	U:-0.40	U:-1.40
			p>0.05	**p<0.05**	p>0.05	p>0.05
The state of choosing the profession willingly						
Yes	99	68.9	140.40±15.91	22.81±7.12	9.01±4.15	19.41±6.12
No	190	31.1	134.51±17.22	23.02±7.52	9.21±4.32	18.01±6.50
Test and p			U:-2.50	U:-0.40	U:-1.51	U:0.40
			p<0.05	p>0.05	p>0.05	p>0.05

Table 4. Correlation analysis of Empathic Skills Scale and Maslach Burnout Inventory subscales

Correlation analysis		Empathic skills	Emotional exhaustion total	Depersonalization total	Personal achievement total
Empathic skills total	r[a]	1	0.06	-0.11*	0.09
score	p		0.12	0.02	0.05
Emotional exhaustion	r[a]	-0.06	1	0.57**	0.57**
total score	p	0.12		0.00	0.00
Depersonalization	r[a]	-0.11	0.57**	1	0.54**
total score	p	0.02	0.00		0.00
Personal achievement	r[a]	0.09	0.57**	0.0.54**	1
total score	p	0.05	0.00	0.00	

[a] Spearman correlation
*Correlation is significant at the 0.05 level (1-tailed)
**Correlation is significant at the 0.01 level (1-tailed)

4. Discussion

Nursing is a profession that provides individual and social service and assistance. It contributes to the health and well-being of individuals with these services [25]. Since nurses are continually in communication with patients during the planning, implementation, and evaluation of nursing services, it is important for nurses to be able to express themselves comfortably to nurses and to be open to them. At this point, it is very important for nurses to have an empathic approach to patients [2,4,5,26].

In our study, it was found that nurses had moderate total mean emphatic skills scores and moderate empathy levels. While there are studies that showed moderate empathy scores in studies conducted on nurses, similar to the results of or study [4, 7,27], there are also studies that have reported high [3, 5,8,28,29] and low levels of empathy [13,30]. In their study, Özdemir et al. (2015) reported empathy levels above moderate [31]. In our study, it was found that empathy was statistically significantly affected by the service nurses worked in, working type, and the state of choosing the profession willingly (p<0.05). In their study, Şahin et al. (2018) found that the participants had high emphatic tendency and found that the participants who had been working for 3-4 years and those who had been working for 40 hours a week had higher empathy [8]. Burnout is a common condition in professions providing service to humans and it can cause problems such as insomnia, fatigue and headache, and chronic diseases when it continues for a long time. One of the professions in which burnout is experienced most frequently in nursing [20,22,24,26,32]. A large number of causes such as chronic patient care, busy shifts, number of shifts and too many weekly working hours, long term occupational stress, problems with other employees in the workplace, disagreement with managers may cause burnout in nurses. Nurses who experience burnout may also experience a decrease in the quality of care they provide to patients, problems in effective communication, personal problems, and even think about leaving their jobs [20,22,32,33].

Burnout is addressed in three dimensions as emotional exhaustion, depersonalization, and personal achievement [16]. Burnout first occurs with emotional exhaustion, the individual experiences fatigue, and a decrease in mental strength. Emotional exhaustion is followed by depersonalization, where individuals are seen as an object and individuals try to protect themselves from stress in this way. The last step is a decrease in individual achievement and skills [33]. Stress has been found to increase burnout, and the increase in burnout has been found to affect job satisfaction, anxiety, insomnia, and general health [22].

In our study, mean subscale scores of Maslach Burnout Inventory were found as 22.8±7.2 (moderate) in emotional exhaustion, as 9.1±4.2 (moderate) in depersonalization, and as 19.0±6.3 (moderate) in personal achievement. There are similar results to the results of our study in literature [7,10,24,35,37]. Unlike our study, it was found in Aylayer et al.(2011)'s study that 59.8% of the

participants had low emotional exhaustion scores, depersonalization (9.37±4.62) and personal achievement (21.96±4.0) subscales were similar, and mean emotional exhaustion (15.6±7.6) subscale scores were lower [21]. In their study conducted on dialysis nurses, Karkar et al. (2015) found a moderate level of burnout (42%) in the participants, while Fitzgerald et al. (2018) found very high emotional exhaustion and depersonalization scores in their study on 442 nurses and Lee et. al(2018) found low empathy scores and high burnout level in their study on 446 assistant physicians [23,27,30].

In our study, subscales of burnout were found to be significantly affected by age, marital status, and income status (p<0.05). In emotional exhaustion, depersonalization, and personal achievement subscales, participants between the ages of 48 and 57 and those who were married were found to have significantly higher burnout levels than the other groups. At the same time, it was found that the participants who had income lower than expense had significantly higher burnout levels than the other groups. Considering burnout state's being affected by the sociodemographic and professional features of the participants, it can be seen that there is confusion in the literature. While there are studies in which subscales of burnout are affected by age, gender, marital status, services nurses worked in, total working time, educational status, total working time in the service, type of work, status, and way of employment; there are also studies which show the opposite. In our study, burnout was found to be statistically significantly affected by total working time, total working time in the service, weekly working hours, type of work, and status (p<0.05). It was found that the emotional exhaustion subscale was significantly affected by working time, services nurses worked in and working status, while the depersonalization subscale was found to be significantly affected by weekly working hours, and the personal achievement subscale was found to be significantly affected by total working time, total working time in the current service and working status. Similar to the results of our study, Aylayer et al. (2011) reported an increase in personal achievement level in individuals with a total working time of 10 years and longer [21]. Julia-Sanchis et al. (2019) reported that age and total serving time were inversely proportional to depersonalization [28], while Fitzgerald et al. (2018) reported that emotional exhaustion and depersonalization were mildly correlated with age and low personal achievement was positively correlated with age [27]. Günüşen et al. (2010) reported that burnout was affected by income status, career choice, education, and marital status; women experienced more emotional exhaustion than men and men had higher depersonalization scores [20].

In our study, no association was found between burnout subscales and gender (p>0.05). In their study conducted on 89 nurses, Can et al. (2019) did not report differences in Maslach burnout subscales in terms of gender. Depersonalization, personal achievement, and burnout total scores were found to show significant differences in terms of the services nurses worked in [34], this study was similar to our study in that there were no differences between burnout subscale scores in terms of gender and different from our study in terms of depersonalization and personal achievement scores, in our study, emotional exhaustion was found to be affected by the services nurses worked in. In their study conducted on 267 nurses and doctors, Yuguero et al. (2018) did not find a significant difference between burnout, gender, and occupation and found that doctors in rural areas had low empathy scores and that high empathy was associated with high burnout in nurses and doctors [29]. In their study, Uzun et al. (2020) found that mean personal achievement scores were affected by gender, income status, and the state of choosing the profession; while they were not affected by age, marital status, educational status, experience, and the service nurses worked in [35]. In their study, Kütükçü et al. (2019) found that burnout was not affected by the type of work, experience and the service nurses worked in [38]. In their study, Kaya et al. (2010) found that gender, age, profession, and the service the nurses worked on significantly affected burnout, while marital status, educational status, and the service nurses worked in did not. Women were found to have higher burnout levels than men. Burnout score was found to decrease as age and working time increased [15]. In their study Kuo et al (2012) conducted on 660 nurses, they found a statistically

significant association between age, marital status, educational status, monthly income, and empathy. No association was found between gender and empathy. Empathy was found to increase as professional experience increased [3].

In their study conducted on 468 health professionals, Türkmenoğlu et al. (2017) did not find any association between emotional exhaustion and personal achievement. It was found that personal achievement decreased as depersonalization increased [36]. In their study on 44 nurses, Özsoylu et al.(2017) found that nurses working in intensive care had low personal achievement and high emotional exhaustion scores [24].

In or study, a negative statistically significant association was found between empathic skills total score and burnout inventory depersonalization subscale total score (p<0.05). In their study, Şahin et al. (2018) found a negative association between empathy and personal achievement scores [8]. Williams et al (2017) found a negative association between empathy and emotional exhaustion and a positive association between empathy and personal achievement [26]. Caro et al (2017) found a positive association between the personal achievement subscale and empathy and a negative association between emotional exhaustion and empathy [10]. Picard et al (2016) reported in their qualitative study on 24 participants that depersonalization affected empathy [14]. Fitzgerald et al (2018) found a positive association between age and experience, a negative association between empathy and depersonalization, and a positive association between empathy and low personal achievement [27].

5. Conclusion

In this study which aimed to examine the association between empathic skills and burnout levels of nurses, a negative association was found between empathic skills and depersonalization subscale of burnout. As a result, the depersonalization score will decrease as the empathic skills score increases. Empathy is especially required in patient and nurse relationships in nursing. Intense feelings of empathy and turning this feeling into sympathy may cause nurses to become insensitive, to experience burnout, and to experience personal failure. In this sense, it is recommended to include empathic communication in nursing training, to give in-service training to nurses in this sense so that empathic communication can be regulated in the most suitable way and burnout can be prevented.

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Research Article

COMPARISON OF HEALTHCARE SYSTEMS PERFORMANCES IN OECD COUNTRIES

*Oğuzhan YÜKSEL *[1]* ⓘ

[1]Republic of Turkey Ministry of Health, Isparta Oral and Dental Health Center, Isparta, Turkey
* Corresponding author; oguzhan@doctor.com

Abstract: *Health spending is increasing every day around the world. Because of this, efficient use of resources (human, technology, material, etc.) becomes more important. This study aimed to compare the health efficiencies of the Organization for Economic Co-operation and Development (OECD) countries. In order to consider the trend of efficiency of the countries in the observed period (2014-2018), window analysis is chosen as the most appropriate input-oriented Data Envelopment Analysis (DEA) technique. The DEA window method was chosen since it leads to increased discrimination on findings and enables year-by-year comparisons. Input and output variables used in the study were determined by examining other studies in the literature. In this respect, the input variables were identified as the number of physicians per thousand people, the number of nurses per thousand people, the number of hospital beds per thousand people, health spendings (% of GDP); and output variables were expected life expectancy at birth, and rate of surviving infants. According to the results of the DEA window analysis, only Mexico was found to be efficient. Other countries with an efficiency score of more than 90% are Turkey (0.999), Japan (0.991), Korea (0.974), Luxembourg (0.937). On the other hand; Austria (0.591), Switzerland (0.545), and Germany (0.511) were the last countries in the efficiency score ranking. In these countries, which produce high health output, their inputs are also high, so they are at the end of the ranking of efficiency scores.*

Keywords*: OECD Countries, Healthcare Performance, DEA Window, Efficiency*

1. Introduction

Societies must have a healthy generation to sustain their existence. It is expected that societies consist of healthy individuals will make positive contributions to the power of production. Because of this, health services should be available when they are needed by all segments of citizens. Health problems and policies are one of the most important issues of the people and states in accordance with the understanding of the social state [1].

Health indicators are one of the most important parameters used in determining the level of development and socioeconomic development of countries. According to the Organization for Economic Co-operation and Development (OECD); summary indicators of population health and health system performance include; risk factors for health (smoking, alcohol, air pollution ext.), health care resources (health spending, doctors, nurses ext.), quality of care, access to care, health status (life expectancy, mortality ext.) [2].

Efficiency analyses can be performed with the data selected from these indicators. It is possible to have information about the performance of health systems of regions, various organizations, or countries. Changes in the health status of society can be followed. Regional or international comparisons

can be made and lead to remedial policies in the health sector. The public can easily notice changes in the health sector (positive or negative). Improvements or declines in the health sector are easily understandable. Citizens constantly commute to medical facilities for their illnesses or checks. From this point of view, health administrators need to pay attention to feedback from the public. Inter-country benchmarks, which include the activities of the health sector, are also important.

When the world's practices are examined, it can be said that each country has its health systems. Although various classifications are made, the most widely accepted is the classification for the financing of Health Services. Taxes, social insurance premiums, out-of-pocket payments, or private health insurance can be used to finance health services. A key feature of the Beveridge model is that health care is funded based on taxes. It is used in countries such as the United Kingdom, Denmark, Finland, Ireland, Spain, Sweden, Italy, Norway, Portugal, Greece. In the Bismarck model, the contributions of employees and employers constitute resources. It is practiced in Germany, Austria, Belgium, France, the Netherlands, and Switzerland. The most well-known country that implements private health insurance is the United States. Although various applications are made in countries, whichever is the most commonly used method is evaluated in that class [3].

All over the world, while health care costs are increasing, patients' expectations are also changing. States are also making efforts to eliminate factors that disrupt public health while trying to facilitate access to health care. As people's interest in healthy living increases, demands diverge. Health care providers are being challenged in the face of increasing demand for services from day today. Countries have to meet the health needs of the people by using their resources most effectively. All people have the right to live in healthy conditions. Currently, one of the most important elements that make countries competitive is a human investment. Because the healthier individuals are, the more they can contribute to themselves and the country they are in.

The aim of this study is to address the levels of efficiency in health care of OECD member countries and to make recommendations for solving problems. In the study, the health services offered to the citizens of OECD countries, including Turkey, were evaluated comparatively.

2. Data and Methodology

This study focused on the performance of the health systems of OECD countries. States must provide quality, effective and efficient health care to their citizens. For this reason, efficiency values between countries have been studied comparatively.

In this context, the study aimed to compare the health efficiencies of OECD countries. OECD countries with similar goals have been selected as decision-making units (DMUs). The analysis was conducted using the DEA-Solver program. The input-oriented Data Envelopment Analysis (DEA) technique–window analysis (with constant returns to scale (CRS) assumption) method was used. The sample used in the study and the variables determined is given below.

2.1. Study design, sample and variables

The study aimed to use the most up-to-date data from OECD countries. For this reason, the 5 years between 2014-2018 have been determined. In variables determined as input and output, countries that do not have incomplete data were included in the study. Finland, Czech Republic, New Zealand, Colombia, Greece, Portugal, Netherlands, and Chile were not included in the research due to incomplete data. The lack of complete 2019 and 2020 data and the fact that it only covers OECD countries is one of the limitations of the study.

In DEA analysis, the choice of DMUs that produce similar outputs with similar inputs is important. OECD countries also participate in this organization for similar purposes. In addition, in the

DEA method, all inputs and outputs must be selected in a positive or negative direction. In this study, all of the input variables and one of the output variables (life expectancy at birth) were positive.

One of the output variables, infant mortality rates (IMR), is negative. Instead, infant survival rate (ISR) was used as a positive directional variable. The formula used for the ISR calculation method is as follows [4].

Infant Survival Rate (ISR) = (1000-IMR)/IMR   (1)

The study examined 29 OECD countries. The data used in the analysis were obtained from OECD Health Statistics [5]. The variables used were determined by reviewing the literature. For example; In their work in OECD countries, Afonso and Aubyn, have 3 outputs (the infant survival rate, life expectancy, and potential years of life not lost) and 4 inputs (the number of practicing physicians, practicing nurses, acute care beds per thousand habitats and high-tech diagnostic medical equipment) were used [4]. Hadad et al. aimed to identify health activities in OECD countries. They determined "practicing physicians per 1000 population, inpatient beds per 1000 population, total expenditure on health per capita, GDP per capita and consumption of fruit and vegetables" as input variables in their study [6]. Life expectancy at birth (years) and infant mortality (deaths per 1000 live births) are the output variables.

2 output and 4 input variables used in the research and their descriptions are listed in Table 1.

Table 1. Input and Output Variables

		Indicators	Definition
Input	**PHY**	The number of physicians	The number of practicing, professionally active, or licensed to practice physicians per 1000 population.
	NUR	The number of nurses	The number of practicing, professionally active, or licensed to practice nurses per 1000 population.
	HB	The number of hospital beds	All hospital beds are regularly maintained, staffed, and immediately available per 1000 population
	HS	Health spending	% of Gross Domestic Product (GDP), current $
Output	**LE**	Life expectancy at birth	The average number of years that a person at birth is expected to live, assuming that age-specific mortality levels remain constant.
	ISR	Infant Survival Rate	Computed via equation using IMR. IMR is the number of deaths in children under 1 year of age per 1000 live births that occurred in a given year.

2.2. DEA Window Analysis

DEA is a non-parametric and linear programming-based efficiency measurement method that measures the relative efficiency of homogeneous DMUs using the same inputs and outputs [7, 8]. DEA is a technique that provides information to administrators for more efficient use of resources. In addition, window analysis allows us to include the time dimension in efficiency analysis.

DEA window analysis is a DEA technique that can measure multi-period performance. Allows you to measure how the efficiency scores of DMUs change over different periods [9]. DEA window analysis developed by Charnes, Clark, Cooper, and Golany [10], first used in 1984 [11]. The performance of DMU in the studied period is compared with its own performance in other periods and the performance of other DMUs [12].

In this perspective, it is assumed that there were no significant technical changes during the analysis period (the technological limit is constant) [13]. In traditional DEA applications, each DMU is observed only once, as cross-sectional data is used. It can be said that DEA window analysis is useful in determining performance changes in the specified period [14]. A window length is determined in the analysis. DMUs data at different times are considered to be of a different unit. Each DMU is compared

to both itself and other DMUs. In the analysis, the DMU in the first year is calculated as another DMU for the second year [15].

$T (t = 1,..., T)$ in the time period, N pieces $(n = 1,...,N)$ suppose it is DMU. r denotes the number of inputs and s denotes the number of outputs. The observation of n (DMU_t^n) in the t-period has an r-dimensional input vector $x_t^n = (x_{1t}^n, x_{2t}^n, ..., x_{rt}^n)'$ and an s-dimensional output vector $y_t^n = (y_{1t}^n, y_{2t}^n, ..., y_{st}^n)'$. Assume that the window starts at k time $1 \leq k \leq T$ and that the window width w is $1 \leq w \leq T\text{-}k$. Each window is shown with k_w. The matrices created for a window analysis in this structure can be written as follows [16].

Input matrix;

$$X_{k_w} = (x_k^1, x_k^2, ..., x_k^N, x_{k+1}^1, x_{k+1}^2, ..., x_{k+1}^N, x_{k+w}^1, x_{k+w}^2, ..., x_{k+w}^N), \tag{2}$$

Output matrix;

$$Y_{k_w} = (y_k^1, y_k^2, ..., y_k^N, y_{k+1}^1, y_{k+1}^2, ..., y_{k+1}^N, y_{k+w}^1, y_{k+w}^2, ..., y_{k+w}^N). \tag{3}$$

This analysis assumes that DMUs are a different unit in each period [17]. Substituting the above inputs and outputs of DMU_t^n into relevant models will generate the results of DEA window analysis.

3. Results

The study analyzed the health system efficiencies of 29 OECD countries. The input-oriented DEA window model was used. In this study, efficiency scores were calculated with 5-year data (from 2014 to 2018) and selected window analysis as the most appropriate DEA technique to take into account the efficiency trend of countries during the observed period. The reason for this is to determine whether OECD countries have experienced a change in effectiveness over the 5-year period with DEA window analysis.

The data is arranged in accordance with the analysis. For solving the specified DEA model (Window-I-C) the software DEA-Solver-LV has been used. The results at window length level 3 were interpreted. Table 2 shows the minimum, maximum, and average values of input and output variables and which countries have them.

Tablo 2. Input and Output Variables (Min., Max., Avg.)

PHY	2014	Country	2015	Country	2016	Country	2017	Country	2018	Country
Min.	1.76	Turkey	1.81	Turkey	1.83	Turkey	1.87	Turkey	1.88	Turkey
Max.	5.05	Austria	5.09	Austria	5.13	Austria	5.18	Austria	5.24	Austria
Avg.	3.27	-	3.30	-	3.35	-	3.40	-	3.45	-
NUR	**2014**	**Country**	**2015**	**Country**	**2016**	**Country**	**2017**	**Country**	**2018**	**Country**
Min.	1.85	Turkey	1.95	Turkey	1.93	Turkey	2.07	Turkey	2.34	Turkey
Max.	16.89	Norway	17.34	Norway	17.49	Norway	17.67	Norway	17.74	Norway
Avg.	8.78	-	8.89	-	8.97	-	9.09	-	9.21	-
HB	**2014**	**Country**	**2015**	**Country**	**2016**	**Country**	**2017**	**Country**	**2018**	**Country**
Min.	1.03	Mexico	1	Mexico	1	Mexico	0.99	Mexico	0.98	Mexico
Max.	13.21	Japan	13.17	Japan	13.11	Japan	13.05	Japan	12.98	Japan
Avg.	4.97	-	4.93	-	4.91	-	4.88	-	4.83	-
HS	**2014**	**Country**	**2015**	**Country**	**2016**	**Country**	**2017**	**Country**	**2018**	**Country**
Min.	4.35	Turkey	4.14	Turkey	4.31	Turkey	4.21	Turkey	4.16	Turkey
Max.	16.41	United States	16.71	United States	17.05	United States	17.00	United States	16.89	United States
Avg.	8.72	-	8.72	-	8.80	-	8.77	-	8.79	-
LE	**2014**	**Country**	**2015**	**Country**	**2016**	**Country**	**2017**	**Country**	**2018**	**Country**
Min.	74.3	Latvia	74.5	Lithuania	74.7	Latvia	74.8	Latvia	74.9	Latvia
Max.	83.7	Japan	83.9	Japan	84.1	Japan	84.2	Japan	84.3	Japan
Avg.	80.4	-	80.3	-	80.6	-	80.7	-	80.8	-
IMR	**2014**	**Country**	**2015**	**Country**	**2016**	**Country**	**2017**	**Country**	**2018**	**Country**
Min.	1.8	Slovenia	1.6	Slovenia	0.7	Iceland	1.9	Japan	1.6	Estonia
Max.	13.6	Mexico	13.6	Mexico	13.4	Mexico	13.5	Mexico	12.9	Mexico
Avg.	4.0	-	3.9	-	3.9	-	3.8	-	3.7	-

In Table 2; Mexico is the only country that is fully efficient in all 3 periods: 2014-2016, 2015-2017, and 2016-2018. In the average efficiency scores of all periods, the top 5 ranked countries are Mexico (1), Turkey (0.999), Japan (0.991), Korea (0.974), and Luxembourg (0.937). The efficiency scores of these 5 countries are over 90%. The worst results were found in France (0.636), Norway (0.602), Austria (0.591), Switzerland (0.545), and Germany (0.511). It can be said that the lower ranking of these countries (since input-oriented DEA window analysis is used) is due to high input values.

According to OECD data for 2019, United States has the highest total health spending per capita ($11,072). Among the countries covered by the study, the lowest total health expenditures per capita were in Mexico ($1,154) and Turkey ($1,337). In OECD countries, the average per capita health spending is $ 4,224 [5]. For example, in PHY (the number of physicians) of input variables, countries such as Turkey, Mexico, Japan, Korea, and Luxemburg have values below the OECD average. When LE (life expectancy at birth) values were examined, it was found that Latvia and Lithuania had the lowest values. Japan, on the other hand, is noted for its longest life span. Turkey's expected life year at birth is about 78. In the infant mortality rates (IMR), Turkey and Mexico are the countries with the worst values in the sample. The reason why they rank high in the efficiency scores can be explained by the fact that their input values are lower than in other OECD countries, rather than producing the highest health output with the least input.

Countries that are probed in the ranking based on efficiency scores must go to the regulations in the use of their inputs. If these countries do not make the necessary administrative decisions, the

investments they will spend (capital, labor, medical equipment, technology, etc.) can remain unrequited. Investments that do not positively change outcomes return as ineffectiveness as time progresses. Given the public opinion, it is negative to see that the return on investment is insufficient. This can lead to various restrictions in the field of Health. DEA Window-I-C (input CRS) analysis results (length of the window: 3) are shown in Table 3.

Tablo 3. Results DEA Window-I-C (lenght of window: 3)

Country	2014	2015	2016	2017	2018	Average	C-Average
	0.662	0.659	0.652			0.657	
Australia		0.669	0.662	0.643		0.658	0.656
			0.667	0.648	0.645	0.653	
	0.600	0.584	0.587			0.590	
Austria		0.588	0.591	0.614		0.598	0.592
			0.563	0.584	0.613	0.587	
	0.708	0.701	0.697			0.702	
Belgium		0.713	0.709	0.692		0.705	0.702
			0.716	0.698	0.681	0.698	
	0.849	0.846	0.845			0.847	
Canada		0.862	0.861	0.858		0.860	0.855
			0.867	0.864	0.847	0.859	
	0.634	0.642	0.647			0.641	
Denmark		0.656	0.660	0.629		0.648	0.643
			0.662	0.631	0.630	0.641	
	0.802	0.786	0.814			0.800	
Estonia		0.786	0.818	0.807		0.803	0.825
			0.812	0.801	1.000	0.871	
	0.639	0.628	0.628			0.632	
France		0.640	0.640	0.631		0.637	0.637
			0.646	0.636	0.640	0.641	
	0.519	0.509	0.502			0.510	
Germany		0.518	0.511	0.507		0.512	0.511
			0.516	0.512	0.507	0.512	
	0.620	0.642	0.638			0.634	
Hungary		0.642	0.638	0.673		0.651	0.650
			0.637	0.671	0.689	0.666	
	0.737	0.736	1.000			0.824	
Iceland		0.736	1.000	0.704		0.813	0.821
			1.000	0.708	0.766	0.824	
	0.806	0.762	0.764			0.777	
Ireland		0.771	0.771	0.778		0.773	0.780
			0.776	0.784	0.807	0.789	
	0.855	0.856	0.848			0.853	
Israel		0.866	0.858	0.845		0.856	0.856
			0.859	0.847	0.872	0.859	
	0.758	0.746	0.727			0.744	
Italy		0.753	0.734	0.732		0.740	0.738
			0.736	0.734	0.723	0.731	
	0.990	1.000	0.976			0.989	
Japan		1.000	0.978	0.978		0.985	0.991
			1.000	1.000	0.994	0.998	
	0.983	0.992	0.963			0.980	
Korea		1.000	0.972	0.953		0.975	0.974
			0.987	0.968	0.945	0.967	
	0.811	0.771	0.738			0.773	
Latvia		0.771	0.740	0.731		0.748	0.763
			0.740	0.733	0.835	0.770	

Table 3. Continued.

Country	2014	2015	2016	2017	2018	Average	C-Average
Lithuania	0.714	0.672	0.653			0.679	
		0.672	0.653	0.725		0.683	0.684
			0.650	0.723	0.696	0.690	
Luxembourg	0.936	0.964	0.933			0.944	
		0.964	0.933	0.943		0.946	0.937
			0.930	0.940	0.893	0.921	
Mexico	1	1	1			1	
		1	1	1		1	1
			1	1	1	1	
Norway	0.613	0.602	0.591			0.602	
		0.607	0.600	0.596		0.601	0.602
			0.602	0.598	0.609	0.603	
Poland	0.844	0.843	0.816			0.834	
		0.855	0.828	0.839		0.841	0.840
			0.838	0.850	0.851	0.846	
Slovak Republic	0.623	0.640	0.622			0.628	
		0.640	0.622	0.658		0.640	0.637
			0.620	0.656	0.655	0.644	
Slovenia	0.902	0.918	0.805			0.875	
		0.926	0.816	0.780		0.841	0.841
			0.821	0.785	0.819	0.808	
Spain	0.880	0.878	0.856			0.871	
		0.886	0.864	0.838		0.863	0.859
			0.866	0.840	0.827	0.844	
Sweden	0.686	0.666	0.676			0.676	
		0.679	0.677	0.721		0.692	0.700
			0.677	0.717	0.801	0.732	
Switzerland	0.541	0.533	0.539			0.538	
		0.542	0.548	0.546		0.545	0.545
			0.553	0.551	0.554	0.553	
Turkey	1	1	0.996			0.999	
		1	1	0.992		0.997	0.999
			1	1	1	1	
United Kingdom	0.829	0.831	0.837			0.832	
		0.846	0.852	0.846		0.848	0.845
			0.858	0.852	0.849	0.853	
United States	0.800	0.799	0.799			0.800	
		0.814	0.815	0.802		0.810	0.808
			0.822	0.810	0.813	0.815	

As shown in Table 3; according to the results of the DEA window analysis, Germany, France, Norway, etc. failure of countries with high health outcomes to be effective may not be enough to qualify the health system of these countries as a failure. Although these countries produce high health output, their inputs are also high, so they are at the end of the efficiency scores ranking.

High input usage detected in inefficient countries is undesirable from the point of view of resource allocation. But when health efficiencies are examined, it is debatable which input and output variables should take precedence. States must provide their citizens with the highest quality health care. For this reason, more attention can be given to outputs or inputs can sometimes remain in the background. In health studies, input-oriented analyses are often recommended due to the difficulty of changing outputs. The input-oriented model is valuable in public institutions because it encourages savings. It can be said that this analysis is important to show that output can be achieved with less labor, capital, and medical supplies.

In countries with lower than average infant mortality rates from output variables (e.g. Japan, Slovenia, Estonia ext.) the high performance of the health system is in line with expectations. But some countries with a low-efficiency score (for example, Germany, Switzerland, Austria ext.) are the exception. Figure 1 shows the ranking of average scores (2014-2018), starting with the highest efficiency score.
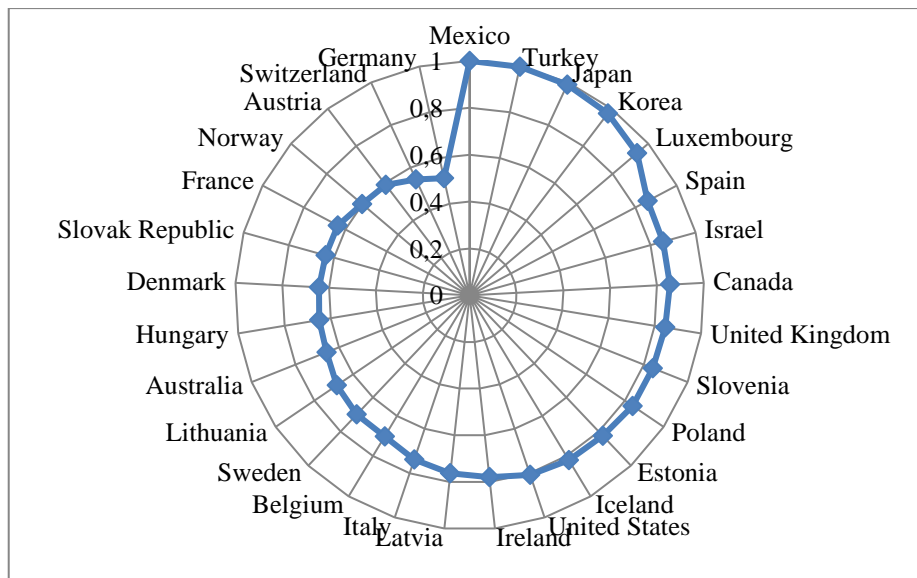

Figure 1. Ranking of DEA window average scores

When the windows in the analysis are examined (without taking into account efficiency score levels), there are some countries that are constantly increasing between periods. These countries are Estonia, France, Hungary, Israel, Lithuania, Poland, Slovak Republic, Sweden, Switzerland, UK, and US. Efficiency scores tend to increase from 2014-2016 to 2016-2018. Although some of these countries have below-average scores, it is positive that they record regular increases. When evaluating the rankings with average scores in Figure 1; the findings are valuable in terms of demonstrating the relative strengths and weaknesses of different OECD countries.

4. Discussion

DEA window analysis is often used in the banking, economy, energy, tourism, and healthcare sectors. Domestic and foreign literature is examined in the field of health and some of it is summarized below.

In a study that examined the level of efficiency of OECD countries in combating COVID-19, Italy, Spain, United States, Great Britain, Northern Ireland, and France were the countries with the lowest scores. Among the efficient countries, Slovakia, Mexico, and Iceland ranked in the top 3 in the CCR model [18]. The active presence of Mexico parallels this study.

In a study in which efficiency calculations were performed over two different models, output variables were determined as life expectancy and infant survival rate. According to the research results, countries that striving to improve their healthcare systems' efficiency should aim to impact population behavior and well-being rather than only ensure adequate medical care [6]. Life expectancy at birth (years) and infant mortality (deaths per 1000 live births) were determined as output variables in this study.

In another study, indicators of health resources were determined as a variable. Cluster and TOPSIS analyses were used. According to the findings, the countries most similar to Turkey are South

Korea, Mexico, and Poland. Also in the rankings are the US, Japan, and Canada at the top [19]. Similarly, Japan ranked high in this study with an average activity score of 0.99.

Asandului, Roman, and Fatulescu (2014) examined the health system of 30 European countries. In the analysis, the CRS efficiency average was 0.74 and 0.77 for VRS. According to the CRS, only 5 out of 30 countries (Bulgaria, Cyprus, Romania, UK, and Sweden) have been efficient. Countries with below-average efficiency scores are Germany, France, Lithuania, the Czech Republic, and Hungary [20]. In this study, the inefficiency of Germany and France is similar.

The study, written by Kocaman, Mutlu, Bayraktar, and Araz, (2012), measured the efficiency analysis of the health systems of OECD countries. In the study, 34 countries measured the efficiency of 34 countries' health systems using the DEA input-oriented CCR method. Of 34 countries, 29.4% (n=10) were technically efficient. Efficient countries were Turkey, Sweden, Estonia, Australia, Japan, Mexico, Luxembourg, Portugal, Slovenia, and Chile. The lowest is Austria's event score of 0.4093 [21]. Mexico, Turkey, Japan, and Luxembourg also found high efficiency in this study. Also in this study, Austria is at the bottom with an average efficiency score of 0.591. Close results were obtained.

DEA was used in another study that measured the regional effectiveness of healthcare facilities in Slovakia (2008-2015). The results of the analysis showed an indirect dependence between the values of the input-output variables over time and the results of the estimated efficiency in all regions [22]. In countries with high rates of health spending in GDP, it is not right to expect good performance from health systems. Effective use of health expenditures is required. Because the countries that allocate a high share to the Health System (USA, France, Sweden, Germany, Netherlands, etc.) are in the last group in efficiency scores [23]. Countries that produce high output with low inputs are also in the upper group in this study. The importance of using limited resources in the most efficient way is clear.

5. Conclusion

The aim of this study was to evaluate the efficiency of OECD member countries in their health systems. These countries have focused on stable economic development. They act for the same purposes. Special attention is given to health by the organization and member states are encouraged. The research provides a comparison of the health efficiencies of OECD countries with the latest published data. In the input and output variables determined, it is thought that it will contribute to the literature in terms of comparisons between countries.

In the analysis, country comparisons were used to determine the causes of inefficiency in health systems. Therefore, it is not possible to say that the countries that are efficient are the countries with the best health system. But based on the DMU comparison results in the model, it can be said that countries have relatively efficient health systems.

A study comparing the levels of efficiency in health care in 29 OECD member countries shows that some developed countries have low-efficiency scores. On the other hand, it has been found that countries such as Mexico and Turkey have higher health care efficiency scores. This is due to the fact that developing countries such as Turkey and Mexico have achieved similar outputs with fewer resources. Increasing the weight of the private sector in the financing and delivery of health services brings competition. It is of great importance that policymakers deploy resources and services in the most effective way.

For countries that are inefficient; objective determination of the goals that need to be achieved in burden assessments and health indicators can be recommended. In addition, resource allocation in health care needs to be done with scientific data. In subsequent studies, performance rankings, qualitative elements (resource use, organization, etc.) can participate in calculations. It may also be recommended to use output-oriented analyses. It is aimed that countries produce high health output with minimal input. But what policies can be implemented, each country must decide with its own internal dynamics.

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