HYPOTHERMIA IN THE IMMEDIATE POST-OPERATIVE PERIOD: PERCEPTION OF NURSING TECHNICIANS

Hipotermia no pós-operatório imediato: percepção de técnicos de enfermagem

Hipotermia en el periodo postoperatorio inmediato: percepción de los técnicos de enfermería

Aline da Silva Sanguiné[1], Gisele Fabiane do Nascimento Ramos[2], Jaqueline Regina Boschetti[3], Patricia Treviso[4]*

ABSTRACT : Objective: To understand the perception of nursing technicians working in the post-anesthetic care unit (PACU) of a large philanthropic hospital in Porto Alegre regarding hypothermia in the immediate postoperative period (IPO). **Method:** an exploratory, descriptive, field study with a qualitative approach. The data collection was performed from April to May 2017, by means of a recorded interview, using a script composed of 10 questions. Thematic analysis was used to treat the data. **Results:** Nineteen nursing technicians participated in the study. The data analysis resulted in four categories: perception about the definition of hypothermia; complications of hypothermia for the patient in the IPO; actions to prevent and reverse hypothermia; experiences related to situations of hypothermia. **Conclusion:** The interviewees demonstrated knowledge about nursing care for the prevention and reversal of hypothermia in patients in the IPO in the PACU.

Keywords: Hypothermia. Postoperative period. Licensed practical nurses. Recovery room.

RESUMO: Objetivo: Conhecer a percepção de técnicos de enfermagem que atuam na sala de recuperação pós-anestésica (SRPA) de um hospital filantrópico de grande porte de Porto Alegre sobre hipotermia no pós-operatório imediato (POI). **Método:** Estudo de campo, exploratório, descritivo e qualitativo. A coleta de dados foi realizada no período de abril a maio de 2017, por meio de entrevista gravada em áudio, utilizando um roteiro composto de 10 questões. Utilizou-se a análise temática para tratamento dos dados. **Resultados:** Participaram do estudo 19 técnicos de enfermagem. A análise dos dados possibilitou elencar quatro categorias: percepção sobre a definição de hipotermia; complicações da hipotermia para o paciente no POI; condutas de prevenção e reversão de hipotermia; vivências relacionadas a situações de hipotermia. **Conclusão:** Os entrevistados demonstraram conhecimento sobre os cuidados de enfermagem para prevenção e reversão da hipotermia em pacientes no POI que se encontram na SRPA.

Palavras-chave: Hipotermia. Período pós-operatório. Técnicos de enfermagem. Sala de recuperação.

RESUMEN: Objetivo: Comprender la percepción de los técnicos de enfermería que trabajan en la unidad de recuperación postanestésica (URPA) de un gran hospital filantrópico en Porto Alegre sobre la hipotermia en el período postoperatorio inmediato (POI). **Método:** un estudio exploratorio, descriptivo, de campo con un enfoque cualitativo. La recolección de datos se realizó de abril a mayo de 2017, mediante una entrevista grabada, utilizando un guión compuesto por 10 preguntas. El análisis temático se utilizó para tratar los datos. **Resultados:** Diecinueve técnicos de enfermería participaron en el estudio. El análisis de los datos dio como resultado cuatro categorías: percepción sobre la definición de hipotermia; Complicaciones de hipotermia para el paciente en el POI; Acciones para prevenir y revertir la hipotermia; Experiencias relacionadas con situaciones de hipotermia. **Conclusión:** los entrevistados demostraron conocimientos sobre el cuidado de enfermería para la prevención y reversión de la hipotermia en pacientes en la POI en la URPA.

Palabras clave: Hipotermia. Periodo posoperatorio. Enfermeros no diplomados. Sala de recuperación.

[1]Undergraduate Nursing Student at the IPA Methodist University Center - Porto Alegre (RS), Brazil.
[2]Nurse; Nursing Services Administration Specialist. Nurse at the Irmandade da Santa Casa de Misericórdia de Porto Alegre (ISCMPA) – Porto Alegre (RS), Brazil.
[3]Nurse; Nephrology Nurse Specialist. Nurse at ISCMPA - Porto Alegre (RS), Brazil.
[4]Nurse; PhD in Health Sciences; Professor of the Undergraduate Nursing Course at the IPA Methodist University Center - Porto Alegre (RS), Brazil.
*Corresponding author: ptreviso15@gmail.com
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INTRODUCTION

The perioperative period is composed of three phases. The first is the preoperative phase, which begins with the scheduling of the surgical intervention and ends with the transfer of the patient to the operating room (OR)[1]; the second is the intraoperative phase which begins with the patient's entry into the OR and finishes with their admission to the post-anesthetic care unit (PACU); and the third is the postoperative phase, which occurs when the patient arrives at PACU and finishes with the follow-up assessment in the clinical or home environment[1].

In the immediate postoperative period (IPO), which comprises the first 24 hours after surgical procedures which require anesthesia, nursing care aims at observing, identifying and conducting appropriate patient care until recovery from anesthetic effects, i.e., until the patient has normal motor and sensory functions, is oriented, has stable vital signs, and without evidence of hemorrhage or complications[2].

During this period, the patient may present several complications resulting from anesthesia and surgery as well as from previous pathologies. Hypothermia is among the postoperative complications to which the surgical patient is subjected to[2]. A great amount of patients submitted to anesthesia present with hypothermia, due to changes in thermoregulation caused by the anesthetic effect that can reduce up to 20% of the metabolic heat production[3,4], but also due to other factors, such as low temperature of the OR, infusion of cold liquids, blood loss, prolonged surgery time, among others[5].

Hypothermia is a common event in the perioperative period[6]. It is defined as the reduction of the core body temperature below 36° C. In Brazil, there are indications that it affects approximately 70% of the patients submitted to surgical procedures[7], and may be intentional (therapy) - consciously provoked by the medical team for a specific treatment - or unintentional (accidental) treatment - usually occurring in trauma victims , extensive surgical procedures, among others[8].

Unintentional hypothermia in anesthetic-surgical patients occurs because of the effects caused by anesthetic agents on the physiology of thermoregulation, the decrease of the patient's metabolism and exposure to the cold environment of the OR. These factors can cause several complications to the surgical patient, therefore, hypothermia should be avoided or quickly treated[9]. Cardiac arrhythmias, coagulation abnormalities and platelet function, which may lead to increased blood loss, increased risk of mortality and surgical site infection (SSI) are among the complications caused by hypothermia, as well as thermal discomfort, increase in the patient's stay in the PACU and, consequently, an increase in length of hospitalization[6].

Knowledge and understanding about the pathophysiology, complications and forms of prevention are important and necessary for nurses working in PACU to perform their role competently and safely, contributing to the full recovery of the patient[4,10].

The control of the patient's body temperature in the postoperative period is a challenge for the nursing staff, who often have difficulties in providing care in situations of hypothermia. In this scenario, understanding the perception of nursing technicians may contribute to the implementation of improvements in care. In this study, we sought to further develop the hypothermia theme, considering its importance in patient recovery in the IPO. The question that guided this research was: What is the perception of nursing technicians who work in the post-anesthetic recovery room on hypothermia in the immediate postoperative period?

OBJECTIVE

To identify the perception of professional nursing technicians who work in the post-anesthetic recovery room on hypothermia in the immediate postoperative period.

METHOD

This is an exploratory, descriptive, field study with a qualitative approach. It was performed in a large philanthropic hospital in Porto Alegre (RS), which provides care to patients from the Brazilian Unified Health System (SUS), and individuals with private health insurance. The hospital has a PACU with 22 beds.

All nursing technicians who worked for at least six months in the institution, morning, afternoon, evening and nights in the PACU were invited to participate in the study. Those who were on vacation, health leave or absent from the institution during the period of data collection were excluded.

Data were collected from April to May 2017, after the approval of the research project by the Research Ethics Committees (REC) of the institution (1.908.865)

and co-participant (1.940.765). The study was guided by Resolution 466/2012 of the National Health Council (CNS).

Study participants signed two Free and Informed Consent Forms (IC), one form stayed with the researcher and the other stayed with the participant. Regarding the interviews, a questionnaire composed of ten questions was elaborated by the researchers, addressing the temperature levels considered normal, routine body temperature verification, factors that can induce hypothermia in the perioperative period, identification of changes caused by the process of hypothermia, strategies to revert this condition and a question to identify if the participant had already experienced some situation with a hypothermic patient, how the condition was identified and what action was taken. In addition to the 10 questions, questions were asked regarding the sample profile.

A pilot test was conducted with five nursing technicians which aimed to check the understanding of the questions of the research instrument. The interviews were previously scheduled with each participant as well as with the nursing manager of the department in order not to disturb the progress of the activities of the service in question. The interviews lasted approximately 20 minutes and were held in an administrative room in order to maintain and respect the privacy of the subjects. The interviews were recorded and later transcribed in order to help the analysis process.

In order to evaluate the data, the thematic analysis methodology proposed by Minayo[11] was used:

- pre-analysis: continuation of the initial objectives of the research, joining it with the collected material; floating reading, which consists of a greater appropriation of the data, by means of exhaustive reading; careful organization of the material; and definition of keywords or categories;
- exploration of the material, which consists in electing, classifying and aggregating the categories;
- treatment of the results achieved, with a correlation of the data obtained with the theory, aiming to complement the questioning of the study.

RESULTS AND DISCUSSION

Nineteen nursing technicians participated in the study; all who agreed to be part of the study were interviewed. Regarding the sample profile, the average age of the participants is 35 years of age, the majority (17) is female, 10 also work in another institution and the average amount professional experience as a nursing technician is 12 years. As for experience in the PACU, one professional has been working for 7 years and the one with the least amount of working time in the sector has been working there for 14 months.

Based on the answers of the professionals who participated in the study, the units of text were identified, i.e., phrases and words that appear in the responses of the participants in a repeated way and that infer an expression that represents them[12]. Based on this, four categories are listed:

- Category 1: perception about the definition of hypothermia;
- Category 2: complications of hypothermia for the patient in the IPO;
- Category 3: hypothermia prevention and reversal;
- Category 4: experiences related to situations of hypothermia.

To identify the participants of the research, we chose the nomenclature A1 to A19, composed of "A" for anonymous, and followed by the number corresponding to the order of the interviews. The categories are presented and discussed below.

Category 1: perception about the definition of hypothermia

In the post-anesthetic recovery period, the patient is cared for by the PACU nursing team, in which the nursing technician is one of the professionals who will be closest to the patient during all possible changes that may occur during this period, including changes in thermoregulation.

Hypothermia is defined as the loss of heat to the environment, i.e., the state in which the body temperature of an individual is below the normal value, characterized by a blood temperature of below 36ºC, and present in the patients submitted to different surgeries[13].

In the questioning about the definition of hypothermia, the responses were similar in relation to the concept and focus on it as a "low body temperature" situation, which can be seen in the following statements: "Hypothermia is a low body temperature" (A2); "It is the excessive decrease in normal body temperature" (A5).

Hypothermia is responsible for severe complications in the body, especially in the patient in the IPO. The surgical patient undergoes situations that demand the proper functioning of the metabolic functions, which can be altered by hypothermia[3,4,14].

The human body has a core body temperature (brain, heart, lung and splanchnic organs) between 36.6 and 37.6ºC. Hypothermia is a temperature lower than 36ºC[7]. Regarding the values considered for hypothermia, the majority of interviewees highlighted according to the concept: "It would be, in this case, a temperature lower than 36º" (A9); "When it is less than 36º" (A17)

Two participants reported a different value from the others: "AT [axillary temperature] lower than 34º" (A1); "34.5º" (A2).

Knowledge of normal levels and changes in body temperature by the team that provides care to the patient is fundamental so that prevention and reversion measures can be applied and quality of care is guaranteed [4,14].

In the PACU, the nursing team provides care to recover and prevent complications arising from anesthetic and surgical procedures, therefore, it is essential to verify and monitor vital signs, including body temperature.

When the patient arrives at PACU, vital signs should be monitored every 15 minutes in the first hour, every 30 minutes in the second hour, and hourly thereafter if the patient remains stable[9]. As for the routine temperature verification in the PACU, all participants reported similar information, according to the following sample: "In the first hour, every 15 minutes, in the second hour, every 30 minutes and then once every hour" (A1); "At PACU, we check, when the patient arrives, every 15 minutes until one hour goes by, then every 30 minutes, and after the third hour we check once every hour" (A18).

The role of the nursing professional in the postoperative period is to assist patients and their families, clarify doubts and assess the patients' health status at all stages of treatment[9]. When identifying a change in body temperature, the nursing action should be fast so that hypothermia is avoided. Professionals should be aware of changes that may arise at this stage of the IPO and be prepared to intervene safely and with quality. Several factors that can induce hypothermia were mentioned: "There are several, one is the length of surgery time, the type of surgery, anesthesia, general condition of the patient, right?" (A9); "Surgery as a whole contributes to the patient's loss of body heat, light clothing, anesthetic medications, cold room environment, blood loss, delayed surgery" (A19).

Many of the interviewees reported that the temperature of the air conditioning, during the intraoperative period, interferes in the temperature of the patient. In addition, there are other risk factors for hypothermia, such as the nature and size of the surgery; large blood loss; changes caused by the anesthetic procedure; skin antisepsis with cold chemical agents; fully uncovered patient; infusions of cold solutions; and opening of the abdominal and / or thoracic cavity, among others[3,5,9] – which are all justifications for the whole team to be attentive to the thermoregulation of the patient in this period:

> "Infusion of IV cold [intravenous], cavity and open wounds, old age, inhaling cold gases, the air conditioning of the operating room with low temperature and also the anesthetic drugs, these are the ones I know" (A16).

Unintentional hypothermia occurs due to the effects caused by anesthetic agents on the physiology of thermoregulation, low patient metabolism and exposure to the cold environment of the OR[3]. These factors can cause several complications to the surgical patient, therefore, hypothermia should be avoided or promptly treated when it occurs[9]. Many of the respondents reported: "I think it would be the change in metabolism by drugs used during anesthesia during the procedure, low room temperatures and long exposure to these low temperatures" (A10); "Well, during the transoperative period the patient loses heat and their temperature falls, the action of anesthetic drugs can also generate heat loss; ah, another factor is the use of cold agents during surgery" (A11).

Hypothermia can cause various physiological changes, such as the release of catecholamines, by sympathetic-adrenergic stimulation, to control body temperature and increase glucose production from hepatic glycogen[15]. In hypothermia, glucose utilization is depressed due to reduced metabolic activity of the liver, inhibition of enzyme activity, and reduced production of insulin in the pancreas; even the administration of insulin is insufficient to normalize blood glucose. Some speeches emphasize metabolic issues: "I think the factors that can induce are diseases like diabetes, cold environment, circulation problems and hypothyroidism" (A6); "Generally, exposure to cold, low blood glucose levels, medications" (A8).

Temperature control is an important aspect of patient safety. Considering this, it is fundamental that the health teams are aware of the temperature, as well as the signs and symptoms of the patient arriving at the PACU. It must be emphasized that the qualification of nursing professionals must be based on the problematic of their work process[14].

Category 2: complications of hypothermia for the patient in the immediate postoperative period

The patient in the IPO in the PACU is vulnerable to several complications, which can reach different systems, in particular the cardiovascular system, which can lead to myocardial ischemia, tachycardia, arterial hypertension and deep venous thrombosis [13]. When asking the participants if hypothermia could lead to other complications and, if so, what they were, the answers were diverse: "Yes, it can cause some complications ... gangrene, cardiac arrhythmia, bradycardia, among others" (A9); "I think so, freezing, tissue death, damage to nerves and blood vessels can occur; this decrease in body temperature can also cause a decrease in cellular activity, having other complications and also causing the patient's death" (A12).

Hypothermia can also compromise the immune system, reducing the immunity of the patient, which can lead to the incidence of SSIs and deficits in coagulation factors, such as platelet activation and coagulopathy[16]. One participant reported: "Yes, and one of the major risk factors is surgical site infection" (A6).

Other complications are the hydroelectrolytic changes, such as hypokalemia, hypomagnesemia and hypophosphatemia; and endocrine-metabolic changes, such as low corticoid levels, insulin decline, high peripheral insulin resistance, increased TSH (thyroid stimulating hormone) and, consequently, thyroxine and hypoglycemia and hyperglycemia[16]. The participants confirmed the above with the following statements: "Freezing or tissue death, gangrene, damage to nerves and blood vessels, death" (A3); "Yes, alteration of consciousness, cold extremities" (A7).

In the PACU, the patient becomes vulnerable to several complications, especially those with respiratory, circulatory and gastrointestinal origins. Mild hypothermia is classified as 34 to 35.9ºC, moderate as 30 to 33.9ºC and severe as below 29.9ºC[17]. Regarding complications, participants were asked if hypothermia in the IPO was considered a physiological alteration, and how would it be classified: a minimal, moderate or high impact, and what would be the justification. The answers varied:

- "In most patients, it is minimal, because of the room, because of the blood loss, but it is also moderate, which according to the anesthetics, anesthesia has a big effect on temperature. [...]" (A2);
- "If it were a physiological change, it would be moderate to minimal, because patients usually arrive in the post-anesthetic care unit with a temperature of 35.5Cº" (A6).

In mild hypothermia, the patient may exhibit symptoms of atrial arrhythmias, reduced heart rate, altered consciousness, reduced respiratory rate, swallowing reflex depression, pupil dilation, tremor reduction, hyporeflexia, hypotension and possible electrocardiogram alterations[16]. The following responses are observed: "In my opinion, it would be moderate, which could cause bleeding from the OS [operative site], respiratory dysfunction" (A7); "I believe it is moderate, due to the complications caused in the postoperative period" (A9).

When the temperature is lower than 30ºC, it has a great effect, as it increases the risks of the patient entering into a coma, apnea, non-reactive pupils, oliguria, ventricular arrhythmias, asystole, and even death[16]. Aware of such knowledge, some interviewees highlighted: "For me, I classify it as having a great effect, because, if there is decreased cellular activity, it will interfere with the healing of the OS and the anesthetic recovery" (A11); "A ,great impact. Because one of the first postoperative care actions is to keep the patient warm, to avoid a decrease in patient activity" (A13).

As for the factors that can induce hypothermia, the following are highlighted; anesthetic agents, environment temperature, time of exposure of the patient in places with low temperature, administration of cold venous infusions, systemic disorders, among others. In this parameter, some factors were cited, according to the knowledge of each interviewee: "It may repeat..[sic] ... vasoconstriction, delay in healing, general discomfort of the patient" (A1).

As for the signs of temperature changes, the following were characterized: "Cold and pale skin, chills, temperature below 36°C, bluish extremities" (A4); "Well, the patient shivers uncontrollably, has a weak pulse, difficulty in controlling the movements of the body" (A18).

Therefore, monitoring temperature during intraoperative anesthesia is of great importance, as it provides early detection of hypothermia and / or complications, and may facilitate thermal control in the patient's IPO in the PACU.

Category 3: Actions to prevent and reverse hypothermia

Knowing how to identify, recognize and understand care related to hypothermia is of great importance to the

professional so that they are be able to assist the patient, and provide care with quality, safety and efficacy. Perioperative heating reduces blood loss, pain, tremors, and risk of SSI in the IPO[19].

Regarding measures and the prevention of hypothermia, the participants highlight that making use of heating devices is the principal nursing practice for the prevention and reversal of hypothermia:

- "Warming the patient in the operating room with blankets and thermal blankets, using covers on the lower limbs can also be used, infuse heated solutions, warm the head with caps, monitor temperature" (A11);
- "So, [...] when the patient arrives to us, we put blankets on them, and keep maintain room temperature in the PACU" (A14).

Care for the maintenance of the patient's normothermia is performed by means of monitoring body temperature as the main nursing intervention to prevent and reduce risks of future complications[6]. In view of the measures to prevent hypothermia, participants highlight that warming up the patient is strategic care: "The main thing is to warm the patient" (A5); "Warm the patient up immediately and keep the thermometer on the monitor for strict temperature control" (A6).

Other strategies can still be used, such as active and passive heating. Passive heating is a low-cost and effective method of covering and warming the patient with sheets, covers or cotton blankets, wrapping the lower limbs with laminated cotton and crepe bandage is practised. Active measures of heating include; electric blanket, thermal blanket, heated water mattress, irrigation and venous infusion with heated fluids, among others. All of these methods for warming the patient can reduce heat loss by 30% during surgery and in the PACU[14,18].

Category 4: experiences related to situations of hypothermia

The interview script was finalized with a question about the personal experience of each participant regarding a situation of hypothermia, how it was identified and what nursing action was performed at the time. All participants reported that they had experienced some kind of hypothermic patient care: "Yes, the patient arrived with tremors, chills, cold and purple extremities. I covered him with two blankets, put a warm blanket at 43 degrees for quick heating, and gloves filled with hot water over the feet" (A14); "Yes, the patient came in shivering a lot, cold extremities, slow heart rate and breathing too, pale skin. He was heated with blankets and with the thermal blanket at 43 degrees." (A19)

Some interviewees reported that they had not experienced any serious hypothermia, but described how they how they act should it occur: "I have not experienced a very serious situation, but as I said, if it had happened, I would have advised the PACU nurse and would provide blankets, to reverse the situation quickly" (A12); "I never witnessed a serious situation, but for the symptoms such as shivering, cold extremities, low AT, I would provide blankets for heating" (A18).

The fact that all participants report having experienced some situation with hypothermic patients indicates that this complication is common in the IPO as well as highlighting the importance of the nursing team and the use of care strategies during the perioperative period, aiming to prevent this circumstance as well as the need for early reversal when it does occur.

CONCLUSION

This study made it possible to identify the perception of nursing technicians working in the PACU regarding hypothermia in the IPO, demonstrating that the participants are aware of the definition of this condition, the values that determine it and the main triggering factors. In situations in which hypothermia can cause complications in the IPO, the interviewees indicated symptoms such as decreased cellular activity, physiological and metabolic changes, SSIs, among others, that may evolve to a situation without hypothermia reversion.

The findings indicate that the participants use several care strategies to prevent and reverse hypothermia in the IPO, using both passive and active heating methods.

Therefore, it is believed that the clarification about the perception of nursing technicians regarding hypothermia can support and stimulate the search and improvement of new knowledge, as well as highlighting the importance of nursing care in the perioperative period with regard to the prevention and reversion of complications in the postoperative period, as well as promoting new studies in this area.

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