Journal of PeriAnesthesia Nursing 40 (2025) 356–364

Contents lists available at ScienceDirect

Journal of PeriAnesthesia Nursing

journal homepage: www.jopan.org

Research

The Effect of Oral Water and Ice Popsicle Exposure on the Management of Thirst in the Immediate Postoperative Period

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Keywords:
perioperative nursing
postanesthesia care unit
thirst
water
ice

A B S T R A C T

Purpose: Thirst is a high-incidence condition that causes patients to experience problems in the early postoperative period in the postanesthesia care unit (PACU). The study was conducted to determine the effect of oral water and ice application in managing early postoperative thirst.
Design: Randomized controlled trial.
Methods: The study was conducted between January and April 2017 with 150 patients who were transferred from the operating room of a university hospital to the PACU and met the research criteria. The patients were divided into treatment (water group = 50, ice group = 50) and control (n = 50) groups. Patients in the intervention group received oral water/ice application after admission to the PACU after surgery. Patients in the control group received routine treatment and care.
Findings: In intragroup comparisons before and after the application, there was a statistically significant decrease in thirst, dry mouth, dry throat, and difficulty in swallowing in the water and ice groups ($P < .001$); ice application was more effective than water application, and there was no significant difference in the control group ($P > .05$).
Conclusions: Postoperative oral water/ice application was an effective and safe nursing intervention to reduce thirst, dry mouth, dry throat, and difficulty in swallowing. Ice application was more effective.

Thirst is a condition that causes patients to experience problems in the postanesthesia care unit (PACU) in the early postoperative period and has a high incidence of 53.2%-69.8%.[1–4] Thirst, monitored in the early postoperative PACU, is a coping mechanism characterized by a conscious desire to drink water and based on regulating the fluid-electrolyte balance in the organism.[5,6] Thirst and dry mouth in surgical patients may become a more prominent problem, often associated with prolonged preoperative fasting, perianesthesia, and surgical treatment practices, throat irritation due to endotracheal intubation, and intraoperative blood loss.[7–9] Thirst causes intense anxiety and discomfort in the perioperative period. Emotional factors, such as fear, anxiety, and stress in the perioperative period, are also known to be strongly associated with hormones, such as the antidiuretic hormone, which triggers thirst sensation at the central nervous system level, and decreases salivary production, which causes oropharyngeal dryness.[9,10] In the preoperative period, long periods of surgical fasting increase the production of gastric juice, further lowering the pH and increasing the risk of developing complications such as bronchoaspiration, accelerating the development of thirst in the individual and adversely affecting the PACU period.[11,12] By decreasing the preoperative fasting period in line with current recommendations, uncomfortable conditions such as pain and nausea, especially thirst, which negatively affect the patient's health status, will also be reduced.[13]

Various methods can be used to prevent thirst in the early postoperative period. Clinical interventions aimed at relieving the symptoms of thirst include the use of soaked cotton wool or gauze to moisten the oral cavity, and the administration of water at room temperature and in small amounts (nonstandard amounts).[14] In addition to these strategies, cold water is also preferred to relieve thirst and dry mouth, such as gargling with cold water, using cold sterile water sprays, oral swab wipes containing cold sterile water and ice cubes.[12,15–17] It is noted that oral ice application is an option and is important in providing patient comfort in the early

Funding: None to report.
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https://doi.org/10.1016/j.jopan.2024.05.013

postoperative period.[18] Thirst, which causes patients to experience discomfort in PACU, is an important problem that can be greatly reduced with nursing interventions.[14] National and international nursing studies on the management of thirst in the early postoperative period are insufficient.[2,19–21] Preventing/minimizing the complications that may develop during the postoperative care process is possible with early diagnosis and treatment of complications. Since thirst experienced by the patient during the operation is seen as a minor complication, it is not managed within the framework of a system based on a certain protocol in the preoperative and postoperative periods.[12] The interventions implemented by health care professionals within the scope of patient safety should be systematic and based on guidelines.[21] Considering that more qualified care can be provided within the framework of an effective and reliable protocol that includes nursing interventions for the management of thirst based on ensuring patient comfort and safety, this study was planned to determine the effects of oral water intake and ice application in the management of early postoperative thirst. Within the scope of the study, the Turkish validity and reliability study of the Safety Protocol for Thirst Management in the immediate postoperative period (SPTM) was also conducted.

Research Questions

- Is oral water application effective in reducing patients' moderate and severe thirst in the early postoperative period?
- Is oral ice application effective in reducing moderate and severe thirst experienced by patients in the early postoperative period?
- Is oral ice/water application effective in reducing dry mouth, dry throat, and difficulty in swallowing experienced by patients in the early postoperative period?
- What is the difference between oral water application and ice application in reducing moderate and severe thirst experienced by patients in the early postoperative period?

Methods

This study was conducted to determine the effect of oral water and ice application in managing early postoperative thirst. The study was conducted with 150 patients who underwent surgical intervention in the operating room of a university hospital between January 2017 and April 2017 and were transferred to the PACU after surgery; 150 of whom met the research criteria and agreed to participate in the study, 100 in the treatment group (water group and ice group) and 50 in the control group.

The "Patient Follow-up Form," "Thirst and Thirst Symptoms Assessment Form," and "SPTM" developed by Nascimento et al[21] in 2014 were used as data collection tools in the study, and permission was obtained from the researchers for the use of the protocol. The patient follow-up form included individual characteristics of the patients and information about the surgical intervention (age, duration of surgical intervention, duration of anesthesia, duration of PACU stay, type of surgery, type of anesthesia, airway type).

The Thirst and Thirst Symptoms Assessment Form included the following variables: thirst, dry mouth, dry throat and difficulty in swallowing that the patients felt in the early postoperative period. The variables were assessed using the visual analog scale (VAS), which consists of a line divided into equal intervals between 0 and 10 and is widely used to determine subjective characteristics. Since thirst, like pain, is a state of discomfort that includes personal experiences expressed by the individual, the literature supports that the use of VAS in the assessment of thirst is appropriate and used safely in studies.[2,12,15,22–24] A value of 0 on the scale indicates that the individual does not experience thirst and other conditions. In contrast, a value of 10 indicates that the individual experiences thirst and other conditions at the most severe level. The individual verbally communicated the level of thirst he/she feels between 0 and 10 to the researcher.

The Safety Protocol for Management Thirst in the Immediate Postoperative Period is a protocol developed by Nascimento et al[21] and used in the Londrina State University in Brazil; it is a protocol that determines the level of consciousness of the patients in the early postanesthesia period, the protection of airway patency, and the ability to administer oral water/ice to the patients after evaluation of nausea and vomiting. The protocol is prepared as a checklist, and patients must meet the criteria to receive oral water/ice.

Validity and Reliability of the SPTM

To determine the linguistic equivalence between the Turkish translation of the SPTM and the English original,[21] and to ensure its adaptation to the Turkish population, the protocol was first translated from English to Turkish by an academic translation institution. The original protocol and the translation text were reviewed by six experts identified by the researcher and the consultant to evaluate whether the statements in the Turkish translation of the protocol were appropriate. The resulting protocol was back-translated into English by an individual fluent in both languages. Language and content validity was confirmed by determining that there was no change in the meaning of the back-translated protocol.

To examine the content validity of the SPTM, the items in the protocol were evaluated by six faculty members who are experts in the nursing field. The Content Validity Index freedom values for the SPTM were at the level of 1.00 for all items. Since the Content Validity Index freedom values of all things were above the level of 0.99, there was no need for any change. SPTM reliability was evaluated by independent interobserver agreement measurements. The results were statistically analyzed using the intraclass correlation coefficient to determine interobserver agreement. Interobserver agreement was measured by the researcher and an independent observer administering the SPTM to 40 patients in the PACU. The intragroup correlation coefficients of the items had good and excellent reliability (intraclass correlation coefficient = 0.9-1.00).

Procedure

Patients between the ages of 18 and 65, undergoing surgery other than gastrointestinal system surgery, surgical fasting period of at least 8 hours, Amercan Society of Anesthesiologists (ASA) class I, II and III, anesthesia duration longer than 1 hour, admitted to PACU after surgery, with a thirst score of 4 or more (0-3 points according to thirst scores indicate mild thirst, 4-6 points indicate moderate thirst, and 7-10 points indicate severe thirst), and patients who met the appropriate conditions for oral water/ice application after evaluation with SMTP were included in the study. Patients who underwent a second surgery during hospitalization, were transferred to the intensive care unit postoperatively, had fluid-electrolyte imbalance, had problems in the process of weaning from postoperative respiratory support, had postoperative changes in consciousness/acute confusion, had dysphagia or restricted oral fluid intake, were not included in the study.

Patients who met the sampling criteria and volunteered to participate in the study were randomly divided into three groups: patients who received oral water and ice application (water group and ice group) and patients who did not receive the application (control group). Since the patients were to be included in the study in the period following surgical intervention, the closed envelope method was used for randomization. Following the surgical intervention, any envelope was randomly selected for the patients admitted to the

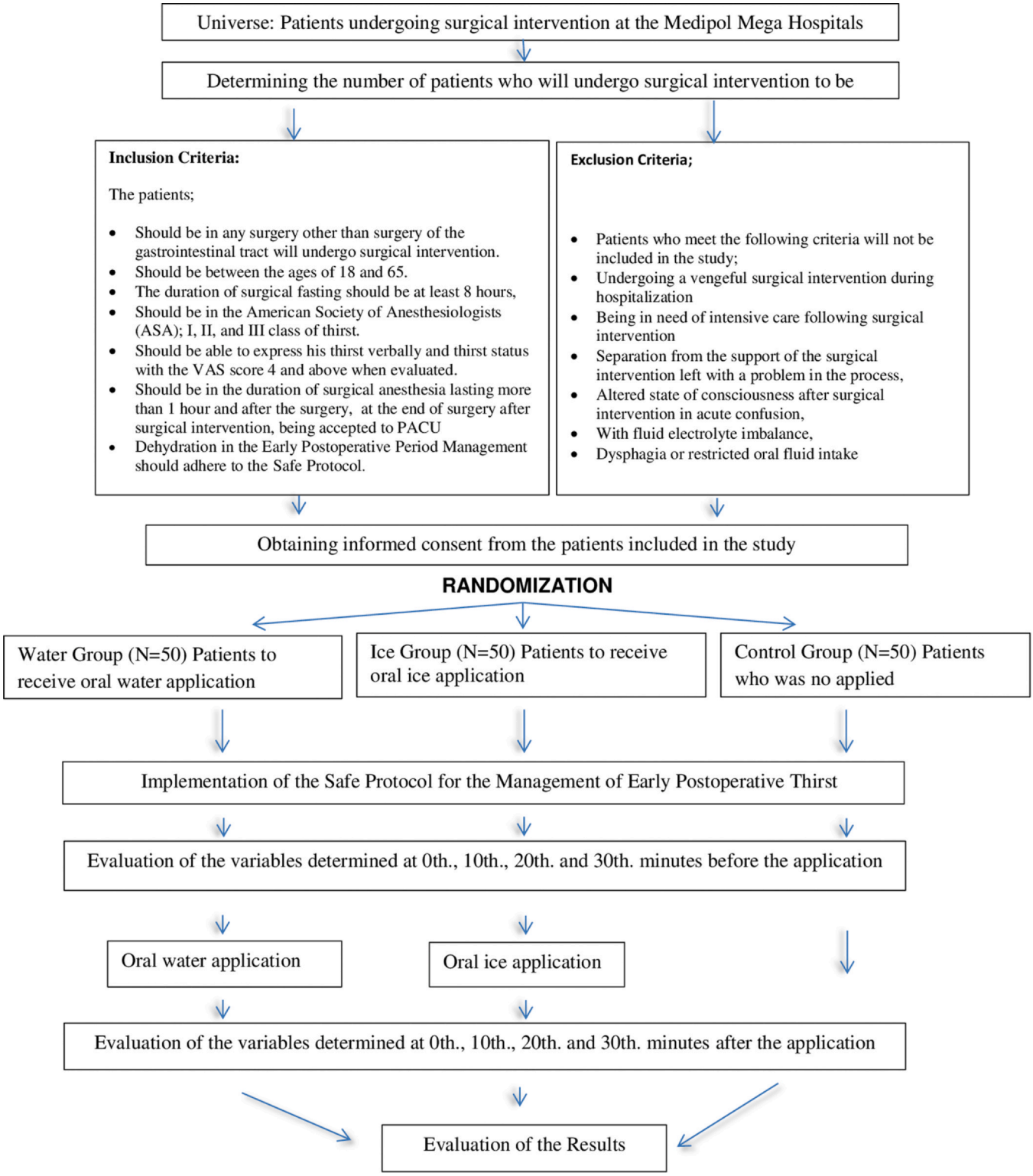

Figure 1. Research design. PACU, postanesthesia care unit; VAS, visual analog scale. This figure is available in color online at www.jopan.org.

PACU, and the application belonging to the relevant group was performed. Information about the patient was obtained from the patient and the patient file (Figure 1).

The same methods, materials, and devices were used during the study to assess thirst and measure the patient's vital signs in the application and control groups. The application was started in the operating room at the end of the surgery and when the patient was admitted to the PACU. The thirst status of the patients in the water and ice group was evaluated using the VAS before the application, and oral water/ice was applied to patients with a thirst status of 4 or more. Care interventions were planned and implemented for the patients in the control group in line with institutional policies and routine practices (vital signs of the patients were monitored and oxygen was administered via nasal/oral mask) of the PACU. The

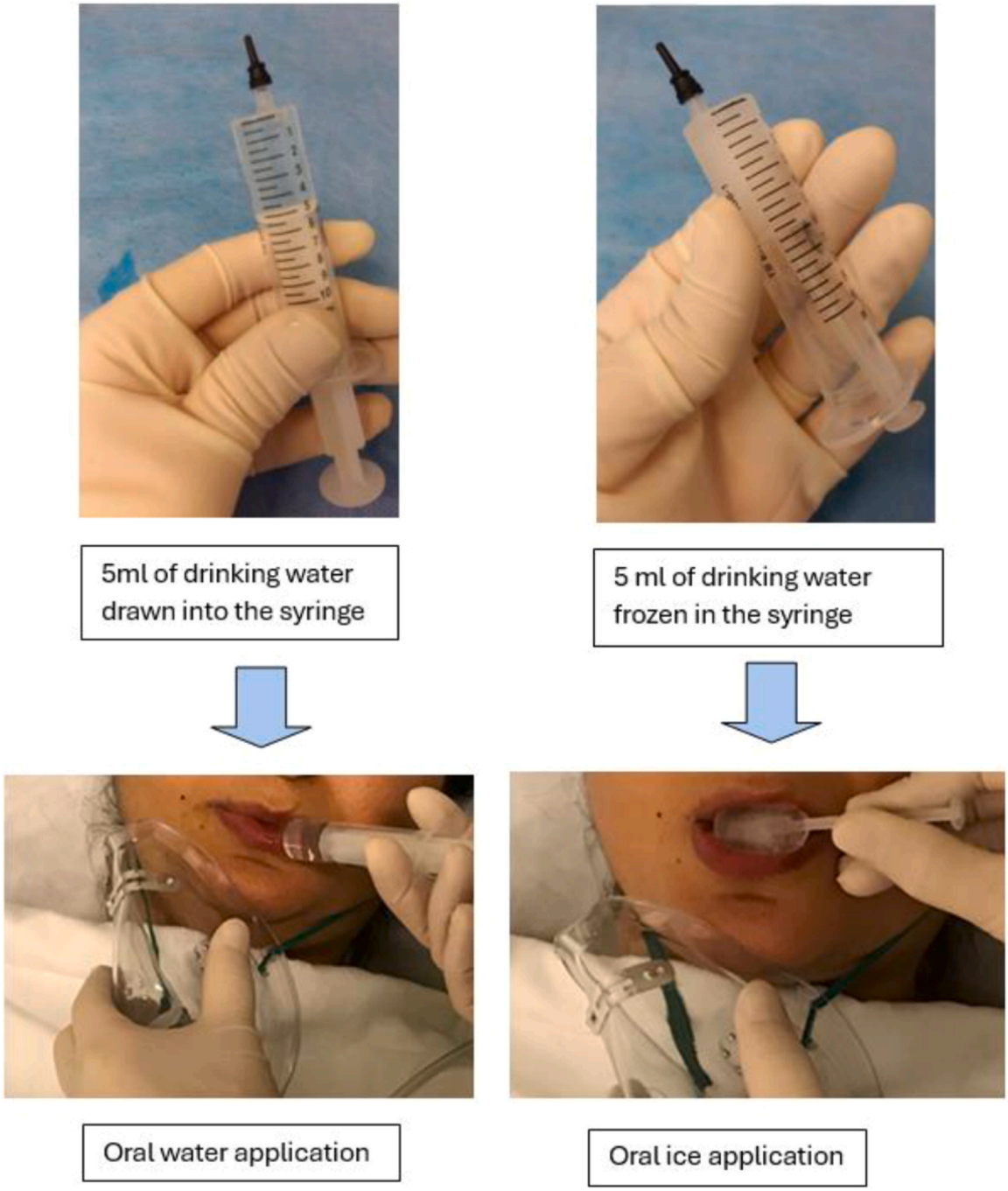

Figure 2. Mean scores for moderate and severe thirst by groups. This figure is available in color online at www.jopan.org.

materials used in the study were 5 mL of drinking water drawn into a syringe, which was kept at room temperature; ice cubes obtained by freezing 5 mL of drinking water in the syringe; instruments, devices, and materials such as bedside monitor, noninvasive blood pressure cuff, temperature probe, and pulse oximetry probe used for continuous monitoring of the patient in the PACU (Figure 2).

Ethical Considerations

To initiate the study, permission was obtained from the noninterventional clinical research ethics committee of a university in Istanbul. Institutional study permission was also obtained from a university hospital in Istanbul, where the study was conducted and registered at ClinicalTrials.gov (NCT04070911). The patients who volunteered to participate in the study were informed about the purpose of the study, the applications to be performed, and that the data to be obtained would not be used for any other research purpose in accordance with the informed consent form and verbal and written consents were obtained from the patients. Since randomization was applied in the assignment of the patients to the research groups, the patients were not told which group they were in, and the informed consent forms for both the intervention and control groups were signed. The flow diagram of the study recommended by the Consolidated Standards of Reporting Trials is presented in Figure 3.

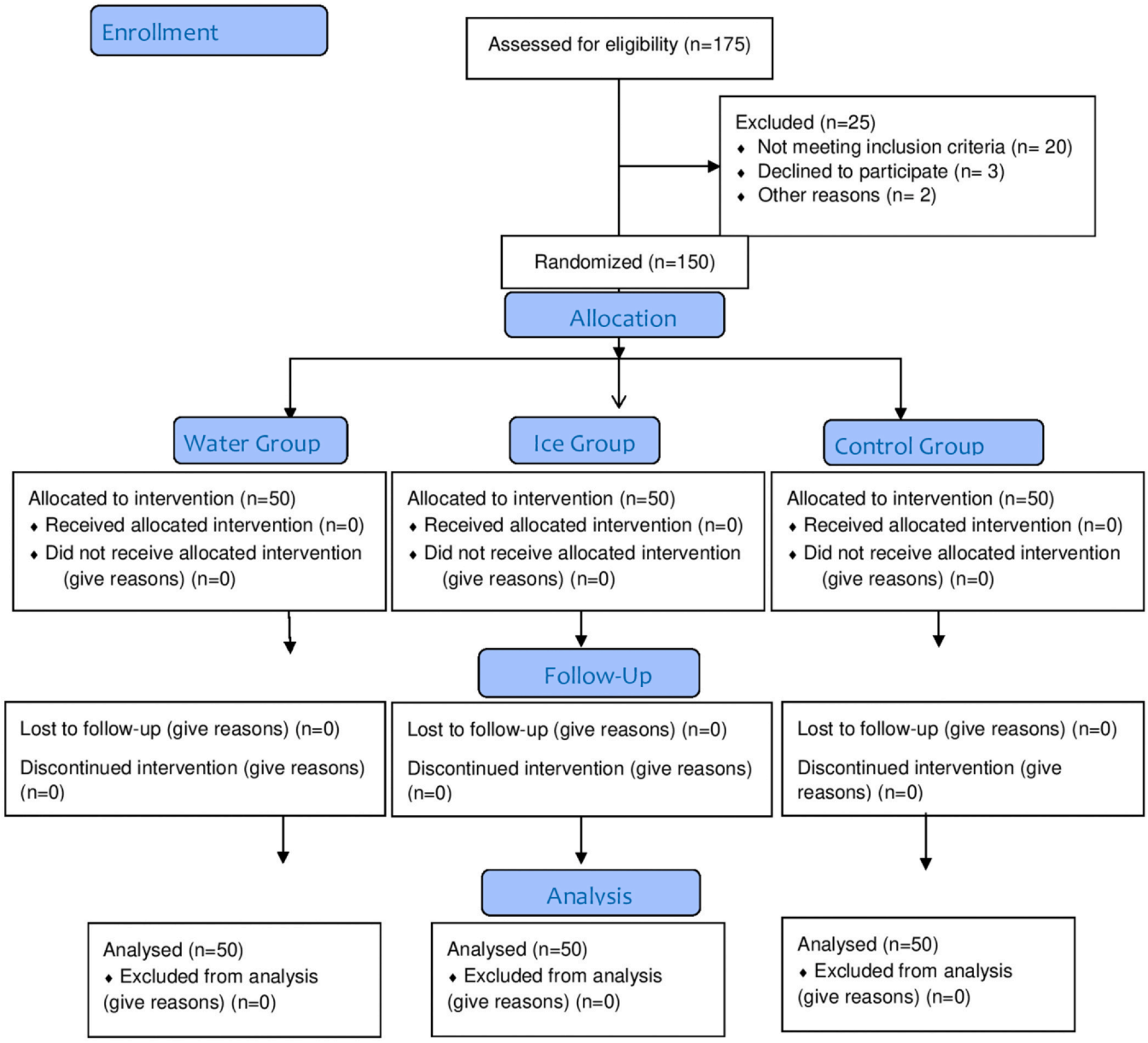

Figure 3. CONSORT flow diagram of patients. CONSORT, Consolidated Standards of Reporting Trials. This figure is available in color online at www.jopan.org.

Data Analysis

Number Cruncher Statistical System 2007 program was used for statistical analysis. Mean, standard deviation, ratio, one-way analysis of variance, Pearson χ^2, Kruskal Wallis, Fisher Freeman Halton, Wilcoxon Signed Ranks, and Friedman test were used to evaluate the data. Cohen's effect size was used to evaluate the effect size between groups. Significance was evaluated at the $P < .05$ level.

Results

Patients were 38 to 43 years old, body mass index was between 26 and 28, 63% were female, 72% were married, 45% were primary school graduates, 72% had no chronic disease, 67% were in ASA I class, 43% did not smoke, and 68% did not drink alcohol. The mean duration of surgical intervention was 110 minutes, the duration of anesthesia was 116 minutes, the mean length of stay in the PACU was 37 minutes, and the duration of surgical fasting was 8 hours. 23% of the patients underwent general surgical interventions, 93% underwent general anesthesia, and 89% underwent orotracheal intubation (Table 1).

When the intra- and inter-group score values of the patients' moderate and severe thirst states before and after the application were compared, there was a statistically significant difference between the score values of the water and ice groups at all follow-ups (0 minute, 10 minutes, 20 minutes, 30 minutes) ($P = .001$). The decrease in the score values of all parameters of the patients in the water and ice group was statistically highly significant as the duration of stay in the PACU increased. In contrast, the score values gradually increased in the control group. Although a highly significant decrease ($P < .01$) was observed in thirst score values in both groups as a result of oral water and ice application, when large effect size results were evaluated between the 2 groups, there was an 87% decrease in thirst score values in the water

Table 1
Comparison of Sociodemographic and Perioperative Characteristics of Patients Between Groups (N = 150)

	Water Group (n = 50)	Ice Group (n = 50)	Control Group (n = 50)		*P*
	Mean ± SD	Mean ± SD	Mean ± SD		
Age (y)	41.86 ± 14.24	38.24 ± 12.38	42.58 ± 14.36		*.239*[*]
Duration of surgical intervention (min)	115.33 ± 39.49	115.22 ± 62.25	101.04 ± 34.46		*.467*[†]
Duration of anesthesia (min)	124.82 ± 43.83	115.20 ± 62.05	111.06 ± 36.90		*.196*[†]
Duration of PACU stay (min)	37.68 ± 6.74	37.12 ± 5.52	38.96 ± 6.61		*.385*[†]
Duration of surgical fasting	8.38 ± 1.05	8.48 ± 1.09	8.32 ± 1.10		*.295*[†]
Anesthetic drugs					
Fentanyl (mcg)	92.71 ± 15.74	91.80 ± 18.04	96.50 ± 13.37		*.180*
Propofol (mcg)	191.52 ± 21.08	182.80 ± 42.62	183.75 ± 32.92		*.542*
Esmeron (mcg)	43.59 ± 9.53	44.43 ± 12.21	45.11 ± 10.71		*.818*
Sevorane (%)	3.57 ± 1.98	4.24 ± 2.10	3.35 ± 1.79		*.074*
	n (%)	*n (%)*	*n (%)*	*N (%)*	
Type of surgery					*.271*[‡]
General surgery	12 (24)	7 (14)	16 (32)	35 (23)	
Gynecology	7 (14)	15 (30)	7 (14)	29 (19)	
Ear nose and throat	9 (18)	12 (24)	10 (20)	31 (21)	
Orthopedics	10 (20)	7 (14)	6 (12)	23 (15)	
Other	12 (24)	9 (18)	11 (22)	32 (22)	
Type of anesthesia					*.836*[§]
General	46 (92)	46 (92)	47 (94)	139 (93)	
Sedation	0 (0)	2 (4)	1 (2)	3 (2)	
Spinal	3 (6)	1 (2)	2 (4)	6 (4)	
Combined	1 (2)	1 (2)	0 (0)	2 (1)	
Airway type					*.539*[§]
Laryngeal mask airway	3 (6.5)	1 (2.2)	1 (2.1)	5 (11)	
Orotracheal intubation	43 (93.5)	45 (97.8)	46 (97.9)	134 (89)	

ANOVA, analysis of variance; PACU, postanesthesia care unit.
[¶]*P* < .05; [‖]*P* < .01.
"*P*" significance levels shown statistically are italicized.
[*] One-way ANOVA test.
[†] Kruskall Wallis test.
[‡] Pearson χ^2 test.
[§] Fisher Freeman Halton test.

Table 2
Comparison of Moderate and Severe Thirst Within and Between Groups (N = 150)

Thirst Scores	Water Group (n = 50)			Ice Group (n = 50)			Control Group (n = 50)		
	BA Mean ± SD	AA Mean ± SD	*P*[*]	BA Mean ± SD	AA Mean ± SD	*P*[*]	BA Mean ± SD	AA Mean ± SD	*P*[*]
0 min	6.32 ± 1.81	4.68 ± 1.73	*Z = −6.308* **.001**[†]	7.68 ± 1.24	6.54 ± 1.31	*Z = −6.547* **.001**[†]	4.70 ± 1.22	4.42 ± 1.34	Z = −1.000 .317
10 min	4.68 ± 1.63	3.48 ± 1.52	*Z = −6.652* **.001**[†]	6.94 ± 1.27	6.00 ± 1.28	*Z = −6.308* **.001**[†]	4.54 ± 1.27	4.58 ± 1.30	Z = −0.707 .480
20 min	3.46 ± 1.54	2.46 ± 1.36	*Z = −6.412* **.001**[†]	6.44 ± 1.37	5.50 ± 1.43	*Z = −5.971* **.001**[†]	4.58 ± 1.46	4.74 ± 1.34	Z = −2.449 **.014**[‡]
30 min	2.54 ± 1.53	1.86 ± 1.20	*Z = −5.203* **.001**[†]	5.60 ± 1.34	4.94 ± 1.36	*Z = −5.260* **.001**[†]	4.80 ± 1.55	5.00 ± 1.41	Z = −1.890 .059
	χ^2 = 130,989 ***P*[§] = .001**[†]	*χ^2 = 121,057* **.001**[†]	**r = 0.87**	*χ^2 = 112,138* **.001**[†]	*χ^2 = 98,864* **.001**[†]	**r = 0.90**	*χ^2 = 24,693* **.001**[†]	*χ^2 = 35,971* **.001**[†]	

AA, after the application; BA, before the application; r, Cohen's effect size.
Boldface indicates significant statistical findings in the tables.
Italics indicate Friedman values, which is a statistical analysis.
[*] Wilcoxon signed ranks test.
[†] *P* < .01.
[‡] *P* < .05.
[§] Friedman test.

group and a 90% decrease in the ice group (*P* = .001) (Table 2, Figure 4).

When the intra- and between-group score values of the patients regarding dry mouth, dry throat, and difficulty in swallowing were compared before and after the application, there was a statistically significant difference between the score values of the water and ice groups in all follow-ups (0 minute, 10 minutes, 20 minutes, 30 minutes) (*P* = .001). In the control group, dry mouth scores increased significantly during PACU stay (*P* = .001) (Table 3).

Discussion

In the early postoperative period, various methods are used to prevent thirst and patient comfort is provided with oral water and ice applications.[18] Research conducted in the early postoperative period report that patients experienced severe thirst in the PACU.[25] Thirst was the most disturbing condition for patients,[26] and 75% felt thirst.[12] In various studies in which the degree of thirst was defined with the VAS, the mean values were shown to be 6.1[12] and 8.2.[27]

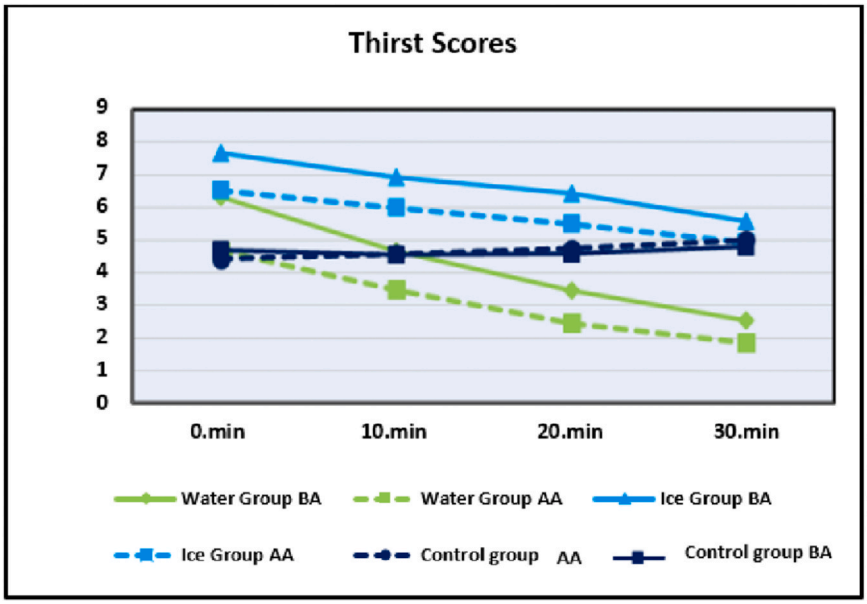

Figure 4. Mean scores for moderate and severe thirst by groups. AA, after the application; BA, before the application. This figure is available in color online at www.jopan.org.

The response to the symptom of thirst may vary according to physiological and sociocultural characteristics.[22] In this study, when patients were compared in terms of descriptive characteristics (age, gender, body mass index, marital status, presence of chronic disease, smoking, and alcohol use), there was no significant difference between the groups ($P > .05$). The multidimensional nature of thirst in surgical patients is closely related to factors such as open surgical intervention causing tissue dehydration, prolonged oxygen therapy in the intraoperative and postoperative period, prolonged open mouth cavity due to intubation, and duration of use of anesthetic agents and drugs.[14] These conditions specific to the surgical intervention may cause the thirst of patients to become more serious. In the study, when the patients in the water, ice, and control groups were compared in terms of characteristics related to the perioperative process (duration of surgical fasting, duration of anesthesia, duration of surgical intervention, duration of PACU stay, type of surgery and anesthesia, airway type, ASA classification) and anesthetic drugs, no significant difference was found between the groups ($P > .05$).

Table 3
Comparison of Dry Mouth, Dry Throat, and Difficulty in Swallowing Within and Between Groups (N = 150)

		Water Group (n = 50)			Ice Group (n = 50)			Control Group (n = 50)		
		BA Mean ± SD	AA Mean ± SD	P*	BA Mean ± SD	AA Mean ± SD	P*	BA Mean ± SD	AA Mean ± SD	P*
Dry mouth scores	0 min	5.98 ± 2.14	4.62 ± 1.84	*Z = −6.082* **.001**†	7.34 ± 1.26	6.22 ± 1.20	*Z = −6.289* **.001**†	4.50 ± 1.68	4.54 ± 1.66	Z = −0.577 .564
	10 min	4.44 ± 1.75	3.52 ± 1.58	*Z = −5.500* **.001**†	6.80 ± 1.26	5.86 ± 1.31	*Z = −6.099* **.001**†	4.52 ± 1.66	4.62 ± 1.69	Z = −1.897 .058
	20 min	3.20 ± 1.59	2.60 ± 1.31	*Z = −4.704* **.001**†	6.18 ± 1.37	5.52 ± 1.25	*Z = −4.456* **.001**†	4.88 ± 1.57	4.68 ± 1.56	Z = −2.714 **.007**†
	30 min	2.58 ± 1.53	2.06 ± 1.39	*Z = −4.735* **.001**†	5.58 ± 1.37	5.08 ± 1.40	*Z = −4.630* **.001**†	4.98 ± 1.52	4.72 ± 1.54	Z = −2.714 **.002**†
	P‡	*χ^2 = 132,846* **.001**†	*χ^2 = 117,430* **.001**†		*χ^2 = 104,832* **.001**†	*χ^2 = 59,189* **.001**†		*χ^2 = 38,671* **.001**†	*χ^2 = 8,419* **.038**†	
Dry throat scores	0 min	5.18 ± 2.51	4.14 ± 2.04	*Z = −5.439* **.001**†	6.50 ± 1.64	6.30 ± 1.58	*Z = −2.456* **.014**§	4.34 ± 1.66	4.42 ± 1.62	Z = −2.000 **.046**§
	10 min	4.14 ± 2.19	3.30 ± 1.85	*Z = −5.181* **.001**†	6.36 ± 1.40	6.10 ± 1.40	*Z = −3.153* **.002**†	4.44 ± 1.63	4.52 ± 1.57	Z = −0.905 .366
	20 min	3.16 ± 1.87	2.54 ± 1.68	*Z = −5.396* **.001**†	5.94 ± 1.38	5.66 ± 1.32	*Z = −3.500* **.001**†	4.46 ± 1.59	4.36 ± 1.64	Z = −1.890 .059
	30 min	2.42 ± 1.73	2.06 ± 1.68	*Z = −3.819* **.001**†	5.40 ± 1.40	5.10 ± 1.45	*Z = −3.419* **.001**†	4.40 ± 1.60	4.40 ± 1.66	Z = −1.633 .102
	P‡	*χ^2 = 114,382* **.001**†	*χ^2 = 105,930* **.001**†		*χ^2 = 78,619* **.001**†	*χ^2 = 72,009* .001†		*χ^2 = 4,859* .182	*χ^2 = 8,674* **.034**§	
Swallowing difficulty scores	0 min	2.30 ± 2.43	1.92 ± 1.97	*Z = −3.491* **.001**†	2.60 ± 2.32	2.56 ± 2.30	*Z = −1.414 .157*	1.56 ± 1.70	1.56 ± 1.70	Z = 0.000 1.000
	10 min	1.64 ± 1.74	1.46 ± 1.57	*Z = −3.00* **.003**†	2.48 ± 2.24	2.40 ± 2.20	*Z = −2.000* **.046**§	1.56 ± 1.70	1.54 ± 1.66	Z = −0.577 .564
	20 min	1.20 ± 1.34	1.02 ± 1.19	*Z = −3.000* **.003**†	2.40 ± 2.20	2.36 ± 2.16	*Z = −1.414 .157*	1.52 ± 1.64	1.50 ± 1.63	Z = −1.000 .317
	30 min	0.86 ± 1.01	0.72 ± 0.88	*Z = −2.333* **.020**§	2.28 ± 2.11	2.22 ± 2.13	*Z = −1.73 20.083*	1.48 ± 1.62	1.48 ± 1.62	Z = 0.000 1.000
	P‡	*χ^2 = 63,398* **.001**†	*χ^2 = 60,420* **.001**†		*χ^2 = 27,717* **.001**†	*χ^2 = 28,253* **.001**†		*χ^2 = 9,429* **.024**§	*χ^2 = 7,500* **.048**§	

AA, after the application; BA, before the application.
Boldface indicates significant statistical findings in the tables.
Italics indicate Friedman values, which is a statistical analysis.
* Wilcoxon signed ranks test.
† $P < .01$.
‡ Friedman test.
§ $P < .05$.

Conchon and Fonseca[14] reported that the thirst value of the patients in the water group after the first application was measured as 6.70, while those in the ice group were calculated as 6.30, and in the evaluation made after 1 hour of stay in the PACU, these values were 2.76 in the water group and 0.87 in the ice group. They concluded that ice cubes were 37.8% more effective than water in quenching thirst. Aroni et al[12] also reported that the mean thirst score of the patients in the water group was 5.1. The mean thirst score of the patients in the ice group was 6.1 in the first evaluation made in the PACU. The mean thirst score of the patients in the water group was 2.3, and the mean thirst score of the patients in the ice group was 1.5 in the last evaluation made at 25 minutes, and there was no statistical difference between the groups in the management of thirst. Moon et al,[23] reported that thirst, which was measured as 8.14 in the experimental group, 3.29 with water application, and thirst, which was calculated as 7.93 in the control group, was 4.00. The thirst level decreased more in the experimental group and was statistically significant. Park et al,[28] also concluded that thirst scores were 8.39 in the saline-frozen gauze group and 8.27 in the wet gauze group immediately after surgery, and that the thirst scores of the patients in the saline-frozen gauze group were significantly lower than the patients in the wet gauze group after the measurement made 1 hour later. In this study, when the thirst score values were compared before and after the intragroup application, there was a highly significant decrease in the thirst score values of the patients in the water and ice groups at all time intervals ($P < .01$), and the thirst score values decreased in the water and ice groups and increased in the control group as the length of stay in the PACU increased ($P < .01$). This result is noteworthy in showing that oral water/ice application, a simple and inexpensive method in the PACU, is effective and reliable in managing moderate and severe thirst experiences and recommended as an intervention within the scope of nursing care. Although there was a highly significant decrease in thirst score values in both groups because of oral water/ice application, when the extensive effect size results were evaluated between the 2 groups, there was an 87% decrease in thirst score values during the PACU stay in the water group. At the same time, there was a 90% decrease in the ice group. In line with this result, the oral ice application was more effective than water application in the management of moderate and severe thirst.

Anesthetic drugs and endotracheal intubation during the operation process may cause dry mouth and throat. İzveren and Dal[29] reported that 80.6% of patients experienced dry mouth in the postoperative period, and Yin et al[30] stated that oral hydration can be performed safely to relieve the discomfort in the mouth and throat area in the early postoperative period in the PACU. Jenkins et al[31] found the value of sore throat as 5 out of 10 points in day surgery patients in the PACU. Lehmann et al[32] concluded that 10% of patients had a painful throat/hoarseness problem. In this study, there was a significant decrease in the dry mouth and throat score values of the patients in the water and ice groups at all time intervals ($P < .01$). At the same time, there was an increase in the dry mouth values before the application in the control group ($P < .01$). These results support that the problem of dry mouth and throat is experienced in the early postoperative period; dry mouth is a condition accompanying thirst, and water and ice application effectively eliminates dry mouth. In the control group, dry mouth scores increased during the PACU stay. Accordingly, it may be thought that the reason for its recent decrease is due to the return to normal physiology of the secretion of oral secretion, which was blocked by the breakdown of the anesthetic drugs used during surgery. Likewise, the reason for the increase in dry throat in the patients in the control group after the first evaluation may be the removal of the anesthetic drugs given to the patient inhaled during the operation from the body through the respiratory system and oxygen therapy applied in the PACU. This result is important in terms of showing that water and ice application is effective in eliminating the dry throat condition that patients frequently experience due to the surgical process as supported the literature.[18,24]

Swallowing difficulty may develop with the disappearance of protective reflexes such as coughing and swallowing, especially during general anesthesia. Bulut et al[33] noted that 50% of the patient's experienced difficulty in swallowing, which decreased significantly after cold vapor application. This study showed that swallowing difficulty values decreased at all times ($P < .01$) in the water and ice group as the time of stay in the PACU increased ($P < .01$) when compared to before and after the in-group application. Since the swallowing score values were in the range of 0 to 3 in the study, it was thought that there was no severe discomfort in the PACU, and the result may be related to factors such as the extubation technique used during awakening from anesthesia and intraoral aspiration.

Conclusion

Early postoperative oral water and ice applications effectively reduced moderate and severe thirst, dry mouth, dry throat, and difficulty in swallowing experienced by patients. As an important component in increasing patient comfort, oral water/ice administration in the early postoperative period is an effective and safe nursing intervention to reduce thirst and other symptoms accompanying thirst.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Esra Eren reports financial support was provided by Istanbul Medipol University. Esra Eren is an employee of Istanbul Medipol University. Seher Deniz Oztekin is an employee of Dogus University and reports administrative support was provided by Dogus University.

Acknowledgments

Participants were informed about the study and oral and written consent was obtained. The authors thank all the people who participated in this study. The authors also thank the nurses and physicians at the clinic for their kind assistance.

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