ORIGINAL ARTICLE

A Survey of Perioperative Monitoring of Body Temperature and Various Techniques Used in Warming the Patients

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ABSTRACT

Objective: To determine the frequency of patient warming and the various techniques used for patient warming in different tertiary care hospitals of Karachi Pakistan

Methodology: The present study was a one-year cross-sectional study conducted at three different hospitals in Karachi in which 80 anaesthesiologists (consultants, specialists and final-year residents) were included through non-probability sampling. The data on perioperative temperature recording and warming methods, including blankets, forced-air warming, and infusion of warmed fluids, were retrieved through a self-administered questionnaire. This study was conducted to evaluate the knowledge and practices of anaesthesiologists in preventing intra- or perioperative hypothermia and its consequences, and informed verbal consent was obtained from all participants. The SPSS version 26 was used to analyze the data. Descriptive statistics were calculated, and the data was analyzed and generated with 95% confidence interval by using SPSS version 26.

Results: The mean age of the participants was found to be 40.13 ± 13.09 years, among them 63.7% were male. The practice of patient warming was documented in 70% of participants. Ambient temperature adjustment was noted as the most common technique, used by 83.3% of the warming group as compared to 16.7% of the non-warming group (p=0.121). Forced-air warming (59.1% vs. 40.9%, p=0.832) while intravenous fluid warming was documented in (62.5% vs. 37.5%, P > 0.05). Temperature monitoring was inconsistent, with over 50% of patients never monitored during surgery or recovery.

Conclusion: The results show that there is variability in perioperative temperature monitoring and warming practices among anaesthesiologists in Karachi. While use of patient warming was widespread, application methods varied considerably. Ambient temperature adjustment was an overused technique; however, practices such as forced-air warming and fluid warming were mixed. These findings highlight the need for standardization of protocols and increased clinician awareness in order to prevent perioperative hypothermia and its associated complications.

Keywords: Clinical protocols, patient warming, surgical procedures, warming techniques

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INTRODUCTION

Perioperative monitoring of body temperature is an essential element of surgical care, as it directly influences the results of patients. Maintaining normothermia during surgical procedures considerably reduces the risk of complications such as surgical infections (SSIS), cardiovascular events, and prolonged recovery times[1]. Hypothermia, defined as a central body temperature less than 36°C, is often induced inadvertently during surgery due to factors such as exposure to cold operating rooms, administration of anaesthetics, and the use of cold intravenous liquids[2]. The importance of body temperature monitoring, lies in its role in the detection of these temperature drops, which can lead to unfavorable results if not treated quickly[3].

Various techniques are used to maintain the temperature and rewarm the patients' bodies during surgical procedures. These methods can be classified as active and passive warming strategies. The methods of active warming, such as warming covers of forced air, proved to be effective in preventing hypothermia during surgery[4]. A systematic journal indicated that the use of these devices not only maintains the central

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temperature but also improves postoperative analgesic and clinical results[5]. Another study highlighted the significance of warming patients before surgery, demonstrating that preoperative warming markedly minimizes intraoperative temperature drops[6].

Conversely, passive methods for warming, like hot socks or blankets, also contribute to temperature maintenance, but their efficiency is variable[7]. Passive warming can have benefits, however it is typically unable to provide the same amount of thermal control as active warming techniques[8]. Therefore, many institutions are now using hybrid strategies that combine both active and passive techniques to optimize thermal comfort and pulsatility around the perioperative period.

Specifically, global recommendations emphasize the use of full thermal control in operating rooms[9]. During the surgical procedure, body temperature needs to be continuously monitored and real-time feedback systems allow prompt corrective actions to overcome hypothermia[10]. The performance of the anaesthesiologist on this question underlines the need for alertness concerning temperature management, because their interventions directly influence patient safety[11].

Effective monitoring and management of perioperative body temperature are essential to minimize complications related to hypothermia. The use of a combination of active, and passive warming techniques, as well as in-depth monitoring practice is necessary to optimize the patient results during the surgeries[12-14]. The importance of this aspect of surgical care cannot be underestimated, as it contributes to the improvement of recovery trajectories and the overall satisfaction of patients.

METHODOLOGY

IRB/ERC Approval:

This cross-sectional study was conducted over six months at various tertiary care hospitals in Karachi, after obtaining approval from the Institutional Review Board of Indus Hospital & Health Network (Ref No: IHHN-IRB-2021-09-002).

A cross-sectional study was conducted over a period of six months at various tertiary care hospitals in Karachi, including The Indus Hospital, Aga Khan University Hospital, Civil Hospital, Jinnah Postgraduate Medical Centre, Liaquat National Hospital, Sindh Institute of Urology and Transplant, Patel Hospital, and Abbasi Shaheed Hospital.

The sample was composed of 80 anaesthesiologists, including consultants, specialists, and the final-year residents in anaesthesiology. The participants were selected using a non-probability consecutive sampling technique. Inclusion criteria for the study were anaesthesia consultants, specialists, and final-year anaesthesia residents. Participation was voluntary. The exclusion criteria included anaesthesia residents in their first, second, or third years of training, MCPS residents, and anaesthesiologists working in primary and secondary care hospitals.

"Practicing anaesthesiologists currently working in tertiary care hospitals were further classified into three categories: consultants, specialists, and final-year residents in anaesthesiology. Perioperative body temperature monitoring refers to the process of measuring a patient's body temperature during the perioperative period (preoperative, intraoperative, and postoperative phases) to prevent complications associated with hypothermia. This includes using thermocouple probes at the tympanic membrane, axilla, rectum, and forehead skin surface, and measuring tympanic temperature using infrared devices, and forehead temperature using liquid crystal thermometer strips. Techniques of patient warming include various methods to prevent or treat hypothermia during the perioperative period. These techniques include the use of simple cotton blankets, carbon-fiber sheets, circulating hot water mattresses, forced air warming, warm fluid infusion, and increasing the ambient temperature in the operating room or recovery area.

Verbal Informed Consent was obtained and those who agreed to take part in the study were provided with a printed self-administered questionnaire which was designed to gather information on demographic details such as the participant's age, qualifications, and the type and part of the hospital where they were working. In addition, the survey included questions regarding the methods used by the anaesthesiologists to assess and monitor body temperature. Beyond monitoring temperature, details were sought on warming methods used during the perioperative periods.

The questionnaire formulated for the survey was analyzed to assess the anaesthesiologists' practical and knowledge-based approaches to the prevention and management of perioperative hypothermia and its associated complications.

Descriptive statistics were calculated, and data was analyzed on SPSS version 26 and generated with 95% confidence interval. Mean with standard deviation, while frequency with percentage, were calculated for quantitative and qualitative variables respectively. The Chi-square test was applied to compare the warming and non-warming techniques at 5% level of significance.

RESULTS

Demographic characteristics of respondents indicated a mean age of 40.13 ± 13.09 with 60% aged between 27 and 40 years and the rest were older. As many as 63.7% of the respondents were male and 36.3% were female. The mean years of professional experience was 7.33 ± 4.32 (97.5% = 1–15 years of professional experience; 2.5% > 15 years). In terms of qualifications, 52.5% were consultants with FCPS, 7.5% MCPS specialists, 1.3% had American Board certification, while 2.5% were FCPS residents with < 2 years of experience and 36.3% with = 2 years of experience. Of these, 76.3% were from private hospitals, while 23.8% were affiliated with government hospitals. Professionals worked mainly in operating rooms (98.8%), and only 1.3% in intensive care unit. This data highlights a predominance of middle-aged, male professionals with less than 15 years of experience, primarily working in operating rooms within private hospitals (Table I).

Table 1: Demographic Characteristics of the Respondents

Variable	Frequency (%)
Age, Mean ± SD= 40.13 ± 13.09 Years	
27 - 40 Years	48 (60.0)
>40 Years	32 (40.0)
Gender	
Male	51 (63.7)
Female	29 (36.3)
Years of Experience, Mean ± SD= 7.33 ± 4.32 Years	
01 - 15 Years	78 (97.5)
>15 Years	2 (2.50)
Qualification	
FCPS (Consultants)	42 (52.5)
MCPS (Specialist)	6 (7.5)
American Board (Certified Diploma)	1 (1.3)
FCPS resident < 2 years' Experience	2 (2.5)
FCPS resident = 2-year experience	29 (36.3)
Type of Institute	
Private Hospital	61 (76.3)
Government Hospital	19 (23.8)
Place of Working at Hospital	
Operating Room	79 (98.8)
Intensive Care Unit	1 (1.3)

Comparison of different warming methods and their relation to warming and non-warming patient groups was studied. Out of all the techniques, increasing the ambient temperature was most commonly employed (83.3% vs 16.7% in the warming vs non-warming groups respectively; OR: 3.0, CI: 0.786–11.44, p=0.121). Hot water bags were not used in the warming group but one was employed in the non-warming group (p-value not applicable, OR: 2.3, CI: 2.30–2.03). Regarding electrical blankets, their use was noted for 60% in the warming group and 40% of non-warming group (OR:0.9, CI:0.115–7.03, p=0.920). The forced-air warming systems was used by 59.1% in the warming group, ,and only 40.9% in the non-warming group (OR: 0.867, CI: 0.231–3.25, p=0.832). Finally, warming of IV fluids was recorded in 62.5% of the warming and 37.5% of the non-warming group (Table 2).

Patient warming and temperature monitoring practices show wide gaps and differences. Only 5% of patients in the operating room at 15 minutes and 12.5% at 30 minutes had their temperatures assessed, and 52.5% were never recorded. Temperature monitoring in the recovery unit: 3.8% at 15 minutes, 7.5% at 30 minutes, and 58.8% never monitored. Axilla was the most frequent site of temperature measurement (46.3%), while tympanic membrane (21.3%) and rectum (2.5%) were measured less frequently. Perioperative warming was reported as practiced 'sometimes' in 67.5% of cases, and patients were reported to have not been warmed at all in 32.5% of cases. Pulmonary artery (36.3%) and tympanic membrane (28.7%) were regarded as the most accurate core temperature measurement sites followed by skin (5%). Total 21.3% percent had a body temperature of 37.5°C during transport from recovery unit to ward (and 48.8%, 36°C). These findings emphasize a need for common reference established protocols for temperature monitoring and warming procedures (Table 3).

Differences in patient-associated parameters among healthcare professionals using different methods of warming were based on age, gender, years of experience, qualifications, workplace, and type of institute. Increasing ambient temperature was the most common method used among patients aged 27–40 years (56.3%), followed by forced-air warming systems (18.8%) and warming of intravenous fluids (16.7%). In professionals older than 40 years, forced-air warming (40.6%) and warming of IV fluids (25.0%) were more popular. More men used forced-air warming systems (31.4%) and warming of intravenous fluids (23.5%), while more women preferred to increase the ambient temperature (55.2%).

Increasing the ambient temperature (46.2%) was the most common use among professionals with 1–15 years of experience, whereas 100% in the group of professionals with more than 15 years of experience,

Table 2: Comparison between Patients Warming and the Techniques Used

Techniques	Patients Warming		OR (C.I.)	P-Value
	Warming (n=56)	Non-Warming (n=24)		
Increase the ambient temperature	30 (83.3)	6 (16.7)	3.0 (0.786—11.44)	0.121
Hot water bags	0 (0.0)	1 (100.0)	2.3 (2.30—2.03)	—
Electrical blanket	3 (60.0)	2 (40.0)	0.9 (0.115—7.03)	0.920
Forced-air warming systems	13 (59.1)	9 (40.9)	0.867 (0.231—3.25)	0.832
Warming of the intravenous fluids	10 (62.5)	6 (37.5)	—	—

Applied Chi-Square, Fisher's Exact test & Regression Model, OR (Odd Ratio), C.I. (Confidence Interval)

Table 3: Practices in Patient Warming

	At 15 mins	At 30 mins	Never
Body temperature of the patient in the operating room	4 (5.0)	10 (12.5)	42 (52.5)
Body temperature of the patient in the recovery unit	3 (3.8)	6 (7.5)	47 (58.8)
	Tympanic Membrane	**Rectum**	**Axilla**
Measure the body temperature	17(21.3)	2(2.5)	37(46.3)
	Yes, sometimes	**No**	------
Warm up the patients in the perioperative period	54(67.5)	26(32.5)	0(0.0)
	Tympanic Membrane	**Skin**	**Pulmonary Artery**
Site showing the most accurate measurement of core temperature	23(28.7)	4(5.0)	29(36.3)
	37.5°C	**36°C**	------
Body temperature of the patient for transporting the recovery unit to the ward bed	17(21.3)	39(48.8)	0(0.0)

Table 4: Distribution of Patients Related Parameters Among Healthcare Professionals' Preferred Techniques

Parameters		Increase the ambient temperature	Hot water bags	Electrical blanket	Forced-air warming systems	Warming of the intravenous fluids
Age (years)	27 – 40	27(56.3)	1(2.1)	3(6.3)	9(18.8)	8(16.7)
	>40	9(28.1)	0(0.0)	2(6.3)	13(40.6)	8(25)
Gender	Male	20(39.2)	1(2.0)	2(3.9)	16(31.4)	12(23.5)
	Female	16(55.2)	0(0.0)	3(10.3)	6(20.7)	4(13.8)
Experience (years)	1 – 15	36(46.2)	1(1.3)	5(6.4)	20(25.6)	16(20.5)
	>15	0	0	0	2(100)	0
Qualification	FCPS (Consultants)	19(45.2)	1(2.4)	1(2.4)	13(31)	8(19)
	MCPS (Specialist)	3(50)	0	1(16.7)	1(16.7)	1(16.7)
	American Board (Certified Diploma)	1(100)	0	0	0	0
	FCPS resident < 2 years' Experience	0	0	0	1(50)	1(50)
	FCPS resident = 2-year experience	13(44.8)	0	3(10.3)	7(24.1)	6(20.7)
Type of Institute	Private	28(45.9)	1(1.6)	5(8.2)	16(26.2)	11(18.0)
	Government	8(42.1)	0	0	6(31.6)	5(26.3)
Place of Working	Operating Room	36(45.6)	1(1.3)	5(6.3)	22(27.8)	15(19)
	ICU	0	0	0	0	1(100)

ICU (Intensive Care Unit), FCPS (Fellow of College of Physicians and Surgeons), MCPS (Member of College of Physicians and Surgeons)

used forced-air warming systems. FCPS consultants most frequently reported raising ambient temperature (45.2%) and using forced-air warming systems (31.0%), while FCPS residents with =2 years of experience reported increasing ambient temperature (44.8%) and using forced-air warming systems (24.1%). Increasing the ambient temperature (45.9%) and forced-air warming systems (26.2%) were common in private hospitals, whereas in government hospitals, forced-air warming systems (31.6%) and intravenous fluids warming (26.3%) were more frequent.

Increasing the ambient temperature (45.6%) and forced-air warming systems (27.8%) were the most commonly used by professionals in the operating room. In contrast, the only method used in the ICU was warming of intravenous fluids (100%). These results demonstrate the diversity of practice driven by patient characteristics, professional background, and work environment, and highlight a lack of uniformity in warming protocols (Table 4).

DISCUSSION

Perioperative temperature regulation and management, as well as warming methods applied to patients, are very important to reduce the risk of intraoperative hypothermia, a widely observed but avoidable dangerous state which may provoke many other complications. The aim of this discussion was to assess how often patient warming practices are performed, the methods used and the impact these perioperative measures have on patient outcomes.

Hypothermia during surgery has been long-documented, as there are multiple patients whose temperature drops as a result of the administration of anaesthesia and cooling effects as a consequence of the environment of the operating room. Perioperative hypothermia is associated with significant risk. Hypothermia can be associated with prolonged recovery times, higher blood loss, increased infection rates, and increased post-operative care[15]. In addition, it causes serious cardiovascular and metabolic disturbance which may hinder surgical procedure. In the study by Yi et al., despite this intravesical therapy, the authors stress the need for active temperature management because they also highlight the high prevalence of intraoperative hypothermia, with a large proportion of general anaesthetized patients experiencing a decrease in the core body temperature[16].

This has led to advances in techniques to prevent hypothermia during surgery. Perioperative active warming techniques (such as forced-air warming blankets) are in widespread use to prevent perioperative hypothermia and maintain thermal comfort. In their study, Özsaban and Acaroðlu showed that active warming (forced-air warming blankets) provides significant reduction of postoperative hypothermia and enhanced thermal comfort[17]. Not only are these methods effective in preventing hypothermia but they also result in improving surgical outcomes, quicker recovery, and reduction in postoperative morbidity.

There are a variety of warming methods, which depend on the type of surgery, patient characteristics, and institutional protocols. For example, specifically in the field of colorectal surgeries, Gala et al. call for more occasional usage of warming devices to actually avoid hypothermia, especially in high-risk patients (old patients, long procedures)[18]. The study also found that passive warming techniques, such as warm intravenous fluids or warm air circulation, are sometimes insufficient for high-risk surgeries, necessitating the use of more robust interventions like forced-air warming or circulating water garments.

Furthermore, the warming technique's efficacy can be influenced by the temperature at which the device is set.. In an experimental study based on different temperatures of forced-air warming blanket, He et al found that higher ambient temperatures are better than lower temperatures for reducing inflammatory markers and improving postoperative clinical recovery in paediatric patients undergoing congenital hip dislocation procedures[19]. This suggests that tailoring the warming method to the patient's condition and the specifics of the surgery is essential for optimizing outcomes.

Despite the widespread use of warming techniques, the implementation of patient warming practices is often inconsistent. According to a survey by Inal et al. among anesthesiology specialists in Turkey, although the majority of clinicians were aware of the risks of hypothermia, prevention practices varied significantly[20]. Notably, barriers to successful and sustained implementation of warming included less education on warming, insufficient apparatus, and heterogeneity of protocols between institutions. These findings align with those of Munday et al., who identified several barriers and enable the implementation of perioperative hypothermia prevention, with the multidisciplinary team's involvement and training being central to overcoming these barriers[21].

The strength of the current body of literature is its demonstration of the effectiveness of active warming techniques in preventing hypothermia and improving patient comfort. The most reliable evidence of the clinical benefits of these practices, such as reduced postoperative complications and shorter recovery time,

comes from their randomized controlled trials, for example, those of Özsaban and Acaroðlu[17]. However, one drawback is that many of the studies are based on certain patients' groups or the type of surgery, so the results are not always generalizable. The evidence on the best temperatures and the duration for warming is also inconsistent, which complicates the creation of standardized protocols.

Recommendations for improving perioperative warming practices include standardizing the use of warming techniques across all types of surgery and patient demographics. More consistent training for healthcare providers and access to proper warming devices is needed from institutions. In addition, the ideal warming temperatures and times for individual surgical procedures should be identified and the impact of normothermia during surgery on long-term results should be addressed in future investigations. Patient-specific factors, including age, comorbidities, and surgery duration, can be included in the warming strategy to make it more tailored and potentially more effective.

In our study, the frequency of patient warming was 70% and the techniques used for patient warming were as follows: increase the ambient temperature 83.6% (p=0.121), hot water bags 0%, electrical blanket 60% (p=0.920), forced-air warming systems 59.1% (p=0.832), and warming of the intravenous fluids 62.5%. Inal MA, et al found the warming techniques to be hot air blowing systems and cotton materials such as blankets and socks (63.7% and 20.1%), respectively[20]. In another study, patient warming was observed in 62.5%, and the techniques were: forced-air warming devices (42.3%), ambient temperature (21.8%), warming the intravenous fluids (13.1%), electrical blankets (12.5%), and hot water bags (8.1%)[22].

Perioperative hypothermia or inadvertent hypothermia represents a significant problem with multiple comorbidities ranging from increased morbidity, mortality, prolonged hospital stays, and higher health resource use costs, thus, patient warming is vital in preoperative, intraoperative, and postoperative settings. There is strong evidence for active warming methods, but further work is necessary to address barriers to implementation and optimize approaches for different surgical settings. Ensuring that this is exercised universally and tailored to the individual patient's needs, can tremendously promote patient safety and comfort during surgical procedures.

CONCLUSION

The results show that there is variability in perioperative temperature monitoring and warming practices among anaesthesiologists in Karachi. While use of patient warming was widespread, application methods varied considerably. Ambient temperature adjustment was an overused technique; however, practices such as forced-air warming and fluid warming were mixed. These findings highlight the need for standardization of protocols and increased clinician awareness in order to prevent perioperative hypothermia and its associated complications.

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REFERENCES

1. de Brito Poveda V, Oliveira RA, Galvão CM. Perioperative body temperature maintenance and occurrence of surgical site infection: a systematic review with meta-analysis. Am J Infect Control. 2020; 48(10):1248-54.
2. Rauch S, Miller C, Bräuer A, Wallner B, Bock M, Paal P. Perioperative hypothermia—a narrative review. Int J Environ Res Public Health. 2021;18(16):8749.
3. Simegn GD, Bayable SD, Fetene MB. Prevention and management of perioperative hypothermia in adult elective surgical patients: a systematic review. Ann Med Surg. 2021;72: 103059.
4. Yoo JH, Ok SY, Kim SH, Chung JW, Park SY, Kim MG, et al. Efficacy of active forced air warming during induction of anesthesia to prevent inadvertent perioperative hypothermia in intraoperative warming patients: comparison with passive warming, a randomized controlled trial. Medicine. 2021;100(12): e25235.
5. Balki I, Khan JS, Staibano P, Duceppe E, Bessissow A, Sloan EN, et al. Effect of perioperative active body surface warming systems on analgesic and clinical outcomes: a systematic review and meta-analysis of randomized controlled trials. Anesth Analg. 2020; 131(5):1430-43.
6. Lee HY, Kim G, Shin Y. Effects of perioperative warm socks-wearing in maintaining core body temperature of patients undergoing spinal surgery. J Clin Nurs. 2018; 27(7-8):1399-407.

7. Koenen M, Passey M, Rolfe M. “Keeping Them Warm”—A randomized controlled trial of two passive perioperative warming methods. J Perianesth Nurs. 2017;32(3):188-98.
8. Bindu B, Bindra A, Rath G. Temperature management under general anesthesia: compulsion or option. J Anaesthesiol Clin Pharmacol. 2017;33(3):306-16.
9. Koh W, Chakravarthy M, Simon E, Rasiah R, Charuluxananan S, Kim TY, Chew ST, Bräuer A, Ti LK. Perioperative temperature management: a survey of 6 Asia–Pacific countries. BMC Anesthesiol. 2021;21:1-0.
10. Sessler DI. Perioperative temperature monitoring. Anesthesiology. 2021;134(1):111-8.
11. Matika R, Ibrahim M, Patwardhan A. The importance of body temperature: an anesthesiologist's perspective. Temperature. 2017;4(1):9-12.
12. Miyazaki R, Hoka S. What is the predictor of the intraoperative body temperature in abdominal surgery? J Anesth. 2019;33:67-73.
13. Lee SY, Kim SJ, Jung JY. Effects of 10-min prewarming on core body temperature during gynecologic laparoscopic surgery under general anesthesia: a randomized controlled trial. Anesth Pain Med. 2020;15(3):349-55.
14. Riley C, Andrzejowski J. Inadvertent perioperative hypothermia. BJA Educ. 2018;18(8):227-33.
15. Ruetzler K, Kurz A. Consequences of perioperative hypothermia. Handb Clin Neurol. 2018; 157:687-97.
16. Yi J, Lei Y, Xu S, Si Y, Li S, Xia Z, et al. Intraoperative hypothermia and its clinicy outcomes in patients undergoing general anesthesia: National study in China. Plos One. 2017:12(6): 60177221.
17. Özsaban A, Acaroðlu R. The effect of active warming on postoperative hypothermia on body temperature and thermal comfort: a randomized controlled trial. J Perianesth Nurs. 2020;35 (4):423-9.
18. Gala T, Shahzad N, Edhi Al, Chawla TU. Perioperative hypothermia in colorectal surgeries: are we doing enough to prevent it? JPMA. 2020;70(2):30-7.
19. He LP, Liu PZ, Wen YM, Wu J. Effect of temperature maintenance by forced-air warming blankets of different temperatures on changes in inflammatory factors in children undergoing congenital hip dislocation surgery. Chin Med J. 2020;133(15):1768-73.
20. Inal MA, Ural SG, Çakmak Hª, Arslan M, Polat R. Approach to perioperative hypothermia by anaesthesiology and reanimation specialist in Turkey: a survey investigation. Turk J Anaesthesiol Reanim. 2017;45(3):139.
21. Munday J, Delaforce A, Forbes G, Keogh S. Barriers and enablers to the implementation of perioperative hypothermia prevention practices from the perspectives of the multidisciplinary team: 3 qualitative study using the Theoretical Domains Framework. J Multidiscip Healthc. 2019:12:395.
22. Köksal GM, Dikmen Y, Utku T, Ekici B, Erbabacan E, Alkan F, et al. Perioperative temperature monitoring and patient warming: a survey study. Turk J Anaesthesiol Reanim. 2013;41(5):149.