

The Intervention Effect of Warm Blanket Compresses and Essential Aromatherapy on Increasing the Body Temperature of Surgical Patients

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Abstract

Aims: This study aimed to show the effectiveness of a combination of interventions by providing warm compresses, blankets, and essential aromatherapy to determine changes in the patient's body temperature after surgery

Methods: The research design used accurate experimental research with a pretest-posttest design. This study had 60 respondents divided into two groups, using a non-probability sampling technique with a stratified random sampling method. The control group was given intervention according to standard hospital procedures: a Striated Blanket at room temperature. The intervention group was given a combination of warm compresses and warm blankets. The temperature of the warm blanket is 44 Celsius, with a compressive time of about 30 minutes. Essential aromatherapy is four drops in 100 cc of water with diffusion for 15 minutes. The research was conducted from December 26, 2022, to January 28, 2023

Results: This research shows a significant difference in the average increase in body temperature. After intervention treatment, a significant value was obtained, namely with a pre-value of 35.43°C and a post-value of 36.50°C ($p=0.00$). Combining a warm compress with a warm blanket at a temperature of 44 Celsius for 30 minutes and giving essential aromatherapy four drops in 100 cc of water with diffusion for 15 minutes give a significant result for body temperature.

Conclusion: The combination of warm compresses, warm blankets, and essential aromatherapy effectively increases the body temperature of postoperative spinal anesthesia patients in the recovery room.

Keywords: warm blanket compresses, essential aromatherapy, body temperature, post-surgery

Introduction

Post-surgery is a condition that is prone to postoperative complications. In this condition, the patient is in the recovery room, and his hemodynamics, such as blood circulation, breathing, and consciousness function, are observed (Dehghanpisheh et al., 2022). In this condition, the patient's body recovers from the effects of anesthesia, which reduces metabolism and body temperature (Suswita D, 2019). Close postoperative observation is a critical point where the nurse's duties and responsibilities are to monitor, maintain, and maintain the physiological function of the patient's vital organs to remain within normal limits (Ujung, 2015).

The problem in postoperative patients is hemodynamic stabilization, where the recovery period after surgery and anesthesia is an essential time for physiological stress in many patients. For example, shivering thermoregulatory disorders that often occur, namely shivering, occur due to a combination of anesthesia and surgical procedures, which can cause a decrease in heart rate so that ventricular contractility decreases and causes changes in blood pressure, a decrease resulting in changes in vital signs, decreased level of consciousness, unresponsiveness (Gerliandi et al., 2021). To pain, even in severe hypothermia, a person shows clinical signs such as death (Zahri Darni & Ririen Tyas Nur Khaliza, 2020). These methods overcome thermoregulation disorders such as shivering and hypothermia, maintain average body temperature during surgery, and improve hemodynamics (Lenhardt, 2018). Nursing care for postoperative shivering must be carefully prepared, especially after significant surgery lasting more than 1 hour 60 minutes (Alemayehu et al., 2020). Namely, a non-pharmacological therapeutic approach that can be carried out with warm blankets and essential aromatherapy is expected to increase patients' body temperature in the recovery room (Torossian A, 2016).

The advantages of giving warm blanket compresses and essential aromatherapy can help patients feel comfortable when experiencing thermoregulation disorders. The combination of warm compresses using blankets and essential aromatherapy is expected to increase the tolerance of the body's regulatory system to decrease body temperature and hemodynamic changes in blood pressure in postoperative patients. The role of nurses in providing non-pharmacological interventions is vital to support, not replace, pharmacological interventions. Non-pharmacological interventions have a significant effect in providing treatment for acute illnesses (Qona'ah A, 2020). Previous research on the effects of giving warm electric compresses and warm intravenous fluids on vital signs conducted by Tri Nova stated that the results of body temperature, blood pressure, RR, HR, and SpO2 significantly increased in the treatment group compared to the control group. This procedure is anticipated to raise the patient's body temperature at the recovery room of H. Badaruddin Kasim Hospital in Tabalong Regency, South Kalimantan, following spinal anesthesia for surgery.

Methods

This type of research is experimental research with an actual experimental research design with a pretest and post-test design with the control group. This research was conducted on post-spinal surgery patients in the Recovery Room of the Central Surgical Installation of H. Badaruddin Kasim Regional Hospital, Kab. Tabalong, South Kalimantan. The research sample obtained using the Lemeshow formula consisted of 30 respondents in the intervention group and 30 in the control group. The intervention group was given a warm blanket compress at 44°C and four drops of essential aromatherapy in 100 cc of water with diffusion for 15 minutes; the control group was given intervention according to standard hospital procedures, namely a Striated Blanket at room temperature for 30 minutes.

This study involved postoperative patients using spinal anesthesia techniques. Probability sampling was carried out using a random sampling method. The

inclusion criteria for this study are: (a) Willing to be a respondent, (b) Patients with spinal anesthesia, (c) Patients aged 17-55 years, (d) Patients with ASA I - III, (e) Patient Operation Time 1-2 Hours. Exclusion criteria: Health problems during surgery, such as systemic diseases (heart defects, hypertension, insulin-dependent diabetes mellitus). Each group in this study was given an electric blanket Xiaomi Youpin 150 x 80 heated to a temperature of 44 °C for 30 minutes and given four drops of essential aromatherapy in 100 ccs of water by diffusion for 15 minutes using Moi Humidifier diffuser Air purifier Aromatherapy Essential Oil 500ML. The measuring instruments used to measure body temperature use an infrared ear thermometer and bed monitor. Measurements were taken before and after administering an electric warm blanket for 30 minutes and Siri water aromatherapy for 15 minutes for postoperative patients in the intervention group. While the control group had measurements taken before and after being given interventions according to hospital standards. Data processing with editing, coding, data entry, and data cleaning processes. Statistical tests were carried out using the SPSS program. The data normality test was carried out before the bivariate test, and it was discovered that each group's body temperature value data was not normally distributed. Bivariate tests were to determine differences in hemodynamic status before and after intervention. Data analysis for each group using the Shapiro-Wilk test was done to determine differences in mean body temperature between groups. The Wilcoxon test was used with the Mann-Whitney test to compare body temperatures and the effectiveness of warm-up between groups.

This research adheres to ethical principles, including informed consent, anonymity, confidentiality, autonomy, beneficence, justice, veracity, and non-maleficence. Ethical permission was obtained from the Health Polytechnic Research Ethics Committee of the Ministry of Health, Semarang, with letter number 0774 /EA/KEPK/2022



Figure 1. Ear Thermometer (a thermometer that uses infrared light to measure the temperature in the ear canal, specifically the tympanic membrane).

Ear thermometers have three main advantages: they measure temperature without contact with the body, provide an estimate of brain temperature because they are close to the brain, and provide readings within two or three seconds.



Figure 2. Moi Humadifier diffuser Air purifier Aromatherapy Essential Oil 500ML



Figure 3. Xiaomi Youpin Electric Blanket 150 x 80 cm.

Results

The research results show that based on gender, in the intervention group, there were 18 (60%) more female respondents than men, while in the control group, there were 16 (53.3%) more female respondents than men. The intervention group had the highest education in Senior High School (SMA), with as many as 18 respondents (60%), and in the control group, 19 respondents (63%). In the intervention group, 13 (43.3%) respondents had Civil Servant (PNS) education, while in the control group, there were 10 (26.7%) respondents. The intervention group was in the 26-40 years age range with 14 respondents (46.7); for the control group aged 17-25 years, there were 11 respondents (36.7). Meanwhile, in the intervention group respondents, the highest surgical indication was laparotomy, namely 15 (50%) respondents, and the lowest was herniotomy, namely 2 (6.7%) respondents. In contrast, in the control group, the highest surgical indication was laparotomy, namely 14 respondents with a percentage of (46.7%). The p-value is > 0.05 , so it can be concluded that the characteristics of the respondents are homogeneous (Table 1).

Table 1. Characteristics of respondents from postoperative patients in the PT recovery room H. Badaruddin Kasim Regional Hospital, Tabalong Regency, South Kalimantan

Characteristics	Intervention (n=30)		Control (n=30)		p
	n	%	n	%	
Age					
17-25	6.0	20.0	11.0	36.7	0.500
26-40	14.0	46.7	10.0	33.3	
41-55	10.0	33.3	9.0	30.0	
Gender					
Man	12.0	40.0	14.0	46.7	0.610
Woman	18.0	60.0	16.0	53.3	
Education					
Junior High School	0.0	0.0	1.0	3.3	0.457
Senior High School	18.0	60.0	19.0	63.3	
Bachelor	12.0	40.0	10.0	33.3	
Work					
House wife	6.0	20.0	6.0	20.0	0.500
Farmer	3.0	9.0	6.0	19.0	
Civil servants	13.0	43.3	10.0	26.7	
Entrepreneur	8.0	26.7	8.0	22.0	
Operation Indications					
Laparotomy	15	50.0	14		0.331
Or if	9	30.0	6	46.7	
Hemorrhoidectomy	4	13.0	5	20.0	
Herniotomy	2	6.7	5	16.7	
				16.0	

Table 2. Body temperature normality test results

Variable	Intervention Group		Control Group	
	Mean±SD	p	Mean±SD	p
Body temperature				
Pretest	35.43 ± 0.37	0.03	35.40 ± 0.37	0.00
Post-test	36.50 ± 0.43	0.00	36.07 ± 0.49	0.00

The data normality test using the average body temperature before and after in the intervention and control groups, showed $p < 0.05$. The result shows that the data normality test in both groups is not standard, so the paired data test uses a non-parametric test (Table 2).

Table 3. The difference in mean body temperature of the intervention group before and after treatment of the intervention group and control group

Group	Pretest	Post-test	z	p
	Mean±SD	Mean±SD		
Intervention Body temperature	35.43 ± 0.37	36.50 ± 0.43	-4,225	0.00
Control Body temperature	35.40 ± 0.37	36.07 ± 0.49	-4,623	0.00

Wilcoxon

The body temperature of both groups before and after treatment experienced changes. The body temperature value in the intervention group increased after being given treatment; a significant difference was found, with the mean body temperature value in the intervention group being 36.50°C (p=0.00), while the mean body temperature value in the control group was 36.07°C (p =0.00) (Table 3).

Although both groups each experienced an increase in body temperature, the intervention group, namely the provision of warm blanket compresses and essential aroma therapy, experienced a more significant increase compared to the control group, thus showing the mean delta value of body temperature for the intervention group—namely 1.03°C in the control group, 0.67°C.

Table 4. Difference in mean delta body temperature of the intervention group before and after treatment between the intervention group and the control group

Body temperature	Intervention	Control	p
	Mean±SD	Mean±SD	
Pretest	35.43 ± 0.37	35.40 ± 0.37	0.60
Post-test	36.50 ± 0.43	36.07 ± 0.49	0.00
(Δ)Delta	1.03 ± 0.57	0.67±0.54	0.01

*) *Man Whitney test (p<0.05)*

Discussion

This research was carried out on December 26 2022-January 28, 2023, at the H. Badaruddin Kasim Regional Hospital, Tabalong Regency, South Kalimantan, for approximately one month. Based on demographic data in this study, patient characteristics include age, gender, education level, occupation, and indication for surgery. There are no statistically significant differences with a p-value > 0,05, so the data is homogeneous and can be analyzed. This study aims to prove the effectiveness of the combined intervention of providing warm blanket compresses and essential aromatherapy to determine the patient's body temperature after surgery.

Relationship between respondent characteristics and the patient's postoperative body temperature

Research has found that almost all respondents experienced changes in body temperature in postoperative patients aged over 26-40 years. The results of this research were supported by Nugraheni, who stated that every patient undergoing post-surgery is at risk of experiencing hypothermia (Renaningtyastutik et al., 2022) The patient's age is one of the main factors that influences the occurrence of hypothermia and shivering(Fitriani et al., 2021)Pediatric and elderly patients have a high risk of surgical complications, including shivering, whereas in adult or productive-age patients, the risk of shivering is lower. The higher the age of the respondent, the higher the risk of experiencing hypothermia (Oktariani et al., 2023). Elderly patients are included in the age group at high risk of experiencing

hypothermia in the perioperative period. Spinal anesthesia performed on elderly patients can cause a more significant shift in thermoregulatory thresholds than in younger patients (Renaningtyastutik et al., 2022) Someone in old age experiences failure to maintain body temperature, either with or without anesthesia; apart from the elderly, pediatric patients, toddlers, and children also have a high risk of postoperative complications (Masithoh D, 2018).

The respondents in this study were more female than male. Research results show that women experience hypothermia more often than men. Study conducted by Harahap; the rate of hypothermia is more common in women than men, namely 51.2%. Research conducted by Rosjidi and Isro'ain also found that women are more susceptible to anesthesia complications than men because of the biological differences and functions between women and men, which cannot change (Syauqi D, 2019)(Syauqi D, 2019). The research found that almost all respondents experienced changes in hemodynamic status in postoperative patients with laparotomy surgery. This research found that significant surgery types with variations in operating time and surgical cases with regional anesthesia, including digestive surgery, urological surgery, orthopedic surgery, and gynecological surgery, will significantly influence hemodynamic status.

The research results showed that all respondents experienced changes in body temperature in postoperative patients. This is because surgery with a long duration will increase the time the body is exposed to cold temperatures and significant types of surgery with varying operating times and surgical cases with regional anesthesia, including digestive surgery. The results of this study are supported by (Winarni E, 2020), who states that types of major surgery that have variations in the length of operation and surgical cases with regional anesthesia include digestive surgery, urological surgery, orthopedic surgery, and gynecological surgery, will significantly affect body temperature.

The effectiveness of giving warm blanket compresses is significant for aromatherapy at body temperature.

This research statistically shows that the intervention group giving warm compresses, blankets, and essential aromatherapy resulted in a more significant increase in body temperature compared to the control group with standard hospital intervention in laparotomy patients. The results of clinical significance calculations show that in the combination of providing warm compresses, blankets, and essential aroma therapy. An effect size value of 0.92 is obtained in the large category. It could reduce therapy failure by 0.6 (60%) and patients who received standard hospital therapy, with an increased absolute risk recognition (ARR) or failure difference. Warm blanket therapy and essential aroma therapy. In the treatment and control groups, it was 0.4 (40%), and the Number of Needed (NNT) value was 2.5, which means that 2-3 people are needed to be given the intervention of warm blanket therapy and essential aroma therapy to prevent one person from getting sick. have an abnormal body temperature. This suggests that it is clinically significant, providing warm compresses, blankets, and essential aroma therapy more effectively than the control group.

Previous research

Previous research that supports this research was conducted in 2018 by Listiyanawati, which compared electric blankets with postoperative cloth blankets on body temperature in 2 groups with 18 respondents in each group. The results of this study showed an increase in the average body temperature with the mean of the intervention group (36.23 ± 0.36) $p=0.00$ and the control group (35.78 ± 0.15) $p=0.00$ with an effect size of 1.6 huge categories, so it can be concluded that the use of electric blankets is more effective in increasing body temperature after -surgical

patients who experience mild hypothermia compared to using cloth blankets (Listiyawanawati & Noriyanto, 2018) Warm compresses, blankets, and essential aroma therapy can increase body temperature. The effect size value was obtained at a value of 0.9 in the large category. So, it can be concluded that the previous study had a more significant effect size, but it can be seen from the mean of this study that it reached an average body temperature of 36.5°C (Listiyawanawati MD, 2018).

Mechanism

During anesthesia and surgery, the body's core temperature decreases due to the release of excess body heat. When body heat is released, it is redistributed from the body's core to the periphery. When the body's core temperature decreases, the nervous system and other organs usually cannot work. Active external heating is a warm blanket by conduction that prevents cold environmental temperatures from entering the body and, conversely, also prevents heat radiation from leaving the body. This process increases the heat content of peripheral thermal compartments and transfers sufficient heat to reduce the gradient to counteract the effects of heat redistribution from outside the body. Thermoregulation to cold is influenced by cold receptors in the skin and inhibited by central heat receptors. Skin cold receptors are the body's defense system against cold temperatures, and afferent input originating from cold baroreceptors is transmitted directly to the hypothalamus. Providing heating increases body temperature and the energy content in the thermal compartments at the body's periphery (Collins S, 2018).

Contribution of research results to nursing practice

A decrease in body temperature (hypothermia) after surgery disrupts the fulfillment of physical comfort needs, closely related to physiological comfort needs. The role and function of nursing is to provide comfort to patients who experience a decrease in body temperature after surgery. One treatment for postoperative patients who experience decreased body temperature is to provide an electric blanket heated to 44°C for 30 minutes and administer four drops of essential aromatherapy in 100 cc of water with diffusion for 15 minutes. as an external heating measure. After spinal surgery, give patients in the recovery room warm compresses, blankets, and essential aromatherapy, which has been shown to improve body temperature and hemodynamics and promote comfort. Thus, the study's findings can inform companion interventions that address nursing issues as they arise, particularly in perioperative and postoperative care. In addition, nurses performing related research to further nursing science may find it helpful as a reference (Alemayehu et al., 2020).

The research results showed that all respondents (100%) experienced changes in the status of body temperature, comfort, blood pressure, pulse, MAP, respiration, and saturation below the normal range, both in the control and intervention groups. This condition certainly needs serious attention from nurses in the recovery room (Majid A, 2015). During anesthesia and surgery, the body's core temperature decreases due to the release of excess body heat (Lopez, 2018). When body heat is released, it is redistributed from the body's core to the periphery. When the body's core temperature decreases, the nervous system and other organs cannot work normally (Kukus et al., 2013). Active external heating using a conduction warm blanket prevents cold environmental temperatures from entering the body and, conversely, prevents heat radiation from leaving the body (Qona'ah et al., 2020). This process increases the heat content of peripheral thermal compartments and transfers sufficient heat to reduce the gradient to counteract the effects of heat redistribution from outside the body. Providing heating increases body temperature and the energy content in the thermal compartment at the body's periphery (Collins et al., 2019). Essential oils also increase the absorption of essential oil molecules in the skin due to occlusion covering the skin's surface, reducing the evaporation of essential oils while warming the skin, thereby increasing penetration. There are two possible

mechanisms for increasing peripheral blood flow, namely increasing cardiac output and redistributing blood flow to various parts of the body by the function of regulating body temperature. Previous research found body temperatures below the normal range cause shivering and even hypothermia. When the core temperature drops by about 1°C, the total oxygen demand and carbon dioxide formation will increase (Mulyadi et al., 2019). Postoperative patients can experience hypothermia, which can occur during the perioperative period and continue into the postoperative period in the recovery room (Yang et al., 2015). Perioperative hypothermia is common and can cause serious health problems. as a secondary consequence of low temperatures in the operating room, open wounds, or medicinal agents used, such as anesthetics and vasodilators (Winarni, 2020). There are various ways to prevent shivering and hypothermia, namely by maintaining body temperature at normal conditions (Fauzi et al., 2015). Another non-pharmacological way is to give a warm blanket compress. The study results showed that in the control group, all respondents, after being given warmers according to hospital standards, experienced an increase in body temperature, and was (35.78 ± 0.15) $p = 0.00$ within the normal temperature range. The results of measurements in the intervention group, all respondents experienced an increase in body temperature, as much as (36.23 ± 0.36) $p = 0.00$ within the normal temperature range. The combination of warm blanket compresses and essential aromatherapy given to postoperative patients in this study increased the patient's core body temperature. So, it can be concluded that using warm blanket compresses is more effective in increasing the body temperature of postoperative patients who experience mild hypothermia compared to using cloth blankets. During anesthesia and surgery, the body's core temperature decreases due to the release of body heat (Kajian & Palembang, 2022). When there is a decrease in core body temperature, the hypothalamus signals to maintain heat by contracting blood vessels and producing heat by shivering (Mughtar & Masda, 2021). Providing warm blankets and essential oil aromatherapy provides warmth to skin receptors, especially in areas with the highest receptor density, such as the neck, chest, and hands, and provides relaxation (Syauqi et al., 2019). Providing heating increases body temperature and the energy content in the thermal compartment at the body's periphery. When there is a change in body temperature, it is detected by two types of thermoreceptors, namely thermoreceptors in the skin and in the hypothalamus. Thermoreceptors in the skin (peripheral thermoreceptors) and in the hypothalamus and spinal cord (central thermoreceptors) (Collins et al., 2018). Central thermoreceptors provide important feedback in maintaining core body temperature, while peripheral thermoreceptors provide information. The hypothalamus integrates reflexes and sends them via sympathetic nerves to the sweat glands, skin arterioles, and adrenal medulla, as well as via motor nerves to skeletal muscles and the heart to maintain temperature (Ilmiasih et al., 2007). The heart helps the arterial circulation to contract and relax periodically. The contraction and relaxation of the arteries coincide with the contraction and relaxation of the heart as blood is pumped into the arteries and veins (Alemayehu et al., 2020). The heat energy is produced in the body. When then distributed throughout the body through blood circulation, the core and surface temperatures of the body parts are evenly distributed (Abdel-Ghaffar & Moeen, 2019). An increase in body temperature is associated with heart rate and blood pressure, which is automatically followed by an increase in mean arterial pressure and pulse rate (Hermanns et al., 2018).

The results of this research are supported by previous research, namely research conducted by Listiyanawati regarding electric blankets in increasing the body temperature of postoperative patients who experience hypothermia. The results of the study stated that the average increase in body temperature in the intervention group before being given an electric blanket was 34.68 degrees Celsius, and the average body temperature after being given an electric blanket was 36.23 degrees Celsius. Meanwhile, in the control group, the average increase in body temperature

before being given a cloth blanket was 34.92 degrees Celsius. After being given a cloth blanket, the temperature was 35.78 degrees Celsius (Noriyanto et al., 2017). Research results by Anugrah 2020 with the title: Giving Lemon Aromatherapy to Changes in Blood Pressure in Pre-operative Spinal Anesthesia Patients at PKU Muhammadiyah Gamping Sleman Hospital, shows that the average blood pressure before giving lemon aromatherapy systole was 139.9 mmHg and diastole 86.8 mmHg and the average Average blood pressure after giving lemon aromatherapy, systole 135.5 mmHg and diastole 82.8 mmHg (Zahri et al. Nur Khaliza, 2020). Meanwhile, using a warm blanket compress is active external heating, which results in heat production from within the body and heat transfer from outside, which can accelerate the increase in body temperature. This blanket helps reduce heat loss by retaining heat by conduction and can protect patients from exposure to cold room temperatures (Masithoh et al., 2018; Utami, 2016). So, by providing warm blanket compresses and essential aromatherapy, the speed becomes more effective. Warming from inside and outside the body to patients who experience decreased body temperature after surgery can help reduce anxiety, increase patient comfort, and even reduce pain complaints in patients who experience postoperative surgical wounds (Utami, 2016). The effect of providing postoperative warming, namely increasing body temperature and increasing the combination of warm blanket compresses, is one additional intervention that can be chosen to overcome the nursing problem of disrupting comfort or preventing postoperative hypothermia (Listiyawanati & Noriyanto, 2018). This study strengthens existing research and theory regarding preferred interventions to prevent postoperative hypothermia. In addition, this study proves that a combination of warm blanket compresses and essential aromatherapy can improve the body temperature status of patients after surgery with spinal anesthesia.

Conclusion

The combination of giving warm blanket compresses and essential aromatherapy increases the body temperature of patients after spinal anesthesia surgery in the recovery room with significant results obtained, namely with a pre-value of 35.43°C and a post-value of 36.50°C ($p=0.00$). In the mean difference between the control group and standard hospital intervention, found that the increase in body temperature was lower than the intervention group with a pre-body temperature value of 35.40°C and a post-body temperature value of 36.07°C ($p=0.00$). Even though both groups each experienced an increase in body temperature, the intervention group, namely the provision of warm blanket compresses and essential aromatherapy, experienced a more significant increase compared to the control group, as shown by the mean delta body temperature value in the intervention group, namely 1.02°C, while the control group, 0.67°C.

Limitations

In this research, there are still limitations, including This study only took samples from one population, namely post-spinal anesthesia patients, so the characteristics and conditions of the respondents were limited, did not measure time to see how quickly body temperature rises within the normal range during treatment, used a bedside monitor to measure hemodynamic status, so direct measurements were not carried out and has not controlled for factors that can influence hemodynamic changes, such as anxiety, stress, and bleeding.

Global Contributions to Nursing Practice

For global nursing practice, applying a combination of warm compresses, blankets, and essential aromatherapy nursing is suitable as an independent nursing intervention in postoperative patients with spinal anesthesia to increase body temperature.

Author Contributions

All authors have accepted responsibility for the entire contents of this manuscript and approved its submission.

Conflict of interest

The authors declare no conflict of interest.

Confession

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