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Expectations of Intensive Care Unit Nurses in Turkey Türkiye’de Yoğun Bakım Hemşirelerinin Beklentileri

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ABSTRACT Objective: This study was conducted as a descriptive study to investigate the problems and expectations of intensive care unit nurses in Turkey.

Materials and Methods: The study was conducted with the participation of 207 volunteer nurses working in different hospitals' various intensive care nurses symposium organized in cooperation with İstanbul Health Care Directorate and İstanbul University in 2010. In gathering data; a questionnaire consisting of 39 multiple choice questions was prepared in the light of literature by researchers in order to determine descriptive characteristics, opinions and experiences of intensive care nurses. The necessary permissions were taken before the research and informed consent was taken from all the participants. Statistical analyzes of the research data were made with NCSS (Number Cruncher Statistical System) 2007 package program. Descriptive statistical methods (frequency distributions) were used in evaluation of data.

Results: As a result of the research, for intensive care nurses; 78% of them work 40-50 hours per week on average, 52.2% of them should be in the form of post-graduate education for intensive care nursing. 52.5% of nurses said that they found the number of nurses working in their unit insufficient, 74.6% of nurses said that they did not find their salaries adequate and 57.5% of nurses said that employment security was not provided.

Conclusion: It is important that the expectations of the intensive care workers in terms of job satisfaction are reflected positively in physical and psychological care of critical patients. Thus effective and productive working environment will be provided in intensive care units.

Keywords: Intensive care units, nurses, expectation

ÖZ Amaç: Araştırma, yoğun bakım hemşirelerinin yaşadığı sorun ve beklentilerini incelemek amacıyla tanımlayıcı olarak yapılmıştır.

Gereç ve Yöntem: Çalışma, 2010 yılında İstanbul Sağlık Müdürlüğü ve İstanbul Üniversitesi işbirliği ile düzenlenen yoğun bakım hemşireleri sempozyumuna çeşitli hastanelerin bu ünitelerinde görev yapan gönüllü 207 hemşirenin katılımı ile yapılmıştır. Verilerin toplanmasında; araştırmacılar tarafından ilgili literatür ışığında hazırlanan, çalışanların tanıtıcı özellikleri, meslekle ilgili düşünce ve deneyimlerini belirlemeye yönelik 39 adet çoktan seçmeli sorudan oluşan anket formu kullanılmıştır. Araştırma öncesinde gerekli izinler alınmış, katılımcılardan onam alınmıştır. Araştırma verilerinin istatistiksel analizleri NCSS (Number Cruncher Statistical System) 2007 paket programı ile yapılmıştır. Verilerin değerlendirilmesinde tanımlayıcı istatistiksel metotlar (sıklık dağılımları) kullanılmıştır.

Bulgular: Araştırma sonucunda yoğun bakım hemşirelerinin; %78'i haftada ortalama 40-50 saat çalıştığını, %52,2'si hemşirelerin yoğun bakım eğitiminin lisans sonrası sertifika eğitimi şeklinde olması gerektiğini, %52,5'i ünitelerde çalışan hemşire sayısını yetersiz bulduklarını, %74,6'sı maaşını yeterli bulmadığını, %57,5'i iş güvenliklerinin sağlanmadıklarını belirtmişlerdir.

Sonuç: Yoğun bakım çalışanlarının iş doyum ve mesleki tatmini açısından beklentilerinin karşılanması kritik hastaların fiziksel ve psikolojik bakımına olumlu yansıtacağından önemlidir. Böylece yoğun bakım ünitelerinde etkin ve verimli çalışma ortamı sağlanmış olur.

Anahtar Kelimeler: Yoğun bakım ünitesi, hemşire, beklenti

Introduction

Health care staff in intensive care units (ICUs) are always exposed to stress and work pressure since patients are critically ill, since highly sophisticated technological devices are used and since health care staff have to communicate and make decisions under hurried conditions there. The International Labor Organization (ILO) have listed main stressors at workplaces as in the following: conflicts with administrators, role confusions and uncertainty, heavy workload, emotional stress due to working with patients, working with patients needing intensive care and being likely to die, conflicts with patients and working in shifts (1). Lack of job descriptions, staff and material shortages and inappropriate physical environments in addition to above-mentioned stressors have a negative effect on psychology and relationships of intensive care staff. Demographic features of staff (education, marital status, physical and psychological illnesses and having children) all affect perceived stress. It has been shown that sources of stress vary with workplaces and that severe, long-term stress causes a wide variety of physical and psychological changes in working people (2).

In Turkey, there are not any regulations about efficient and productive use of workforce. In addition, there are many problems concerning work environments, working hours, resting time, wages, occupational health and work safety. This study was directed towards investigating problems and experiences in a Turkish context of ICU nurses.

Materials and Methods

Aim

This study was carried out to reveal problems and experiences of ICU nurses in Turkey.

Study Design

The study has a descriptive design.

Sample/participants

This study was performed on intensive care nurses joining a symposium arranged by Istanbul Health Care Directorate and Istanbul University in 2010 and working in ICUs of several hospitals. The study population included 226 nurses. The study sample was composed of 207 nurses accepting to participate in the study.

Data Collection

The participants completing the questionnaire prepared by the researcher in light of the relevant literature. The questionnaire comprised of 39 multiple choice questions

about descriptive characteristics and opinions and experiences of the nurses concerning their occupation. Before the symposium, the aim of the study was explained to the nurses and the questionnaire was distributed to those giving informed consent by the researchers. After the participants filled in the questionnaires, they were collected by the researchers.

Ethical Considerations

The study purpose and potential subject's right to decline participation were explained to all individual who were interviewed. All participants provided oral informed consent. A written permission was obtained from Istanbul Health Care Directorate.

Data Analysis

Obtained data were analyzed with Number Cruncher Statistical System 2007 and evaluated with descriptive statistics, mainly with frequencies.

Results

Two hundred and seven nurses working in ICUs of hospitals of the Turkish Ministry of Health, university hospitals and private hospitals participated in the study.

Of all the participants, 61.8% (n=128) worked at hospitals of the Turkish Ministry of Health, 26.6% (n=55) in private hospitals and 11.6% (n=24) at university hospitals. Forty-nine point three percent of the participants (n=102) worked in general ICUs, 23.6% (n=49) in internal medicine ICUs, 15% (n=31) in surgical ICUs and 12.1% (n=25) in neonatal ICUs (Table 1).

Of all the nurses, 87% (n=180) were female, 38.7% (n=80) were aged 26-30 years, 58% (n=120) were university graduates and 68.1% (n=141) had work experience of 1-5 years in ICUs (Table 2).

Of all the nurses, 87% (n=180) lived in their homes, 57% (n=114) used mass transportation, 74.6% (n=153) did not find their salary sufficient and 77% (n=154) were not a member of a nursing association (Table 3).

Ninety point three percent of the nurses (n=186) worked in ICUs willingly. Seventy-eight percent of the nurses (n=160) worked for 40-50 hours weekly on average. Seventy-nine percent of the nurses (n=162) had a job description. Seventy-three point nine percent of the nurses (n=153) had to fulfil work which the physicians were responsible for. Fifty-two point five percent of the nurses (n=109) found the number of nursing staff insufficient. Fifty-seven point five percent of the nurses (n=115) reported that they had no safety (Table 4).

Fifty-six point five percent of the nurses (n=117) did not attend a certificate program for intensive care nursing. Fifty-

two point two percent of the nurses (n=108) were in favor of the idea that education for intensive care nursing should be offered through certificate programs after undergraduate nursing education. Seventy-six point four percent of the nurses (n=152) did not follow the literature about intensive care nursing, but 58.5% of the nurses (n=120) attended scientific meetings. Thirty-nine point six percent of the

nurses (n=78) were exposed to an autocratic management approach and 44.7% of the nurses (n=92) reported to experience sharing and harmony partially at their workplaces. Thirty-nine point one percent of the nurses (n=79) said the administration appreciated their achievements (Table 5).

Of all the nurses, 72.4% (n=150) had low back pain, 68.1% (n=141) had headaches, 30.9% (n=164) had stomach ache, 10.63% (n=22) had varices, 4.83% (n=10) had foot pain and 0.9% (n=2) had back pain (Table 6).

The reasons why the nurses wanted to quit their job in ICUs were reported to be understaffing by 48.7% of the nurses (n=101), working hours by 43.9% of the nurses (n=91), low salaries by 31.8% of the nurses (n=66) and workload by 0.9% of the nurses (n=2) (Table 7).

Table 1. The distribution of the intensive care nurses by hospitals and intensive care units (n=207)

Hospitals and ICUs		n	%
Hospitals	Hospitals of the Turkish Ministry of Health	128	61.8
	University hospitals	24	11.6
	Private hospitals	55	26.6
ICUs	Reanimation	102	49.3
	Internal medicine	49	23.6
	Surgical	31	15
	Neonatal	25	12.1

ICU: Intensive care unit

Table 2. Descriptive characteristics of the intensive care nurses (n=207)

Characteristics	n	%
Gender		
Female	180	87
Male	27	13
Age		
20-25 years	66	31.9
26-30 years	80	38.7
31-35 years	46	22.2
36 years and older	15	7.2
Education		
High school	39	18.8
Two-year university program	38	18.4
University	120	58.0
Master of science	10	4.8
Duration of work experience in ICUs		
1- 5 years	141	68.1
6-10 years	45	21.7
11-15 years	18	8.7
>15 years	3	1.5

ICU: Intensive care unit

Discussion

In the present study, the intensive care nurses were found to perform work for which other ICU staff is responsible in addition to fulfilling their own responsibilities. In fact, 67.1% of the nurses performed secretarial work, 73.9% fulfilled responsibilities of physicians, 34.8% carried out laboratory work and 9.7% performed work of cleaning staff. However, 79% of the nurses had a job description. Kivanç et al. (3) in their study on intensive care nurses reported that 74.4% of the nurses performed work for which they actually were not responsible. They noted that 61.8%, 52.9% and 42.2% of the nurses performed work of physicians, cleaning staff

Table 3. Social status of the intensive care nurses (n=207)

Social status		n	%
Accommodation	Home	180	87
	Apartment provided by employers	26	12.5
	Staying with a relative	1	0.5
Types of travel to work (n=200)	Shuttles provided by employers	10	5
	Mass transportation	114	57
	Driving by one's own car	25	12.5
	On foot	51	25.5
Considering salary sufficient (n=205)	Yes	4	2
	No	153	74.6
	Partly yes	48	23.4
Member of a nursing association (n=200)	Yes	46	23
	No	154	77

and secretaries respectively. In a study on midwives and nurses from all parts of Turkey, 75.4% of the participants commented that they had to carry out work which members of other occupations were supposed to do and that the most important factor with a negative effect on their working conditions was unclear job descriptions of health staff (4). In the latest statute issued in the Turkish official newspaper on 19 April 2011, work, responsibilities and authorities of nurses for each unit/ward/department/field of nursing were described. In developing countries, nurses are held responsible for carrying out functions of other occupations like medical secretary, physiotherapist, dietician, social worker and laboratory technician in addition to patient care services. This may cause some conflicts between members of different occupations. However, if members of each occupation fulfill their own responsibilities, carry out their own work and use their own authorities, unnecessary conflicts can be eliminated and workload can be reduced.

In the current study, 74.6% of the nurses considered their salaries insufficient. In a study on nurses and midwives from different parts of Turkey, 58.1% of the participants said

they did not get the salary they deserved (4). In a study by Şentürk (5), 32.1% and 50.9% of the nurses found their salary adequate and partly adequate respectively. In a study by Tunçel et al. (6), 17.1% of the intensive care nurses found their salary insufficient and 82.9% of the intensive

Working conditions		n	%
Working in ICUs willingly (n=206)	Yes	186	90.3
	No	20	9.7
Weekly working hours (n=205)	Fewer than 40 hours	5	2.5
	40-50 hours	160	78.0
	51-60 hours	40	19.5
Having a job description (n=205)	Yes	162	79.0
	No	43	21.0
Fulfilling responsibilities of other staff ^a	Secretary	139	67.1
	Physician	153	73.9
	Laboratorian	72	34.8
	Cleaning staff	20	9.7
	Physiotherapist	4	1.9
Staffing	Sufficient	39	18.9
	Partly sufficient	59	28.6
	Insufficient	109	52.5
Provision of work safety (n=200)	Yes	85	42.5
	No	115	57.5

^aMore than one option was marked. ICU: Intensive care unit

Table 5. Opinions of the intensive care nurses about education and administration of their workplaces (n=207)

Opinions about education and administration		n	%
Attending a certificate program	Yes	90	43.5
	No	117	56.5
Education for intensive care nursing	Incorporation into undergraduate nursing education	74	35.7
	Incorporation into master of science programs	25	12.1
	Certification programs following undergraduate nursing education	108	52.2
Following the literature about intensive care nursing (n=199)	Yes	47	23.6
	No	152	76.4
Attending scientific meetings (n=205)	Yes	120	58.5
	No	85	41.5
Type of management (n=197)	Autocratic	78	39.6
	Democratic	48	24.4
	Participatory management approach	71	36.0
Sharing and harmony between team members (n=206)	Yes	86	41.7
	No	28	13.6
	Partly yes	92	44.7
Administration's appreciation of staff achievements (n=202)	Yes	79	39.1
	No	60	29.7
	Partly yes	63	31.2

Table 6. Health problems frequently experienced by the intensive care nurses (n=207)

Health problems ^a	n	%
Headache	141	68.1
Low back pain	150	72.4
Stomach ache	64	30.9
Varices	22	10.63
Foot pain	10	4.83
Back pain	2	0.9

^aMore than one option was marked.

care nurses found their salary partly sufficient. In a study by Durak and Serinkan (7) on intensive care nurses from Denizli, Turkey, 66.7% of the nurses reported that their monthly income was equal to their monthly expenses and 15.4% of the nurses reported that their monthly income was lower than their monthly expenses. However, in a study by Cortese (8) on intensive care nurses from Italy, 79.5% of the nurses were satisfied with their salary. Lliopoulou and While (9) reported that only 10% of the intensive care nurses in Greece were content with their salary. In a study by Pietersen (10) on nurses in South Africa, 79% of the nurses said they got a salary lower than they deserved. In a study by Aiken et al. (11) on nurses from 12 European countries, 80% of the nurses from Sweden, 78% of the nurses from Norway, 74% of the nurses from Ireland, 46% of the nurses from England and 34% of the nurses from Switzerland were happy with their income. Rises in salaries of nurses working in ICUs, where 24-hour care services are provided, advanced knowledge and technology are needed, great devotion and sacrifice are required and severe stress is experienced, will allow long-term employment of the nurses and will create high job satisfaction and high quality care offered by the nurses with good qualifications.

In the present study, 78% of the participants worked for 40-50 hours per week and 19.5% of the participants worked for 51-60 hours per week. Durak and Serinkan (7) revealed that 51.3% of the nurses worked for 40-50 hours weekly and that 41% of the nurses worked for 40 hours weekly. In a study by Özalın and Nehir (12) in Ankara, Turkey, 34.1% of the nurses worked for 40-45 hours a week and 60.6% of the nurses worked for 46-60 hours a week. Şentürk (5) showed that 81.1% and 18.9% of the nurses worked for 40-45 hours and 46 hours and more a week respectively. A study by Sevinç et al. (13) on intensive care nurses in university hospital and private hospitals indicated that 38.2%, 52.1% and 9.7% of the nurses worked for 40 hours, 41-48 hours and more than 48 hours a week respectively. Studies on nurses from other countries showed fewer weekly working hours. Holland et al. (14) from Australia reported that the nurses worked for 36 hours a week on average. In an extensive study by Wu et al.

(15) on nurses from the U.S., Japan and Taiwan, 58% of the American nurses, 23% of the Japanese nurses and 16.4% of the Taiwanese nurses worked for fewer than 40 hours a week. Working hours of nurses in Turkey are described in the civil servant law 657 and the labor law 4587. According to the civil servant law 657, it is obligatory to work for 40 hours a week. General Health Insurance requires working 45 hours a week. In many developed countries, nurses work for 36 hours a week on average. However, it seems impossible to shorten working hours in Turkey, where the number of nurses is not as high as that of developed countries.

In this study, 52.5% of the nurses did not consider the number of ICU nurses sufficient and 28.6% of the nurses considered it partly sufficient. In a study by Kivanç et al. (3), 78.6% of the nurses noted that the number of nurses working in their unit was insufficient. In a study by Bahçecik and Koca Kutlu (16) on intensive care nurses, 74.3% of the nurses reported understaffing in the ICUs. In the present study, of all the nurses wanting to quit their job in the unit, 48.7% mentioned understaffing, 43.9% mentioned working hours and 31.8% mentioned low income as reasons for their leave. In a study by Yıldız and Kanan (17), 43.1% of the intensive care nurses were not satisfied with their unit due to heavy workload. In a study on midwives and nurses from all parts of Turkey, the most frequently reported factor affecting working conditions was heavy working conditions at the rate of 27.8%, followed by problems with the administration at the rate of 14.7% and inability to specialize in a nursing discipline at the rate of 14.2% (4). Akyüz (18) in a study on nurses in Trabzon, Turkey, reported the most frequent reason for lack of job satisfaction to be problems with working schedules at the rate of 48.8%. It was followed by communication problems reported by 30.5% of the nurses, inappropriate physical conditions reported by 29.3% of the nurses, financial insufficiency reported by 17.1% of the nurses, lack of social facilities reported by 13.4% of the nurses and lack of job satisfaction reported by 12.2% of the nurses. In a study by Kılıç and Keklik (19) on health professionals, 46.2% of whom were nurses and midwives, the leading factor preventing job satisfaction was found to be low wages, followed by physical conditions, working hours and relationships with administrators and colleagues. In a study by Pietersen (10) including nurses in South Africa, rises in salaries, improvements in working conditions and increases in nursing staff size were found to increase job satisfaction in 60%, 15% and 14% of the nurses respectively. As in other parts of the world, nursing staff shortages are a serious problem in Turkey (8,10,20-22). According to health statistics issued by the Organization of Economic Cooperation and Development (OECD) in 2013,

Table 7. Reasons why the nurses wanted to quit their job in intensive care units (n=207)

Reasons for quitting a job in ICUs ^a	n	%
Low salary	66	31.8
Working hours	91	43.9
Understaffing	101	48.7
Workload	2	0.9

^aMore than one option was marked. ICU: Intensive care unit

the number of nurses per 1000 people is 19.94 in Norway, 15.45 in Iceland, 12.8 in Australia, 11.14 in the United States, 10.64 in Canada and 9.39 in Canada. In Turkey, it was the lowest at the ratio of 1.83/1000 (23). Understaffing in ICUs which have heavy workloads and severe work stress worsens working conditions, which will have a negative effect on occupational and social communications.

In the current study, 13.6% of the participants said there was no sharing and harmony and 44.7% of the participants said there was not complete sharing and harmony. In Bahçecik and Koca Kutlu's (16) study, 59% of the nurses considered their relationship with their colleagues as good. In Lliopulou and While's (9) study, 12% of the participants said they were satisfied with their relationships with the administrators and their colleagues. In Cortese's (8) study on Italian intensive care nurses, 63% and 34.6% of the participants were happy with their relationships with nurses and physicians respectively. In Wyatt and Harrison's (20) study on American pediatric intensive care nurses, 82% and 68.9% of the participants said that their relationships with their colleagues and administrators contributed to their job satisfaction respectively. Positive interactions, sharing and relationships between staff in ICUs will strengthen their sense of belonging to the unit and increase their motivation. Social activities organized in or outside the unit at certain intervals, meetings held to solve problems and projects performed together can contribute to creation of positive relationships.

In the present study, 58.5% of the participants were found to attend scientific meetings and 23.6% of the participants were found to follow the literature about intensive care. In Taşkın Yılmaz et al.'s (24) study on nurses and midwives in İstanbul, 62% of the nurses reported to attend socio-cultural activities about their occupations. In Korkmaz and Görgülü's (25) study on nurses at Ankara University Hospital, 58.9% of the nurses attended occupational courses and seminars and 31.1% of the nurses sometimes attended them. In a study by Kelleci et al. (26) on nurses in a university hospital in Sivas, Turkey, 78.9% of the participants took part in scientific meetings and 11.4% of the participants followed the literature regularly. Administrative support for intensive care nurses to attend scientific meetings and to follow the literature will help update their knowledge and thus improve patient care and job satisfaction.

In this study, 90.3% of the participants reported that they worked in the ICUs willingly. In Yıldız and Kanan's (17) study, 67.9% of the intensive care nurses worked in ICUs of their own accord and 50.9% of the intensive care nurses were satisfied with the unit they worked in. In Yıldız and Birgili's (27) study on intensive care nurses in Muğla, Turkey,

53.3% of the nurses worked in ICUs willingly, but 46.7% worked in ICUs since they were appointed by the hospital administration. In Şentürk's (5) study, 67.9% of the intensive care nurses worked in ICUs of their own accord. In Özalın and Nehir's (12) study, 34.6% of the intensive care nurses reported to work in ICUs voluntarily. In Cortese's (8) study on intensive care nurses in Italy, 41.8% and 21.9% of the nurses wanted to quit working in the unit and at hospital respectively and 14.6% wanted to quit working as a nurse. In Heinen et al. (28) study including nurses from 10 European countries, 33% of the nurses wanted to quit working at hospital and 9% of the nurses did not want to work as a nurse any more. A considerable rate of nurses is not satisfied with their job. It may be due to such problems as lack of job satisfaction, heavy workload and lack of autonomy. Such problems may cause nurses to work in hospitals and even stop working as a nurse.

In the present study, 39.6% and 24.4% of the nurses mentioned the presence of autocratic and democratic management styles in their units respectively. Thirty-nine point one percent of the nurses noted that administrators appreciated achievements of the employees. In a study by Bahçecik and Koca Kutlu (16) 32.4% of the intensive care nurses told to be appreciated in their unit. Avcı et al. (29) performed a study on intensive care nurses and palliative care nurses to determine recommendations directed towards improvement of nursing care and motivation among nurses and obtained recommendations about attitudes of the administrators towards problem solving from 32.2% of the nurses. Among these recommendations were impartial and fair treatment, taking account of performance, support for staff, rewarding, not transferring the staff without their consent, valuing staff and asking about their opinions. In a study by Kivanç (30) intensive care nurses were found to expect satisfactory and fair income, fair promotion, good working conditions, job guarantee and safety, provision of advancement opportunities in career and professional development opportunities, appreciation of achievements, tolerance for personal problems, democratic management style, on the job training and in-service training. The most frequently reported expectations were satisfactory payment, arrangement of working hours, an increase in yearly work leaves, elimination of staff shortages, being respected and valued. Consistent with the present study, it is obvious in the literature that democratic and participatory management styles and appreciation of achievements can increase motivation of intensive care staff.

In the current study, 42.5% of the participants reported to have work safety, but 57.5% of the participants reported not to have work safety. In a study on nurses and midwives

from different parts of Turkey, 25.6% of the participants found precautions against infections insufficient and 37.5% of the participants found them partially sufficient (4). In the present study, the health problems frequently experienced by the intensive care nurses were found to be low back pain (72.4%), headache (68.1%), stomachache (30.9%), varices (10.63%), foot ache (4.83%) and back pain (0.9%). In Kivanç's (30) study, the participants were found to experience pain in the low back, neck and back (65%), joint pain (9%), headache (5%), stomach ache (2%), upper respiratory tract infections (59%), stress (30%), tiredness (14%), varices (12%), sleeplessness (11%), allergies (8%) and hepatitis (6%).

Conclusion

To conclude, nurses in ICUs, where there are naturally a lot of stressors, can have lower rates of job satisfaction than in those in other units. Factors affecting motivation in ICUs are insufficient physical conditions, heavy loads of the roles, uncertainty in roles, insufficient payment, communication between team members and management styles. Working in an environment where staff has equal rights and gets involved in decisions, achievements are appreciated, sense of belonging is strengthened, democratic and participatory management style is adopted and payment and working hours are improved will increase motivation and job satisfaction. The goal of hospitals is to have staff who can give excellent care and has high performance. This is especially important for ICUs. It will not be right to expect staff with poor performance to offer high quality care. It is necessary for administrators to fulfill expectations

of staff to increase their performance. Therefore, they should investigate expectations of staff in ICUs through questionnaires at certain intervals to solve their problems. Improvement of working conditions (arrangement of working hours and breaks, sufficient payment, occupational health and employment of a sufficient number of staff etc.) will increase motivation. If staff in ICUs is allowed to work in other departments at certain intervals, their willingness to work can be increased. It is important to fulfill staff expectations so that their job satisfaction can be increased and so that physical and psychological care for critically ill patients can be improved. This will create an efficient and productive working environment in ICUs.

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Ethics

Ethics Committee Approval: A written permission was obtained from Istanbul Health Care Directorate.

Informed Consent: All participants provided oral informed consent.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Concept: S.T.E., M.M.K., Design: S.T.E., M.M.K., Data Collection or Processing: S.T.E., M.M.K., Analysis or Interpretation: S.T.E., M.M.K., Literature Search: S.T.E., M.M.K., Writing: S.T.E., M.M.K.

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