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RESEARCH ARTICLE

DETERMINING THE KNOWLEDGE OF NURSES WORKING IN THE TURKISH REPUBLIC OF NORTHERN CYPRUS ON PERIOPERATIVE PERIOD ENHANCED RECOVERY AFTER SURGERY (ERAS) PROTOCOLS: A QUANTITATIVE DESCRIPTIVE STUDY

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ABSTRACT

Purpose: The aim of this study is to determine the knowledge level of nurses working in surgical clinics about perioperative period (ERAS) protocols.
Material and Methods: This descriptive research design completed between March and June 2021. The population of the study consisted of 126 nurses working in the surgical clinics of a State hospital in Northern Cyprus. The study was completed with 93 nurses who volunteered to participate in the study. The data were evaluated by accepting the significance level of $p<0.05$ at the 95% confidence interval.
Results: 47.3% of the nurses who participated in the study were 38 years and older, 81.7% were women, 58.1% had undergraduate education, 72% did not receive training on ERAS, and 73.1% of the nurses reported that it was beneficial to apply the ERAS protocol. The general average score of the nurses was determined as 54.67±21.50.
Conclusion: It was determined that the majority of the nurses did not know the ERAS protocol, that the ERAS protocol applications were not included in the clinic where they worked, and they had moderate knowledge. According to these results, it can be suggested that nurses should follow current developments and evidence-based guidelines on the ERAS protocol.

Keywords: Enhanced recovery after surgery, ERAS, knowledge, nursing, perioperative care

INTRODUCTION

Enhanced Recovery After Surgery (ERAS) is a term that includes the perioperative care (pre-, intra-, and post-operative) period, used with evidence-based multidisciplinary, multimodal applications to accelerate functional recovery and optimize postoperative results (1, 2, 3, 4). This term is also called Fast Track Surgery (FTS) in the United States (USA) (5, 6). Danish Prof. Henrik Kehlet is known as a pioneer in the development of these protocols. Fearon and Ljunqvist; focused on accelerating postoperative recovery and reducing complications by modifying the metabolic response to surgical stress in 2001 with a team from Northern European countries such as the Netherlands, Scotland, Sweden, and Norway (6, 7, 8).

The ERAS team was named "ERAS Association (Enhanced Recovery After Surgery Society for Perioperative Care)" in 2010. The main philosophy of the protocol is; to reduce the metabolic stress caused by surgical trauma, to return physiological functions to normal as soon as possible, to provide early mobilization, and to accelerate the return of patients to daily life activities (9, 10). In Turkey, the first foundations were laid at the National Surgery Congress organized by surgeons and anesthesiologists in 2006, and ERAS Turkey Association started its official activities on March 15, 2017 (11). ERAS protocols were first applied for colorectal surgery. Later, protocols were developed for patients who underwent gynecology/oncology, heart/lung surgery, urology, and other gastrointestinal surgery (stomach, pancreas, hepatobiliary, bariatric, pelvic/rectal) (1, 5).

The headliners of the ERAS team are physicians, nurses, dieticians, physiotherapists, and social workers (1, 5). Surgical nurses are expected to adapt to ERAS protocols, which is an up-to-date and evidence-based approach, as they take an active role in all stages of the perioperative period. ERAS protocols are a model consisting of practices that include the dependent and independent roles of nurses (7, 12). With traditional applications, patients had to stay in the hospital long time. Due to the negative impact of this situation on the healing process, evidence-based ERAS protocols have been established that aim to reduce the problems and/or complications that may occur after surgery (13).

The main point that surgical nurses should focus on in ERAS protocols is; Due to the shortening of the hospitalization period of the patients, patient education should be included, including the discharge period. Because the protocols include applications covering the entire journey of a patient, which starts in the outpatient clinic in the preoperative period and ends at home with discharge (1). In this context, surgical nurses should closely follow current and evidence-based new developments (5, 14, 15).

The aim of the study is to determine the knowledge of perioperative period enhanced recovery after surgery (ERAS) protocols among nurses.

Research Questions

1) Is the nurses' level of knowledge about the descriptive features and perioperative period Enhanced Recovery After Surgery (ERAS) protocols sufficient?
2) What is the total knowledge score of nurses regarding the perioperative period Enhanced Recovery After Surgery (ERAS) protocols?

MATERIAL AND METHODS

The quantitative descriptive design research was conducted between March 04 / June 28 2021. The population of the study consisted of nurses working in the surgical clinics of a State Hospital affiliated with the Ministry of Health of Northern Cyprus.

The study population consisted of 126 nurses at the state hospital between 04 March and 28 June 2021. No sample selection method was used. 33 nurses who did not accept to participate in the study, who were on leave at the time of data collection, and who filled out the questionnaire incompletely were excluded from the study, so the study was completed with 93 nurses who volunteered to participate in the study.

Data Collection Tools

The data were collected with the data collection form created by the researchers in line with the literature (2, 5, 7, 11, 16). The forms consists of two parts.

Nurse Identification Form: This form was composed of 10 questions about the descriptive characteristics of nurses (age, gender, educational status, duration of clinical experience, educational status about ERAS protocols, information resources on ERAS Protocols, usefulness of ERAS Protocols, etc.).

Knowledge Level Form of ERAS Protocols: This form was composed of 20 questions to determine the nurses level of knowledge about ERAS protocols. The Knowledge Level Form of ERAS Protocols consists of three sub-dimensions covering

Table 1. The mean knowledge level of nurses working in surgical clinics about ERAS protocols (N=93)

Sub-Dimensions	Mean±SD	Minimum	Maximum
Preoperative period	25.75±9.38	0	45
Intraoperative period	13.54±7.82	0	25
Postoperative period	15.37±10.00	0	30
General total	54.67±21.50	0	100

SD: *Standard Deviation*

preoperative, intraoperative and postoperative period. Questions from 1 to 9 are about the Preoperative period, from 10 to 14 about Intraoperative, and questions from 15 to 20 are about the Postoperative period. In the Knowledge Level Form of ERAS Protocols, each question answered correctly was evaluated with 5 points, a total of 100 points, and wrong answers and no idea answers were evaluated over 0 points. Each correct answer indicates that the knowledge level of nurses increases. The sub-dimensions of the Knowledge Level Form of ERAS Protocols constitute the lowest and highest scores within themselves. Nurses in the preoperative period will be able to get the highest score of 45, the highest score of 25 in the intraoperative period, and the highest 30 in the postoperative period. In order to evaluate the information form in terms of subject scope adequacy, expert opinion was obtained from 5 faculty members and the final form was formed.

Data Collection

The data were collected by giving verbal information about the research during the resting hours of the nurses after all necessary permissions were obtained for the research. The data collection forms filled by the nurses in the company of the researchers were given to the researcher immediately after they were completed to prevent nurses from interacting with each other. Nurses were expected to answer the knowledge level questions about ERAS by ticking one of the options "True", "False" or "No idea". Data collection took an average of 15 minutes.

Pilot Study

In order to determine the intelligibility of the questions in the data form, a pilot study was conducted with 12 nurses, 10% of the population. After the pilot study, no revision was necessary, and the nurses who took part in the pilot study were included in the main sample.

Ethical Approval

For the research to be implemented, written consents were obtained from the Ministry of Health of Northern Cyprus State Hospital Ethics Committee (Date: 07.05.2021, No: 27/21). Before filling out the data collection forms, the necessary explanations were made for the nurses to protect their rights, and their written and verbal consent was obtained with the "Informed Consent Form".

Statistical Analysis

Statistical analyzes were performed using the Statistical Package for the Social Sciences (SPSS) 26.0 software. Descriptive statistics, Kolmogorov Smirnov Z, Independent samples T, Mann Whitney U, and Kruskal Wallis H tests were used to evaluate the data. The data were evaluated and interpreted at the 95% confidence interval, at the $p<0.05$ significance level.

RESULTS

47.3% of the nurses participating in the research are 38 years old and above, 81.7% are women, 58.1% are undergraduate. 25.8% of the nurses gained their professional experience in the general intensive care unit. Nurses who worked for 5-9 years and 20 years or more participated in the study at the highest rate of 26.9%. Nurses working in the general intensive care unit participated in the study at the highest rate of 25.8%. 72% of the nurses reported that they did not receive training on ERAS and did not use information sources about ERAS. 35.5% of the nurses stated that they had no idea about the implementation of the ERAS protocol in the institution they work, and 73.1% of the nurses stated that ERAS protocols were beneficial.

The mean ERAS knowledge level of the nurses (N=93) who participated in the study is given in Table 1. Accordingly, the general average score of the nurses was determined as 54.67±21.50. Nurses had a general mean score of 25.75±9.35 preoperative,

Table 2. Distribution of the responses of nurses working in surgical clinics about ERAS protocols (N=93)

NO	Perioperative Period	Answers	True		False		Not Idea	
			n	%	n	%	N	%
1.	According to ERAS protocols, patient education reduces the patient's need for analgesics.	**T**	57	61.3	8	8.6	28	30.1
2.	Smoking should be stopped eight weeks before the operation.	**T**	62	66.7	16	17.2	23	24.7
3.	Before surgery, patients can be fed with solid foods for up to two hours.	**F**	5	5.4	83	89.2	5	5.4
4.	Antibiotic prophylaxis should be applied 30-60 minutes before surgery.	**T**	54	58.1	16	17.2	23	24.7
5.	Mechanical bowel cleansing should not be routinely performed in elective colon surgery.	**T**	26	28.0	58	62.4	9	9.7
6.	Informing the patient in the preoperative period increases the patient's fear and anxiety about the operation.	**F**	14	15.1	75	80.6	4	4.3
7.	To create metabolic satiety, carbohydrate-rich liquid/food should be given before the surgery.	**T**	24	25.8	39	41.9	30	32.3
8.	According to ERAS protocols, low molecular weight heparin (LMWH) should be administered to prevent deep vein thrombosis (DVT).	**T**	43	46.2	16	17.2	34	36.6
9.	According to ERAS protocols, the body temperature should be below 36°C before surgery.	**F**	17	13.8	55	59.1	21	22.6
10.	During the intraoperative period, the patient's normal body temperature should be maintained with heated intravenous infusions and external warmers.	**T**	55	59.1	10	10.8	28	30.1
11.	According to ERAS protocols, short-acting anesthetics that shorten the recovery time from anesthesia should be used.	**T**	38	40.9	17	18.3	38	40.9
12.	All patients should routinely be fitted with a drain during surgery.	**F**	8	8.6	73	78.5	12	12.9
13.	Combined antiemetics should be used to prevent vomiting during the intraoperative period.	**T**	52	55.9	18	19.4	23	24.7
14.	Vasopressor agents should be used to prevent hypotension due to intraoperative epidural anesthesia.	**T**	34	36.6	18	19.4	41	44.1
15.	With the implementation of ERAS protocols, the use of postoperative analgesics is increasing.	**F**	12	12.9	49	52.7	32	34.4
16.	With the application of ERAS protocols, gas removal occurs in the earlier period after surgery.	**T**	49	52.7	10	10.8	34	36.6
17.	With the application of ERAS protocols, postoperative wound infection is less common.	**T**	57	61.3	9	9.7	27	29.0
18.	The implementation of ERAS protocols increases the postoperative hospital stay.	**F**	8	8.6	63	67.7	22	23.7
19.	According to ERAS protocols, patients should be mobilized by keeping them out of bed for two hours on the day of surgery and six hours until discharge.	**T**	37	39.8	16	17.2	40	43.0
20.	According to ERAS protocols, opioid analgesics should be used routinely in the postoperative period.	**F**	25	26.9	31	33.3	37	39.8

Note: T: *True,* ***F:*** *False*

13.54±7.82 intraoperative, and 15.37±10.00 for the postoperative period, respectively (Table 1).

Table 2 gives the correct and incorrect response rates given by nurses to knowledge level questions about ERAS. It was found that three questions answered correctly by the nurses at the highest level are (1) 'Patients can be fed with solid foods for up to two hours before surgery (89.2%), (2) 'Informing the patient in the pre-operative period increases the patient's fear and anxiety about the surgery (80.6%), and (3) 'a drain should be routinely inserted in all patients during surgery (78.5%). It was determined that among the three questions that were answered least correctly are, (1) 'Carbohydrate-rich liquid/food

Table 3. Comparison of the descriptive characteristics of nurses working in surgical clinics and their knowledge level averages about ERAS protocols (N=93)

Descriptive Characteristics	General Total (Avg±SD)	Preoperative period (Avg±SD)	Intraoperative Period (Avg±SD)	Postoperative period (Avg±SD)
Age				
23-27	43.00±31.93	16.00±10.83	10.00±9.35	17.00±13.03
28-32	57.25±23.08	25.50±9.16	15.75±7.48	16.00±9.81
33-37	48.54±17.53	23.75±8.37	12.29±7.22	12.50±10.52
38 and above	58.18±21.02	28.06±9.16	13.63±8.09	16.47±9.49
p	.250	.115	.155	.437
Gender				
Female	53.75±21.52	25.32±9.46	13.09±7.83	15.32±10.30
Male	58.82±21.54	27.64±9.03	15.58±7.68	15.58±8.81
p	.391	.323	.230	.996
Educational status				
High school	55.00±21.32	27.08±9.40	12.91±8.10	15.00±10.66
Undergraduate	54.25±20.40	25.27±9.13	13.98±7.73	15.00±9.41
Graduate	55.37±24.37	26.11±10.12	12.96±8.11	16.29±11.14
p	.967	.733	.829	.797
Clinical experience gained				
GICU	53.54±22.13	24.37±10.76	14.58±8.83	14.58±9.43
Surgical service	53.46±20.55	27.69±8.06	12.30±7.25	13.46±9.65
Emergency	56.25±25.31	22.50±10.35	14.37±8.21	19.37±9.79
Surgery	66.17±20.57	30.88±8.88	17.05±6.85	18.23±10.44
CVSICU	54.58±22.80	24.16±6.33	13.75±8.56	16.66±11.34
Orthopedic service Cardiology service	45.62±16.13	25.62±9.42	8.75±3.53	11.25±11.57
p	46.36±21.50	22.72±9.04	10.00±7.07	13.63±8.68
Years of profession in Nursing	.300	.275	.170	.477
0-4 years	57.14±16.54	24.28±6.07	12.85±6.36	20.00±9.12
5-9 years	55.00±25.73	24.00±10.60	15.00±7.90	16.00±10.40
10-14 years	47.14±16.37	23.57±8.41	11.78±8.68	11.78±8.90
15-19 years	52.27±21.02	26.13±9.62	12.04±8.26	14.09±10.42
20 years and above	60.00±20.96	28.80±8.93	14.60±7.34	16.60±9.97
p	.403	.380	.562	.363
Currently working clinic				
Surgical service	57.00±18.43	27.00±7.88	13.50±7.83	16.50±8.51
Surgery	63.09±23.20	29.28±9.91	17.14±7.34	16.66±10.99
GICU	56.66±22.39	24.37±10.35	14.79±9.02	17.50±8.59
Orthopedic service	43.00±16.53	22.50±9.20	9.00±3.94	11.50±11.55
Urology service	51.66±15.70	29.16±5.84	12.50±6.89	10.00±8.36
Cardiology service	56.66±16.96	27.08±6.20	13.75±6.44	15.83±10.83
CIC	40.00±26.22	17.00±12.04	8.00±5.70	15.00±11.72
CVSICU	42.00±25.39	23.00±7.58	8.00±9.08	11.00±10.83
p	.177	.219	.076	.614
Educational status about ERAS protocols				
Educated	71.34±17.86	30.96±8.24	18.07±8.00	22.30±8.02
Non Educated	48.20±19.28	23.73±9.05	11.79±7.05	12.68±9.42
p	**.000***	**.001***	**.001***	**.000***
Information resources on ERAS Protocols				
In-service training Congress	70.90±12.00	30.90±7.68	20.45±6.87	19.54±6.87
etc.	77.00±14.40	30.00±7.07	19.00±6.51	28.00±4.47
Media, phone etc.	77.50±33.04	38.75±9.46	16.25±10.30	22.50±15.00
Other	63.33±18.61	26.66±7.52	14.16±9.70	22.50±5.24
Not	48.20±19.28	23.73±9.05	11.79±7.05	12.68±9.42
p	**.000***	**.009***	**.005***	**.000***
Implementation status of ERAS protocols in the institution				
Yes	58.87±18.96	25.80±7.86	14.51±8.59	18.54±7.09
No	55.34±22.71	27.41±9.96	12.75±7.62	15.17±11.29
No Idea	50.15±22.41	24.24±10.16	13.33±7.35	12.57±10.54
p	.304	.620	.699	.120
Thinking that ERAS protocols are useful				
Yes	59.55±20.29	26.83±9.05	14.19±8.13	18.52±8.51
No	0	0	0	0
No Idea	41.40±19.28	22.80±9.79	11.80±9.79	6.80±8.76
p	**.000***	.076	.197	**.000***

Avg: *Average,* ***SD:*** *Standard deviation,* ***GICU:*** *General Intensive Care Unit,* ***CVSICU:*** *Cardiovascular Surgery Intensive Care Unit,* ***CIC:*** *Coronary intensive care, *p<0.05*

metabolic satiety (25.8%), (2) 'Mechanical bowel cleansing should not be routinely applied in elective colon surgery (28.0%) and (3) 'Opioid analgesics should be used routinely in the postoperative period according to ERAS protocols (33.3%) (Table 2).

The comparison of nurses' pre-, intra-, and post-operative periods, general average score and descriptive characteristics are given in Table 3. It was determined that the groups with the highest overall score average were, 38 years and older (58.18±21.02), male (58.85±21.54), postgraduate education (55.37±24.37), experience in the operating room (66.17±20.57), years of service in the profession 20 years and over (60.00±20.96), working in the operating room (63.09±23.20), educated about ERAS (71.34±17.86), information sources such as media, telephone, etc. (77.50±33.04) (highest overall score average), who think that ERAS protocols are applied in the institution (58.87±18.96) and (59.55±20.29) nurses who thought that ERAS protocols were beneficial.

A statistically significant difference was found in the comparison of Nurses' education about ERAS ($p=0.000$, $p=0.001$, $p=0.001$, $p=0.000$, respectively) and ERAS information sources ($p=0.000$, $p=0.009$, $p=0.005$, $p=0.000$, respectively) and general, preoperative, intraoperative and postoperative mean scores ($p<0.05$). Statistical significance was also determined between thinking that ERAS protocols were beneficial and overall and postoperative score averages ($p=0.000$, $p=0.000$, respectively) ($p<0.05$) (Table 3).

DISCUSSION

In this study, it was aimed to determine the knowledge level of nurses, working in surgical clinics, about the ERAS protocol. According to the results of our research; It was determined that most of the nurses (72%) had no idea about ERAS. Studies have shown that most of the other healthcare professionals, including nurses, do not have sufficient knowledge about ERAS in perioperative care (2, 5, 17, 18, 19, 20). These results are similar to the results of our research.

It is seen that 72% of the nurses participating in the research do not use any information source about ERAS. Similar results are seen in other studies conducted in parallel with the results of our research (2, 5). Nurses (35.5%) reported that ERAS protocol applications were not included in the clinic they worked in. According to the research results 88.97% of the nurses reported that ERAS practices were not included in the clinic where they worked (5). According to these results, it is thought that namely the ERAS protocols are not implemented in their institutions or the nurses' lack of awareness about this issue has a great effect on the nurses' lack of knowledge about ERAS. According to the results of our study, 73.1% of the nurses think that ERAS protocols are beneficial.

To accelerate the post-surgical recovery process and to provide the expected benefit from ERAS, all healthcare team members should know ERAS protocols, as well as nurses' awareness and skills on the subject at a sufficient level (15, 17). Successful implementation of ERAS protocols is possible with team collaboration (21). It is reported that ERAS protocols are strong evidence-based applications, but their transition to practice in clinics is a slower process than expected (22).

ERAS protocols constitute the pre-, intra, and post-operative periods (4). These protocols are standardized with preoperative patient education and counseling, prevention of prolonged hunger associated with surgery, anesthesia management, and early postoperative mobilization (23). Education/training of the patient before the operation (deep breathing and cough, pain management, etc.) plays a major role in preventing possible complications (16, 24, 25). The education and counseling service to be given to the patient should begin during the first visit and should continue at all stages of the process (26). In this study, nurses (61.3%) reported that patient education would reduce the need for analgesics. According to the research results of previous studies nurses reported that patients should be educated in the preoperative period. The results are in agreement with our research (5, 19).

According to the 2011-2017 guideline of the American Society of Anesthesiologists (ASA), it is reported that the consumption of solid foods can be stopped six hours before the surgery and liquid foods can be stopped two hours before the surgery (16, 27, 28). According to the results of our research; It is seen that nurses do not have sufficient knowledge about the subject. The previous research results are similar to our research (5, 19, 29). It has been reported that nurses inform patients against any food and beverage consumption after midnight, which is their routine practice. Therefore, 89.2% of the nurses gave wrong answers about the subject. It can be said that this

situation is not suitable for ERAS protocols, which are evidence-based applications, and the lack of information is high.

It is reported in the literature that bowel cleansing should not be routinely performed for colon surgery (30). 62.4% of the nurses participating in the study marked the wrong option. However, it is reported in the literature that mechanical bowel cleansing should not be routinely applied in preoperative period elective colon surgery (18, 31). Few of the nurses participating in the study gave correct answers. It is thought that nurses' knowledge gaps should be eliminated by in-service training and/or literature review on the subject.

Venous thromboembolism (VTE); Among the causes of mortality and morbidity, including deep vein thrombosis (DVT) and pulmonary embolism, is a complication that can be prevented with caution (4). In this context, to prevent DVT, low molecular weight heparin (LMWH) should be administered (high level of evidence, strong recommendation level) and additionally, compression stockings should be worn (high level of evidence, strong level of recommendation) (18, 31). While the majority of the nurses participating in the research gave correct answers about the subject; It is seen that a considerable number of nurses do not have an opinion on the subject. This finding suggests that nurses stay away from current literature information.

Among the knowledge questions, the statement 'a drain should be routinely inserted in all patients during the surgery' was answered correctly with a rate of 78.5%. The presence of drain in the patient; is not routinely recommended because it restricts mobilization and does not prevent anastomotic leaks (26, 32, 33). As a result of the long immobilization process after the surgery; Insulin resistance increases, muscle atrophy develops, respiratory functions are impaired and the risk of thromboembolism increases (17, 26).

Postoperative nausea and vomiting should be prevented. Based on that, combined antiemetics that prevent vomiting should be used in the intraoperative period (11, 17). According to the results of our research, 55.9% of the nurses gave the correct answer to prevent nausea and vomiting. For this result, it is seen that a lot of nurses do not know about preventing nausea and vomiting.

According to ERAS protocols, the patient should be out of bed for two hours on the postoperative zero-day and six hours on the other days until discharge (level of evidence is moderate, level of recommendation is strong) (16, 17, 26). It is seen that 43% of the nurses participating in the research do not have an opinion on the subject. The fact that nurses working in surgical clinics do not have an idea about the subject suggests that they cannot provide effective care to patients who undergo surgery and that patients experience a delay in the wound healing process.

Limitations

This research was limited to the nurses working in the surgical clinics of the state hospital located in the capital city of the North Cyprus, Nicosia.

CONCLUSION

The importance of ERAS protocols is known all over the world by all team members in the surgical field. As stated in the results of our study, the mean level of knowledge of the nurses who received training on ERAS was found to be higher than those who did not. The level of knowledge will increase with education and awareness studies, active implementation of protocols, and/or the implementation of care obligations within the roles that the nurse performs independently on this subject, whose importance is well known.

According to these results, it can be suggested that nurses should follow current developments and evidence-based guidelines on the ERAS protocol, planning education programs for ERAS protocol applications, and increase the knowledge level of nurses by ensuring their participation.

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