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## Interventions of warm blanket compresses and aromatherapy on blood pressure of post-surgery patients

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### Abstract

**Background:** Post-surgery is a condition that is prone to post-surgery complications. During this condition the patient is in the recovery room and observations are made on the function of circulation, respiration and consciousness. Surgical procedures carry the risk of disrupting body integrity and can even become a threat to the patient's life. Effective therapy is used to overcome problems experienced by patients in post-operative care. One of the therapies carried out is by combining warm compresses using blankets and aromatherapy which is expected to have a stronger effect in increasing tolerance of the body's regulatory system to changes in blood pressure.

**Purpose:** This research proves the effectiveness of the combined intervention of providing warm blanket compresses and essential aroma therapy to determine changes in blood pressure in patients after surgery.

**Method:** The research is true experimental research with a pretest-posttest design. This study had 60 respondents who were divided into 2 groups and were taken using random sampling method techniques. The research was conducted on 26 December 2022 – 28 January 2023. In this research statistical analysis was carried out computerized. The pre-test post-test difference test uses the Wilcoxon test. The difference test between groups uses Mann – Whitney.

**Results:** Receiving a combination of warm compresses, blankets heated to a temperature of 44 Celsius for 30 minutes and giving 4 drops of essential aromatherapy in 100 cc of water with diffusion for 15 minutes. This research shows that there is a significant difference in the average value of blood pressure reduction.

**Conclusion:** The combination of giving warm blanket compresses and essential aromatherapy was effective in reducing blood pressure in patients after spinal anesthesia surgery in the recovery room with significant results obtained, namely with a pre value of 134.30 mmHg and a post value of 120.80. Diastolic values were significant, namely with a pre-value of 88.10 mmHg and a post value of 79.67. The mean delta value for systolic blood pressure in the intervention group was -14.50 mmHg in the control group and -6.70 mmHg. The mean delta value for diastolic blood pressure in the intervention group was -8.43 mmHg in the control group and -4.83 mmHg.

**Keywords:** Blanket Warm Compress; Blood Pressure; Essential Aromatherapy; Postoperative.

### INTRODUCTION

Post-surgery is a condition that is prone to post-operative complications. During this condition the patient is in the recovery room and hemodynamics are observed such as circulatory function, respiration and consciousness. In this condition, the patient's body recovers from the effects of anesthesia which lowers

blood pressure (Suswitha, 2019). Close post-operative observation becomes a critical point where the duty and responsibility of the nurse is to monitor, maintain and maintain the physiological function of the patient's vital organs so that they remain within normal limits (Alemayehu, Berhe, Getnet, & Molallign, 2020).

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The problem in post-operative patients is hemodynamic stabilization, the recovery after surgery and anesthesia is an important time for physiological stress in many patients (Mota-Rojas, Olmos-Hernández, Verduzco-Mendoza, Lecona-Butrón, Martínez-Burnes, Mora-Medina, & Orihuela, 2021). Ways that can be used to overcome hemodynamic disorders are maintaining normal blood pressure during surgery, improving hemodynamics (Sutardi, 2022).

Nursing care to overcome post-operative decline needs to be carefully prepared, especially after major surgery that lasts more than 1 hour (60 minutes). Namely with a non-pharmacological therapy approach that can be used with warm blankets and essential aromatherapy (Darni, & Khaliza, 2020). Combining warm compresses using blankets and essential aromatherapy is expected to have a stronger effect in increasing tolerance of the body's regulatory system to hemodynamic changes in blood pressure, in post-operative patients (Def, Sukmaningtyas, & Utami, 2022). Providing warm blanket compresses and essential aromatherapy can help patients feel comfortable when experiencing hemodynamic disorders. It is hoped that this action can reduce the patient's blood pressure after surgery using spinal anesthesia in the Recovery Room at the H. Badaruddin Kasim Regional General Hospital, Tabalong Regency, South Kalimantan.

## RESEARCH METHOD

This type of research is experimental research with a true experimental research design with pretest and posttest with control group designs. This research was conducted on post-spinal surgery patients in the Recovery Room at The Central Surgical Installation of H. Badaruddin Kasim Regional General Hospital, Tabalong Regency, South Kalimantan. The sample for this study was 60 people who were divided into 2 groups, 30 respondents as intervention group 1 who compressed warm blankets with a temperature of 44 degrees Celsius and essential aromatherapy 4 drops in 100 cc of water with diffusion for 15 minutes, 30

respondents as the control group who were given action according to standard procedures at the Hospital.

The population in this study was post-operative patients using spinal anesthesia techniques. Sampling used a probability sampling technique with a random sampling method. This method is a selection method, where each sample gets the same opportunity to be used as a test sample and is carried out randomly without paying attention to the strata in the population. 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 physical status 1-3. 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 heated to a temperature of 44 Celsius for 30 minutes and given 4 drops of essential aromatherapy in 100 cc of water with diffusion for 15 minutes. Measuring tools used to measure body temperature used an infrared ear thermometer and bedside monitor.

Data processing with editing, coding, data entry and data cleaning processes. Statistical tests were carried out with the SPSS program. The data normality test was carried out before carrying out the bivariate test, it was found that the body temperature value data for each group was not normally distributed. Bivariate tests to determine differences in hemodynamic status before and after in each group used the Shapiro-Wilk test, and to determine differences in mean body temperature between groups used the Wilcoxon test with the Mann Withney test to determine the comparison of the effectiveness of warming between groups. This research applies the research ethics of informed consent, anonymity, confidentiality, autonomy, beneficence, justice, veracity and non-maleficency. This research was carried out after obtaining ethical clearance from the Semarang Ministry of Health Polytechnic Research Ethics Committee with letter number 0774/EA/KEPK/2022.

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**RESEARCH RESULTS****Table 1. Characteristics of respondents (N=60)**

<b>Variables</b>	<b>Intervention (n=30)</b>	<b>Control (n=30)</b>	<b>P</b>
<b>Age (Mean± SD)(Range)(Year)</b>	(34.67±10.23)(17-55)	(31.76±11.92)(17-55)	
17-25	6/20.0	11/36.7	0.500
26-40	14/46.7	10/33.3	
41-55	10/33.3	9/30.0	
<b>Gender (n/%)</b>			
Male	12/40.0	14/46.7	0.610
Female	18/60.0	16/53.3	
<b>Education (n/%)</b>			
Junior High School	-	1/3.4	0.457
Senior High School	18/60.0	19/63.3	
University	12/40.0	10/33.3	
<b>Occupation (n/%)</b>			
Housewife	6/20.0	6/20.0	0.500
Farmer	3/10.0	6/20.0	
Civil servants	13/43.3	10/33.3	
Self-employed	8/26.7	8/26.7	
<b>Surgery Indications (n/%)</b>			
Laparotomy	15/50.0	14/46.6	0.331
Orif	9/30.0	6/20.0	
Hemorrhoidectomy	4/13.0	5/16.7	
Herniotomy	2/7.0	5/16.7	

The characteristics of research respondents include age, gender, education level, occupation, education level, and indications for surgery which are explained in table 1. The research results in table 1 show that based on gender, there were 12 male respondents in the intervention group (40%) and 18 respondents (60%) were female, while in the control group there were 14 male respondents (46.7%) and 16 female respondents (53.3%). In terms of education, the majority of respondents in the intervention group were upper secondary (Senior High School) level with 18 respondents (60%), and in the control group there were 19 respondents (63%). Most of the respondents in the intervention group were civil servants with 13 respondents (43.3%), while in the control group there were 10 respondents (33.3%). Then, in terms of respondent age, the largest number of respondents in the intervention group was in the 26-40 age range with 14 respondents (46.7), for the control group the age range was 17-25 with 11 respondents (36.7). Meanwhile, among respondents in the intervention group, the most indication for surgery was laparotomy, namely 15 (50%) respondents and the least was herniotomy, namely 2 (7.0%) respondents, while for the control group, the most indication for surgery was laparotomy, namely 14 respondents with a percentage of (46.7%). obtained p-value >0.05, so it can be concluded that the characteristics of the respondents are homogeneous.

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**Table 2. Blood Pressure Normality Test Results**

Blood Pressure	Group			
	Intervention	p	Control	p
<b>Systolic (Mean±SD)</b>				
Pre test	134.30±9.06	0.07	134.30±9.06	0.02
Post test	120.80±11.38	0.04	120.80±11.38	0.01
<b>Diastolic (Mean±SD)</b>				
Pre test	88.10±7.387	0.01	90.70±5.07	0.00
Post test	79.67±7.30	0.06	85.20±8.495	0.00

The research results in table 2 show the normality of the data using the average pre and post blood pressure in the intervention group and control group showing the results of  $p < 0.05$ . This shows that the data normality test in both groups shows that the data is not normally distributed so that the paired data test uses a non-parametric test.

**Table 3. Difference in Average Systolic and Diastolic Blood Pressure**

Blood Pressure	Pre-test (Mean±SD)	Post test (Mean±SD)	p
<b>Systolic</b>			
Intervention	134.30±9.06	120.80±11.38	0.00
Control	135.73±14.78	129.03±16.45	0.01
<b>Diastolic</b>			
Intervention	88.10±7.39	79.67±7.04	0.00
Control	90.70±5.07	85.87±8.95	0.01

\*) Wilcoxon test ( $p < 0.05$ )

The research results in table 3 show that the group given the intervention of providing warm blanket compresses and essential aroma therapy obtained significant values, namely with a pre value of 134.30 mmHg and a post value of 120.80 ( $p=0.00$ ). In the average difference between the control group and the standard hospital intervention, it was found that the increase in blood pressure was lower than the intervention group with a pre-systolic blood pressure value of 135.73 mmHg and a post-systolic blood pressure value of 129.03 ( $p=0.01$ ).

The research results in table 3 show that the group given the intervention of providing warm blanket compresses and essential aroma therapy obtained significant values, namely with a pre value of 88.10 mmHg and a post value of 79.67 ( $p=0.00$ ). In the average difference between the control group and the standard hospital intervention, it was found that the diastolic increase was lower than the intervention group with a pre-diastolic blood pressure value of 90.70 mmHg and a post-diastolic blood pressure value of 85.87 ( $p=0.01$ ). The diastolic increase was lower than the intervention group with a pre-diastolic blood pressure value of 90.70 mmHg and a post-diastolic blood pressure value of 85.87 ( $p=0.01$ ).

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**Table 4. Difference in Mean Systolic and Diastolic Delta**

Blood Pressure	Group		p
	Intervention	Control	
<b>Systolic Delta (Mean±SD)</b>			
Pre-test	134.30±9.06	135.73±14.78	0.85
Post test	120.80±11.38	129.03±16.45	0.02
(Δ)Delta	-14.50±14.94	-6.70±16.00	0.02
<b>Diastolic Delta (Mean±SD)</b>			
Pre-test	88.10±7.39	90.70±5.07	0.32
Post test	79.67±7.04	85.87±8.95	0.00
(Δ)Delta	-8.43±8.24	-4.83±10.15	0.04

\*)Man whiteneey test (p<0.05)

The research results in table 4 show that although both groups each had a decrease, the intervention group, namely giving warm compresses, blankets and essential aromatherapy, had a more significant increase than the control group, showing the mean delta value for diastolic blood pressure in the intervention group, namely -8.43 mmHg in the control group and -4.83 mmHg.

## DISCUSSION

Based on demographic data in this study, patient characteristics include age, gender, education level, occupation and indications for surgery. There are no statistically significant differences, so it can be said that the data is homogeneous and can be compared. This study aims to prove the effectiveness of the combined intervention of providing warm blanket compresses and essential aroma therapy to determine blood pressure in post-operative patients.

The research results showed that almost all respondents experienced changes in blood pressure in post-operative patients over the age of 26-40 years. The results of previous research state that every patient undergoing post-operative surgery is at risk of experiencing hemodynamic changes (Torossian, Van Gerven, Geertsen, Horn, Van de Velde, & Raeder, 2016). The higher the age of the respondent, the higher the risk of experiencing hypertension. Elderly patients are included in the age group at high risk for hypertension in the perioperative periode. More respondents in this study were female than male. The results showed that women experienced more

hemodynamic changes than men (Febriaty, & Anita, 2021). In previous research, the rate of hypothermia was more common in women than men, namely 51.2%. Other research also found that women are more susceptible to anesthesia complications than men (Setiawan, Rohmani, Kumiaty, Ratnaningrum, & Basuki, 2017). All of this is due to the biological differences and biological functions that exist in women and men which cannot be exchanged. In the research, it was found that almost all respondents experienced changes in hemodynamic status in post-operative patients with laparotomy surgery (Widodo, 2020). This research found that types of major surgery which have varying lengths of operation and surgical cases with regional anesthesia, including digestive surgery, urological surgery, orthopedic surgery and gynecological surgery, will greatly influence hemodynamic status (Winarni, 2019).

The results of this research statistically show that the group that was given the intervention of providing warm blanket compresses and essential aroma therapy obtained a significant value, namely with a prevalue of 134.30 mmHg and a post value of 120.80 (p=0.00). In the average difference between the control group and the standard hospital intervention, it was found that the increase in blood pressure was lower than the intervention group with a pre-systolic blood pressure value of 135.73 mmHg and a post-systolic blood pressure value of 129.03 (p=0.01). Even though both groups each had a decrease, the intervention group, namely the provision of warm blanket compresses and essential aroma therapy,

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had a more significant increase than the control group, showing a mean delta value for systolic blood pressure in the intervention group, namely -14.50 mmHg in the control group and -6.70 mmHg. The results of this research statistically show that the group that was given the intervention of providing warm blanket compresses and essential aromatherapy obtained a significant value, namely with a prevalue of 88.10 mmHg and a post value of 79.67 mmHg ( $p=0.00$ ). In the average difference between the control group and the standard hospital intervention, it was found that the diastolic increase was lower than the intervention group with a pre-diastolic blood pressure value of 90.70 mmHg and a post-diastolic blood pressure value of 85.87 mmHg ( $p=0.01$ ). Even though both groups each had a decrease, the intervention group, namely the provision of warm blanket compresses and essential aromatherapy, had a more significant increase than the control group, showing a mean delta value for diastolic blood pressure in the intervention group, namely -8.43 mmHg in the control group and -4.83 mmHg.

Providing a warm blanket and essential oil aromatherapy provides warmth to skin receptors, especially in areas with the greatest receptor density such as the neck, chest and hands and provides relaxation. Provision of warming increases body temperature and increases the energy content in the thermal compartment at the body's periphery (Rahimah, & Yulianti, 2015). When there is a change in body temperature, it is detected by 2 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) (Renaningtyastutik, Lumadi, & Handian, 2022). Central thermoreceptors provide important feedback in maintaining core body temperature while peripheral thermoreceptors provide information (Muchtar, Suangga, & Kurniawan, 2023).

During anesthesia and the surgical process, the body's core temperature decreases due to the release of body heat. When there is a decrease in core body temperature, the hypothalamus signals to maintain heat by contracting blood vessels and producing heat by means shivering (Collins, Budds, Raines, & Hooper, 2019). The body's regulation of shivering involves contraction and relaxation of skeletal

muscles, which can increase the metabolic rate 4-5 times greater than under normal conditions (Ilmiasih, Nurhaeni, & Waluyanti, 2015). The increase in metabolic rate caused by the release of thyroxine and catecholamines (epinephrine and norepinephrine) in the body results in increased stimulation of sympathetic nervous system activation and increased catecholamine secretion in response to cold temperatures, thereby slowing down brain activity, changes in blood pressure, pulse rate, vascular resistance, peripheral blood (Putri, Titik, & Sari, 2017).

Providing a warm blanket and essential oil aromatherapy provides warmth to skin receptors, especially in areas with the greatest receptor density such as the neck, chest and hands and provides relaxation (Abdel-Ghaffar, & Moeen, 2019). Provision of warming increases body temperature and increases the energy content in the thermal compartment at the body's periphery. When there is a change in body temperature, it is detected by 2 types of thermoreceptors, namely thermoreceptors in the skin and in the hypothalamus (Utami, 2016). Thermoreceptors in the skin (peripheral thermoreceptors) and in the hypothalamus and spinal cord (central thermoreceptors). 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 (Listiyawanati, & Noriyanto, 2018). 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. The heat energy that has been produced in the body is then distributed throughout the body through blood circulation, so that the core temperature and surface temperature of the body parts are even. An increase in body temperature is related to heart rate and blood pressure, automatically followed by an increase in mean arterial pressure and pulse rate (Fatimah, Ratna, & Mardalena, 2018).

Previous research has not examined the effectiveness of electric warm blankets on blood pressure, but this study proves that giving warm blanket compresses and essential aromatherapy is

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effective in reducing systolic blood pressure, namely with a prevalue of 134.30 mmHg and a post value of 120.80 ( $p=0.00$ ). with an effect size value of 0.5 in the medium category. However, it is assumed that the reduction in blood pressure occurs due to the provision of essential oil aroma therapy. This is supported by previous research by Anugrah in 2020 entitled the administration of lemon aromatherapy on changes in blood pressure in pre-operative patients with spinal anesthesia at Muhammadiyah Gamping Hospital, Sleman, which shows the average -The average blood pressure before giving lemon aromatherapy, systole was 139.9 mmHg and diastole 86.8 mmHg and the average blood pressure after giving lemon aromatherapy, systole was 135.5 mmHg and diastole 82.8 mmHg.

Meanwhile, the use of a warm blanket compress is an active external warming that produces heat production not only from within the body but the delivery of heat from outside can provide comfort. The use of this blanket helps reduce heat loss by retaining heat by conduction and can protect patients from exposure to cold room temperatures. So, through a combination of giving warm blanket compresses and essential aromatherapy, the speed is more effective. Warming given from inside and outside the body to patients who experience changes in blood pressure after surgery can help increase patient comfort, and can even reduce complaints of pain in patients who have post-operative surgical wounds. The effect of providing post-operative warming is to increase body temperature and increase the combination of warm blanket compresses is one additional intervention that can be chosen to overcome the nursing problem of disturbance of comfort or changes in post-operative hemodynamics. This study corroborates existing research and theory regarding preferred interventions to address postoperative blood pressure changes. In addition, this study proves that the combination of warm blanket compresses and essential aromatherapy can improve the hemodynamic status of post-operative patients with spinal anesthesia.

## CONCLUSION

The combination of giving warm blanket compresses and essential aromatherapy was effective in reducing blood pressure in patients after spinal anesthesia surgery in the recovery room with significant results obtained, namely with a pre value of

134.30 mmHg and a post value of 120.80. Diastolic values were significant, namely with a pre value of 88.10 mmHg and a post value of 79.67. The mean delta value for systolic blood pressure in the intervention group was -14.50 mmHg in the control group and -6.70 mmHg. The mean delta value for diastolic blood pressure in the intervention group was -8.43 mmHg in the control group and -4.83 mmHg.

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