P- ISSN: 2086-3071 | E-ISSN: 2443-0900

ORIGINAL ARTICLE

The Effect of Giving a Warm Blanket to Changes in The Central Temperature of Postoperative Patients with Subarachnoid Block Anesthesia

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ARTICLE INFORMATION

Article history
Received January 5, 2021
Revised June 26, 2020
Accepted January 7, 2021

Keywords
Warm blanket, shivering, subarachnoid block anesthesia.

ABSTRACT

Introduction: *Shivering after anesthesia subarachnoid block is a common complication seen with an incidence of 40-60% after anesthesia. One of the post pharmacological shivering management is given a warm blanket. Experimental research was carried out in the Conscious Installation Room of the Central Surgical Installation of RSSA Malang.* ***Objectives:*** *To determine warm blankets' effect on changes in postoperative patients' central temperature with subarachnoid block anesthesia. The benefits of this study are to improve the quality of care for patients with surgery, accompanied by shivering events.* ***Methods:*** *The research design was Quasy-Experiment with Random Sampling technique, and the sample size was 20 respondents, two groups: control and treatment. The two groups of respondents' temperatures were evaluated and noted before treatment and after giving blankets every 15 minutes to 60 minutes.* ***Result:*** *The test results of the average temperature difference before treatment and the second 60 minutes of the two groups p = 0.0142 with α = 0.05 showed significant differences concluded that temperature changes in post-anesthesia patients subarachnoid block.* ***Conclusions:*** *Non-pharmacological hypothermia treatment after anesthesia subarachnoid block using an electric blanket warmer is more effective. The blanket's temperature can be maintained stable so that the heat transfer process does not decrease the blanket's temperature due to the temperature of the cold environment.*

Journal of Nursing is a peer-reviewed journal published by the School of Nursing at the Faculty of Health Science, University of Muhammadiyah Malang (UMM), and affiliated with the Indonesia National Nurse Association (INNA) of Malang.

Website: http://ejournal.umm.ac.id/index.php/keperawatan
E-mail: Jurnal.keperawatan@umm.ac.id

1. Introduction

In every major or minor surgery, the body's tissues are cut off; this will cause what is called pain. Advances in technology and science in medicine lead humans to overcome this problem; ways to overcome them are known as anesthetics. The action of Sub-Arachnoid Nerve Block anesthesia, besides having advantages, also has disadvantages. One of the drawbacks of Sub-Arachnoid Block anesthesia is hypothermia with Shivering symptoms (shivering). The incidence is about 45-85% of cases after anesthesia (Nurkacan, Chandra, and Nugroho, 2013; Laksono R, 2012).

The definitive cause of post-anesthesia shivering is that the patient experiences hypothermia during surgery, triggered by a combination of disruption of temperature regulation due to anesthesia and cold operating room temperature. This hypothermia also results from an internal redistribution of body heat from core temperature to peripheral tissue. This condition occurs because of the sympathetic block below the block. Furthermore, loss of thermoregulation below block height results in loss of body heat (Patrianingrum et al, 2015).

According *to* Nurullah Afifah (2015), post-anesthesia shivering management in adult patients can be given intravenous Petidine 10-20 mg therapy, warm blankets, warm infusions

Please cite this article as: F Ekorini, D. and Lumadi, S. A. (2021) 'The Effect of Giving A Warm Blanket to Changes in The Central Temperature of Postoperative Patients with Subarachnoid Block Anesthesia in RSSA Malang', *Jurnal Keperawatan*, 12(1). doi: 10.22219/JK.V12I1.10800.

(with warmer infusion), lamps to warm body temperature. In a preliminary study by Nurkacan et al from the Department of Anesthesia and Intensive Therapy FKUI / RSCM for incidence and degree of shivering comparing the effects of Acetated Ringer's (Asering) and Lactated Ringer's (RL) solution on core temperature and frequency of shivering in 40 Sectio Caesarea patients under anesthesia, Subarachnoid Nerve Block showed that Asering was more effective in preventing hypothermia and postoperative shivering, exhibited a lower incidence of shivering than the RL group up to 25 minutes, and a lower degree of shivering in the first 20 minutes than the Dr. RL group. Some researchers concluded that the administration of normal 0.9% warm saline fluid affects preventing shivering in endourological surgery, a cesarean section with subarachnoid block anesthesia (Muhali 2011; Minarsih, 2013; Nayoko, 2016)

A hypothermic incident with shivering symptoms (shivering) in patients after anesthesia Sub Arachnoid Block (SAB) in the conscious recovery room Central Surgical Installation (IBS) RSSA Malang from 14 to September 27, 2018, with 51 patients after subarachnoid block anesthesia (SAB)) who experienced shivering 12 patients (23.5%)

Therapeutic modalities to reduce the incidence of shivering (shivering) using pharmacological and non-pharmacological methods. Non-pharmacological methods such as giving warm intravenous fluids and warm blankets (blanket warmer). Research on providing blankets more generous in postoperative patients with subarachnoid block anesthesia has not been carried out at RSSA Malang, so it is necessary to do this research to determine the effect of a blanket warmer on changes in the central temperature of postoperative patients with subarachnoid block anesthesia.

2. Methods

The research design used in this study used a quasi-experimental method, which revealed a causal relationship by involving the control group with the treatment group. The selection of these two groups used a random technique. In this design, the experimental group was given treatment while the control group was not. It was started with a pre-test in both treatment groups, and after giving the treatment, a post-test was carried out. The quasi-experimental research design proved the effect of providing a warm blanket to the treatment group on changes in patients' central temperature after subarachnoid block anesthesia.

The population in this study is the entire research subject to be studied. In this study, the population taken was all patients who underwent surgery with subarachnoid block anesthesia who met the criteria set at the time of the survey in the conscious recovery room of the central surgical installation of RSSA Malang. The sample obtained is that each treatment group 9 respondents with one reserve respondent, a total of 20 respondents who meet the inclusion criteria. This study's sampling technique was carried out using Purposive Sampling.

The instrument in this study used an interview sheet including patient identity and observation sheets including postoperative room entry hours, temperature measurements blanket warm (blanket warmer) made of wool, vital signs every 15 minutes, and the patient's hours move rooms. The measuring instrument used in this study is the digital thermometer ThermoOne Infra-Red Ear Thermometer according to Onemed standards with a sensitivity of 0.1 OC, an accuracy of ± 0.2 OC, and a measurement time of 1 second. The scale on this type of thermometer is only from 35OC - 44 OC.

3. Results and Discussion

Analysis of the Effect of Giving Blanket Warmer on Changes in the Central Temperature of Postoperative Patients with Sub Arachnoid Block Anesthesia

1. Difference test for mean temperature 0, 15, 30, 45, and 60 for the treatment and control groups.

The analysis of the temperature difference test between each group is presented in table 1.

P- ISSN: 2086-3071 | E-ISSN: 2443-0900

Table 1.Test for different temperatures of each treatment group and control group

Test	Time	Group	N	α	p	$\bar{x}$	Don't Dev	*Information*
t dependent	0	Treatment	10	0.05	0.810	36.19	0.36	H0 is accepted
		Control	10			3 6.23	0.37	
t dependent	5	Treatment	10	0.05	0.519	36.32	0.33	H0 is accepted
		Control	10			36.03	0.47	
t dependent	0	Treatment	10	0.05	0.464	36.33	0.38	H0 is accepted
		Control	10			36.20	0.40	
Mann Whitney	5	Treatment	10	0.05	0.393	36.38	0.36	H0 is accepted
		Control	10			36.26	0.37	
t dependent	0	Treatment	10	0.05	0.510	36.54	0.27	H0 is accepted
		Control	10			*36.32*	*0.30*	

Minute 0 (Initial Temperature)

The results of the mean temperature difference test in the 0th minute (initial temperature) between the treatment group and the control group are presented in Table 1 with the independent t-test, which states that the initial temperature in the treatment group and the control group is not statistically significant as indicated by a significance value of 0.810

15th minute

The results of the mean temperature difference test at 15 minutes between the treatment group and the control group are presented in Table 1 with the independent t-test, which states that the temperature at the 15th minute in the treatment group and the control group is not statistically significant, indicated by a significance value of 0.519

30th minute

The mean temperature difference test results at 30 minutes between the treatment and control groups are presented in Table 1 with the independent t-test, which states that the temperature at 30 minutes in the treatment group and the control group is not significantly different. Statistically indicated by a significance value of 0.464.

45th minute

The mean temperature difference test results at 45 minutes between the treatment group and the control group are presented in Table 1 with the Mann Whitney test stated that the temperature at 45 minutes in the treatment group and the control group was not statistically significant, indicated by a significant value of 0.393.

60th minute

The mean temperature difference test results at 60 minutes between the treatment group and the control group are presented in Table 1. The independent t-test stated that the temperature at 60 minutes in the treatment group and the control group was not statistically significant, indicated by a significant value of 0.5101.

2. Difference Test for the mean temperature of the 0th minute with the 60th minute of the treatment group

Table 2. Difference Test for the mean temperature of the 0th minute (initial temperature) and the 60th-minute temperature in the treatment group

Test	Group	N	α	p	$\bar{x}$	St. Dev	Information
t dependent	0th minute	10	0.05	0.014	36.19	0.36	H0 is rejected
	60th minute	10			36.54	0.27	

The test results with the t-dependent test above obtained p-value <□, thus there is a significant difference in the treatment group.

3. Difference Test of the mean temperature of the 0th minute (initial) and the 60th-minute temperature of the control group

Table 3. Difference Test for the mean temperature of the 0th minute and 60th minute of the control group

Test	Group	N	α	p	$\bar{x}$	St. Dev	Information
t dependent	0th minute	10	0.05	0.182	36.23	0.30	H0 is accepted
	60th minute	10			36.30	0.30	

The test results with the t dependent test above obtained p> 0.05; there was no significant difference in the control group.

4. Test the Effect / Effectiveness of a Warm Blanket on Changes in Temperature with Time

Table 4. Test for the Effect of Linear Regression

Group	Test	R	R Square	Adjusted R Square	Change Statistics			
					F Change	df 1	df2	Sig F. Change
Treatment	Linear Regression Analysis	0.951	0.9042	0.872	28.31	1	3	0.013
Control	Linear Regression Analysis	0.756	0.571	0.429	4,000	1	3	0.139

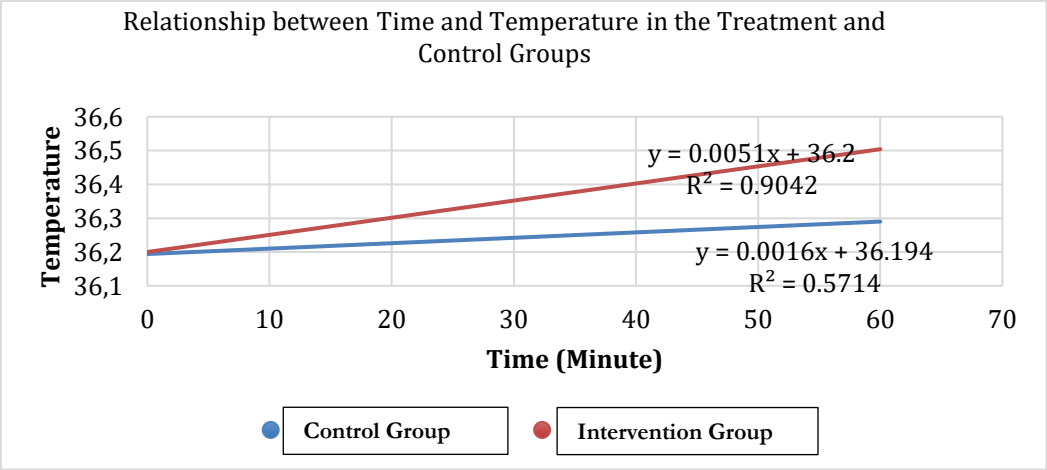

Figure 1. Graph of the Relationship between Time and Temperature in the Treatment and Control Group

P- ISSN: 2086-3071 | E-ISSN: 2443-0900

The linear regression test between time and temperature in the treatment group obtained a p-value of 0.013 (p <0.05); it can be concluded that time has a significant effect on the treatment group's temperature. The model obtained is Y = 36.2 + 0.0051X. When the time is fixed, the temperature is 36.2 ℃. Each additional time of 1 minute will increase the temperature by 0.0051 ℃. The results of R2 = 0.9042, which means that time affects the treatment group's temperature by 90.42%. In comparison, the remaining 9.58% is influenced or explained by other variables not included in this research model.

The linear regression test between time and temperature in the control group obtained a p-value of 0.139 (p> 0.05). It can be concluded that time has no significant effect on temperature in the control group. The model obtained is:

Y = 36.194 + 0.002X

at the time fixed, the temperature is 36.194 ℃. Each additional time of 1 minute will increase the temperature by 0.002 ℃. The result of R2 = 0.571, which means that time affects the control group's temperature by 57.1%. In comparison, the remaining 42.9% is influenced or explained by other variables not included in this research model.

1. Identification of Central Temperature Before Treating Postoperative Patients with Sub Arachnoid Block Anesthesia

Based on the results of the analysis of research conducted on 20 respondents (10 respondents in the control group and ten respondents in the treatment group) after surgery with Sub Arachnoid Block (SAB) anesthesia in the Aware Recovery Room of the Central Surgery Installation of RSSA Malang, that the central temperature of all respondents, both the control group and treatment before being given a blanket ranged from 35.6 to 36.7 degrees Celsius.

A central temperature measuring spot is a more reliable indicator of the body temperature than an area that shows surface temperature. The temperature measurement site was selected in the tympanic membrane channel, which was close to the core body temperature using a digital thermometer with a sensitivity level of 0.1 ℃, the accuracy was ± 0.2 ℃, and the measurement time was 1 second according to the Onemed standard.

The results of statistical tests at the initial temperature before being given blankets to the two groups of respondents with the independent t-test using the SPSS program showed the results of the data normality test in the control group using the Shapiro-Wilk test at 0 minutes had a significant value of 0.472 (p> 0, 05). The treatment group has a significant value of 0.076 (p> 0.05), so it can be concluded that the temperature distribution is normal. The test used is the independent t-test. The test results with the independent t-test had a significant value of 0.812, which means that the central temperature before treatment in the two groups was not statistically significant.

The range of normal human body temperature ranges from 36.7 ℃ -37.1 ℃ (Morgan 2013). Still, from the results of research, the central temperature before treatment is in a category below this set point due to subarachnoid block anesthesia, which causes vasodilation, surgery, and the ambient temperature inside the operating room itself. So with this, we need treatment to maintain body temperature back to the normal temperature set point (Minarsih, 2013).

Based on the research results, the researcher argues that the central temperature before treatment is below the normal setpoint temperature of 35.5 ℃ - 36.8 ℃. Many factors influence these differences, including the type, duration, and area of operation that can cause temperature variations before treatment among respondents.

2.Identification of temperature changes after being given a blanket at the 15th, 30th, 45th, and 60th minutes

The results of statistical tests on temperature changes in the two groups of respondents using the independent t-test in the SPSS program show the following results:

a. At the 15th minute:

The results of the analysis of temperature changes in the 15th minute showed that in the treatment group, half (50%) of the respondents experienced an increase. In contrast, in the control group, half (50%) of the respondents experienced a decrease. The results of the Independent T-Test statistical test are p = 0.196 with α = 0.05, because p> 0.05, it can be concluded that H0 is accepted, which means there is no effect of giving a warm blanket (blanket warmer) on changes in the central temperature of postoperative patients. with sub arachnoid block anesthesia. Changes in temperature are influenced by several factors, including basal metabolic rate, organ and environmental disorders (Kukus, Supit, and Lintong, 2009; Satria, Budhi, and Nurdyanti, 2016).

According to researchers, the process of heat transfer from a warm blanket has not been maximized with a relatively short time in the 15th minute in the treatment group. In contrast, in the control group, the opposite happened to the transfer of heat from the respondent's body to an ordinary blanket according to the heat transfer theory from objects of higher temperature to a lower temperature. But in the treatment group, there was a change in temperature of one respondent aged 19 years. According to the researchers, it was influenced by the basal metabolic rate of the human body. The basal metabolic rate of each individual is different. This impacts the amount of heat produced by the body is different, so it is necessary to narrow the age inclusion criteria further to homogenize respondents.

b. On the 30th minute:

The analysis of temperature changes in the 30th minute showed that almost half (40%) experienced an increase in the treatment group. In comparison, those experiencing a decrease and without change were 30% each, and in the control group, half (50%) of respondents experienced a decline, and others increased (30%) and remain (20%). The result of the Independent T-Test statistical test is p = 0.682 with α = 0.05, because p> 0.05, it can be concluded that H0 is accepted, which means that there is no effect of blanket warmer on changes in the central temperature of postoperative patients. with subarachnoid block anesthesia.

Body temperature can exchange with the environment, meaning that body heat can be lost or reduced due to colder environments. Vice versa, the environment can affect human body temperature. The transfer of human and environmental temperature occurs mostly through the skin (Kukus, Supit, and Lintong, 2009). According to researchers, at the 30th minute, the blanket's temperature began to decrease because the blanket material that was warmed could not store heat for a long time.

c. In the 45th minute

The results of the analysis of changes in temperature at 45 minutes showed that the treatment group half (50%) experienced an increase, the other half (50%) decreased and remained from the initial control temperature (50%) remained as at the initial temperature, the other half rose and fell. Meanwhile, half of the control group (50%) remained the same as the initial temperature; the others went up and down. The results of the Independent T-Test statistical test are p = 0.184 with α = 0.05, because p> 0.05, it can be concluded that Ho is accepted, which means there is no effect of giving a warm blanket (blanket warmer) on changes in the central temperature of postoperative patients. with subarachnoid block anesthesia. As a result of the action of subarachnoid block anesthesia, vasodilation occurs so that the body experiences a

P- ISSN: 2086-3071 | E-ISSN: 2443-0900

decrease in temperature. To return body temperature to normothermic conditions, it can be done in various ways, namely transferring heat (heat) from another object according to heat transfer. The heat transfer process takes place in 4 mechanisms, namely: conduction, radiation, convection, and evaporation (Stolesting RK, 2015; Harahap, Kadarsah, and Oktaliansah, 2014).

According to the researcher, the heat transfer in this study was not maximal, which was influenced by the heated blanket material that could not store heat for a long time. The temperature on the blanket had decreased. The consciously recovered room environment is very influential, too, with temperatures between 19 ℃-23 ℃.

d. In the 60th minute:

The analysis of temperature changes at the 60th minute showed that in the treatment group, almost all experienced an increase (80%). In comparison, the control group mostly (60%) experienced a rise, others decreased (40%). The results of the independent t-test statistical test are p = 0.002 with α = 0.05 because p <0.05, it can be concluded that Ho is rejected, which means that there is an effect of giving a warm blanket (blanket warmer) on changes in the central temperature of postoperative patients with subarachnoid block anesthesia.

From the description of the statistical test above, it can be concluded that giving a warm blanket (blanket warmer) to postoperative patients with subarachnoid block does not affect changes in the tympanic temperature of respondents before the 60th minute and after the 60th minute shows an impact on the timpani temperature increase.

According to researchers, the treatment of giving a warm blanket before the 60th minute shows that the heat transfer of the blanket to the skin surface takes a long time but creates a sense of comfort for respondents. The ambient temperature influences the length of heat transfer. This is in line with heat transfer with existing theories about thermoregulation and heat transfer mechanisms (Eysenbach, Miller, 2015).

3 Identification of Changes in Average Temperature in the Treatment and Control Groups

The test results of the mean difference test for the treatment group with the t-dependent test mean temperature of the 0th minute and 60th minute is p = 0.014 with α = 0.05 because p <0.05, H0 is rejected, so it can be concluded that the temperature of the 0th minute and 60th minute were statistically significant, which means that there was an effect of giving a blanket warmer on changes in the central temperature of patients after surgery with subarachnoid block anesthesia.

The test results of the mean difference test of the control group temperature with the t-dependent test mean temperature of the 0th minute and 60th minute is p = 0.182 with α = 0.05, because p> 0.05 then H0 is accepted so that it can be concluded that the temperature of the 0th minute and 60th minute was not statistically significant, which means that there was no effect of regular blanket administration on changes in the central temperature of postoperative patients with subarachnoid block anesthesia.

After the subarachnoid nerve block anesthesia action, one of the consequences is that the body becomes hypothermic so that the management is to return the body to a normothermic condition, to return the body to a normothermic condition it can be done in various ways, namely by transferring heat (heat) from one object to another or from one substance to another. Hence, it is necessary to understand the concept of heat transfer (Tansey and Johnson, 2019).

In this study, using a blanket warmer as a medium for transferring warm temperatures to the respondent's body was used as a comparison using an ordinary blanket for control. To achieve the goal of differences in changes in the central temperature, changes in postoperative patients with subarachnoid block anesthesia are expected. According to the researchers, there is a difference between the use of a regular blanket and a warm blanket on changes in the central temperature of postoperative patients with subarachnoid block anesthesia, but it takes a long time, namely at the 60th minute.

4.Analysis of the Effect of Giving Regular Blankets and Warm Blankets (Blanket Warmer) on Changes in Central Temperature of Postoperative Patients with Sub Arachnoid Block Anesthesia

Heat is defined as the energy transferred from one object to another due to the object's temperature. When two or more objects occur in thermal contact, heat flow will occur from objects with a higher temperature to objects with lower temperatures until thermal equilibrium is achieved. Body temperature is determined by the relationship between body heat production and body heat loss to the environment (Eysenbach, 2015).

In this study, a blanket warmer was used as a medium to transfer warm temperatures to the respondent's body so that the expected temperature would be achieved. The statistical test results showed that giving a warm blanket (blanket warmer) to postoperative patients with sub arachnoid block did not affect changes in the respondents' tympanic temperature before the 60th minute after the 60th minute showed an impact on the increase in tympanic temperature. This can prove that the existing theory of heat transfer (heat) is not in doubt.

According to Nurkacan (2013) from the Department of Anesthesia and Intensive Therapy FKUI / RSCM for the incidence and degree of shivering comparing the effects of Acetated Ringer's (Asering) and Lactated Ringer's (RL) solution on core temperature and frequency of shivering in 40 Sectio Caesarea patients under Subarachnoid Nerve anesthesia Block showed that Asering was more effective in preventing hypothermia and postoperative shivering, showed a lower incidence of shivering than the RL group up to 25 minutes, and a lower degree of shivering in the first 20 minutes than the RL group.

Muhali (2011) research, Minarsih (2013), Nayoko (2016) concluded that giving normal saline 0.9% warm fluid affected preventing shivering in endourological surgery, a cesarean section with subarachnoid block anesthesia. From the research above, it is reinforced by research by Rositasari and Dyah (2017) that there is no similarity in variables, but from the various variables from the various studies above are independent variables (independent variables), which both have positive effects on the dependent variable

In this study, researchers observed the effect of giving a warm blanket (blanket warmer) on temperature changes in postoperative patients with subarachnoid block anesthesia. In the test results, the impact of time and temperature at a fixed time temperature is 36.2 ℃. Each additional time of 1 minute will increase the temperature by 0.0051 ℃. The results of R2 = 0.9042, meaning that time affects the temperature of the treatment group by 90.42%. In comparison, the remaining 9.58% is influenced or explained by other variables not included in this study. The control group obtained a p-value of 0.139 (p> 0, 05); it can be concluded that time does not have a significant effect on temperature.

At the fixed time, the temperature is 36.194 ℃. Each additional time of 1 minute will increase the temperature by 0.002 ℃. The result of R2 = 0.571, meaning that time affects the control group's temperature by 57.1%. In comparison, the remaining 42.9% is influenced or explained by other variables not included in this study.

Based on the results of the research conducted by researchers, it was shown that there was an effect of giving a warm blanket (blanket warmer) in postoperative patients with subarachnoid block anesthesia at the 60th minute of 90.42%, the increase was every 1 (one) minute compared to using a regular blanket which only 57.1%, this can prove that one of the attempts to treat hypothermia in patients after subarachnoid block anesthesia is by giving warm blankets. And this can also be used as one of the hospital literature to make Standard Operating Procedures (SOP) for handling hypothermia in a conscious recovery room.

4. Conclusion

Based on the research results on the effect of blanket warmer on changes in postoperative patients' central temperature with subarachnoid block anesthesia at RSSA Malang, the following conclusions are obtained.

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P- ISSN: 2086-3071 | E-ISSN: 2443-0900

For all respondents, both the treatment and control groups, the central temperature distribution before being given a blanket ranged from 35.6 to 36.7 degrees Celsius.

For all respondents in the treatment group, mental temperature distribution after being given regular blankets ranged from 35.5 ℃ to 36.9. After being given warm blankets, the control group respondents with the central temperature distribution went from 35.5 ℃ to 36.8 ℃.

The average temperature change increased between 0.4% -0.7% from the initial temperature that occurred in the 15th to 60th minute in the treatment group. Meanwhile, the control group showed decreased temperature <0.2% from the initial temperature, namely at 15 to 45 minutes, and an increase of 0.2% at 60 minutes.

The mean difference test results between the two groups with t-independent test at 0 minutes, obtained p = 0.810, 15 minutes obtained p = 0.519, at 30 minutes obtained p = 0.464, at 45 minutes obtained p = 0.393. In the 60th minute, it was found that p = 0.5101 with α = 0.05, because p> 0.05, it can be concluded that it is not statistically different. The results of the mean difference test for the 0th minute (initial) and the 60th minute of the treatment group obtained p = 0.014 with α = 0.05, which means that there is an effect of giving a warm blanket (blanket warmer) on changes in the central temperature of postoperative patients with subarachnoid anesthesia. Block in the 60th minute while the mean difference test for the 0th minute (initial) and the 60th minute of the control group obtained p = 0.182 with α = 0.05, it can be concluded that there is no effect of giving a regular blanket.

Acknowledgments

Thank you to the Chairman of STIKES Maharani and RSUD Dr. Saiful Anwar Malang City, which has become the research and to the respondents.

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