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RELATIONSHIP BETWEEN AGE, LENGTH OF OPERATION, AND USE OF INHALATION AGENTS WITH THE EVENT OF HYPOTHERMIA IN POST OPERATION PATIENTS WITH GENERAL ANESTHESIA IN THE RECOVERY CENTRAL SURGICAL ROOM INSTALLATION RSUD KANJURUHAN KEPANJEN

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ABSTRACT

Hypothermia is a condition in which the body becomes cold because the body temperature regulation is not able to overcome / regulate body temperature into normal level. Secondary hypothermia can occur due to medical actions such as drugs given in general anesthesia. Approximately 60% of postoperative patients who enter the Recovery Room can become hypothermic. The purpose of this study was to determine the relationship between age, duration of surgery, and use of inhalation agents with the incidence of hypothermia in postoperative patients with general anesthesia in the recovery room at the Central Surgical Installation of Kanjuruhan Hospital. Kepanjen. Cross sectional research method was used, The sample used was 80 people with simple random sampling. Patients temperature were measured before entering the operating room, and measured later after the surgery. Age, duration of surgery and use of inhalation were obtained from the patient's pre-postoperative data. Results: There was a significant effect ($p<0.01$) between age, and use of inhalation agents with the incidence of hypothermia in postoperative patients with general anesthesia in the recovery room at the Central Surgical Installation of Kanjuruhan Kepanjen Hospital. Age makes thermoregulation in patients different. Elderly experience changes in the function of the respiratory muscles, heart and blood vessels so that thermoregulation becomes less effective. Meanwhile, inhalation agents make blood vessels expand or vasodilate so that the body loses heat more easily. The hypothalamus and thermoregulatory control are also impaired by these inhaled agents. This makes the patient more susceptible to hypothermia

KEYWORDS: Hypothermia, Age, Duration of Operation, Use of Inhaled Agents.

INTRODUCTION

Hypothermia is a condition where the body becomes cold because the body temperature regulation is not able to overcome / regulate body temperature to a normal level. Where at normal times, the body is able to regulate the temperature in the range of 36.5-37.5 °C. When the body is outside this range, the body will find it difficult to balancing, namely through a balance of heat production and heat loss in the form of sweat. Hypothermia often occurs when we are in a cold place such as the northern hemisphere or when we travel to the top of a mountain. Hypothermia can also happen to patients after surgery because of the cold temperature in the operating room. When the patient suffers from hypothermia, the patient may experience an increased risk of bleeding, longer recovery after anesthesia, an increased risk of infection, myocardial ischemia, impaired wound healing, and primary hypothermia occurs solely due to the influence of external temperature, while secondary hypothermia can occur. due to medical actions such as due to drugs (Harahap, 2015).

The World Health Organization states that every year surgery with anesthesia continues to increase. In 2016 there were million patients undergoing surgery worldwide, while in 2017 it increased to 148 million people, and in 2018 there was a significant increase in operations, namely more than 230 million surgeries in one year worldwide. While in the Asian region, 77 million patients underwent surgery in 2017 (Kemenkes RI, 2018).

Approximately 60% of postoperative patients who go to the Recovery Room experience hypothermia. This was also revealed in a study at Hasan Sadikin Hospital, Bandung, that the incidence of post general anesthesia hypothermia performed at the Central Surgical Installation (IBS) was 87.6%. Meanwhile, in a study conducted at the Salatiga City Hospital, it was reported that almost 80% of post general anesthesia patients experienced hypothermia. If a temperature less than 35C as a guideline, the incidence of hypothermia is 50-70% of all patients undergoing general anesthesia (Harahap, 2012; Setiyanti, 2016). Based on the results of a preliminary study conducted in the Recovery Room at the Central Surgical Installation of RSUD Kanjuruhan Kab. Malang in April 2019, data obtained on the average number of patients with general anesthesia of 100 people. From the results of a documentation study of 10 medical record data in March 2019 it was found that 8 out of 10 (80%) patients experienced hypothermia, where body temperature is below 35C.

Hypothermia that occurs in patients undergoing surgery is generally caused by: the use of anesthetic drugs, administration of intravenous fluids in cold conditions, the operating room temperature is cold, the factor of age, the extent of the surgical wound and decreased muscle activity. Hypothermia can also occur in patients due to a combination of surgery that uses anesthesia and the operation itself which results in impaired body temperature regulation function so that core body temperature is experienced (Brunner & Suddarth, 2013).

Giving general anesthesia will make the postoperative patient feel a cold, vibrating sensation and shivering is a very common event that occurs in most patients. This unavoidable side effect is part of recovery from anesthesia and an almost unavoidable consequence. Hypothermia remains the most common complication of surgery under anesthesia. The incidence of postoperative hypothermia continues to increase every year.

The effects of hypothermia are in line with the decrease in body temperature. Basal Metabolic Rate (BMR) will decrease by 10 percent for every 1 degree decrease in body temperature. Hypothermia will result in changes in every organ physiologically. Initially, hypothermia will actually increase the body's metabolic rate, which is reflected in the cardiovascular system with an increase in pulse (tachycardia), blood vessel resistance in the periphery, resulting in shivering activity. Furthermore, hypothermia causes a decrease in heart rate, thereby reducing the contractility of the ventricles of the heart, which in turn lowers blood pressure. When our bodies are at temperatures below 28 degrees Celsius, the risk of heart ventricular fibrillation will also increase. In the respiratory system, initially there will be an increase in breathing (tachypnea) to compensate, but if it continues, the body will fail to compensate, resulting in bradypnea and carbon dioxide retention where the skin becomes cyanotic. (Potter & Perry, 2009).

Based on the explanation above, the researchers decided to conduct a study entitled "The Relationship of Age, length of Operation, and Use of Inhaled Agents with Hypothermia Incidence in Post-operative Patients with General Anesthesia in the Recovering Room of the Central Surgical Installation of Kanjuruhan Kepanjen Hospital".

MATERIALS AND METHODS

This study was conducted in December 2019-January 2020 on patients undergoing surgery using general anesthesia. The research was conducted in the Recovery Room of the Central Surgical Installation (IBS) Kajuruhan Hospital, Malang Regency. The research method used cross sectional, namely taking data about temperature before and after surgery, duration of surgery, wound area and use of inhalation agents. The number of respondents is 80 respondents obtained through purposive sampling method.

RESULTS

Table 1 : Respondent Characteristic.

Variable	N	F(%)
Age		
17 – 25	20	25
26-45	30	37,5
> 46	30	37,5
Length of Operation		
One hour and less	42	52,5
More than one hour	38	47,5
Used of Inhalation Agent		
Yes	18	22,5
No	62	77,5
Total	80	100

(Source : Primary Data Desember 2019 – Januari 2020)

Based on Table 1, it is known that the characteristics of the respondents, most of them (37.5%) are 26-45 years old and above 46 years old (37.5%). Most respondent (52.5%) underwent surgery in less than 1 hour, and most of them (77.5%) did not use inhalation agents.

Table 2: Postoperative Hypothermia in Patients with General Anesthesia in the Recovering Room at Kanjuruhan Hospital, Malang Regency, December 2019.

Incident of Hypothermia	n	%
Heavy	0	0
Moderate	10	12,5
Mild	37	87,2
No Hypothermia	3	0,37
Total	40	100

(Source : Primary Data Desember 2019 – Januari 2020))

Based on Table 2, it is known that there was no incidence of heavy hypothermia in all patients. Most of the respondents experienced mild hypothermia as many as 37 patients (87.2%) and 10 patients experienced moderate hypothermia (12.5%).

Table 3: Results of the analysis of the relationship between age and the incidence of hypothermia using Chi-Square.

Age	Incident of Hypothermia						P
	No		Mild		Moderate		
	n	%	n	%	n	%	
17-25 y.o	0	0	20	25	0	0	0,000
26-45 y.o	2	0,25	27	33,75	0	0	
More than 45 y.o	1	0,12	19	23,75	11	12,5	
Total	3	0,37	66	87,13	11	12,5	

(Source : Primary Data Desember 2019 – Januari 2020)

Based on table 3, it is known that the p value is 0.000 which means statistically there are differences in the incidence of hypothermia in different age ranges.

Table 4: Results of the analysis of the relationship between the length of surgery and the incidence of hypothermia.

Length of Operation	Incident of Hypothermia						p
	No		Mild		Moderate		
	n	%	n	%	n	%	
1 hour and less	2	0,25	31	38,7	4	0,5	0,622
More than 1 hour	1	0,12	35	43,7	7	0,87	
Total	3	0,37	66	82,4	11	1,27	

(Source : Primary Data Desember 2019 – Januari 2020)

Based on table 4, the p-value is 0.622, which means statistically there is no difference in the incidence of hypothermia in different operating durations.

Table 5: Analysis of the relationship between the administration of surgical inhalation agents and the incidence of hypothermia.

Agen inhalasi	Kejadian Hipotermia						p
	Tidak		Ringan		Sedang		
	n	%	n	%	n	%	
Tidak diberikan	3	0,25	55	38,7	3	0,5	0,000
Diberikan	8	0,12	10	43,7	0	0,87	
Total	11	0,37	66	82,4	3	1,27	

(Source : Primary Data Desember 2019 – Januari 2020)

Based on table 5, the p-value is 0.000, which means that statistically there are differences in the incidence of hypothermia on different inhalation agents.

DISCUSSION

Based on the results of the study, the value of the Chi-Square Test Result was p < 0.000 so it was concluded that there was a relationship between age and the incidence of postoperative hypothermia in the Rehabilitation Room of Kanjuruhan Hospital, Malang Regency. Based on Table 1, it is known that the characteristics of the respondents, most (37.5%) are 26-45 years old and above 46 years old (37.5%) and 20 respondents (25%) are between 17-25 years old.

Based on the results obtained, the higher the respondent's age the higher the probability of the respondent experiencing hypothermia. This conclusion is also in accordance with what was obtained by Harahap (2014) where he found that elderly patients have a high risk of experiencing hypothermia when undergoing perioperative procedures. This is further associated with the administration of general anesthesia which when given to the elderly will cause a decrease in the temperature regulation threshold so that elderly patients are more susceptible to changes in environmental temperature.

Potter & Perry (2010) said that heat loss either due to conduction, radiation and convection or other ways resulted in hypothermia. Moreover, the operating room which is usually set in cold conditions often makes the patient susceptible to hypothermia, through the mechanism of temperature propagation between the skin surface and the surrounding environment. Furthermore, intravenous fluids that enter the patient's body in a cold state can affect the patient's core temperature.

Joshi, Shivkumaran, Bhargava, Kausara & Sharma (2006) conducted a study and also obtained more detailed data that when elderly patients experience hypothermia, there is a change in cardiovascular function, where arterial and peripheral blood vessels experience stiffness coupled with decreased cardiac

output. Furthermore, respiratory muscle weakness and lung stiffness result in ineffective circulation and oxygenation. In addition, the elderly also experience changes in metabolic function, and decreased adrenocorticotropic response so that body heat regulation becomes less than optimal. Many things affect the regulation of temperature regulation in the elderly so that when undergoing surgery, patients will be more prone to hypothermia than younger patients. The decline in organ function and body metabolism in the elderly triggers the increased risk of hypothermia in patients.

Based on the results of the study, the value of the Chi-Square Test Result was p 0.622, so it can be concluded that there is no relationship between the length of surgery and the incidence of postoperative hypothermia in the Recovery Room of Kanjuruhan Hospital, Malang Regency. In this study, researchers only divided the length of operation into 2 types, namely under one hour and above one hour. This is because the duration of the operation in the room ranges from one to two hours.

Our bodies can produce heat through the process of burning glucose through food and drink metabolism, muscle metabolism, and other chemical reactions. In patients with surgery, the patient's BMR automatically decreases due to the effects of anesthesia. Body heat is lost in several ways, such as radiation, conduction, which is the transfer of heat to a nearby object with a lower temperature, convection or heat loss through airflow, the rate of heat loss is affected by wind speed, and evaporation, which is the loss of heat when a liquid turns into a gas. Sweat and breathing play a role in eliminating body heat by 20% (Tanto et al, 2014).

The absence of a relationship between the length of surgery and the incidence of hypothermia in this study was possible because the operating time was not too different, which was only around one to two hours. According to Potter & Perry (2010), hypothermia is caused by the release of heat due to conduction, convection, radiation, or evaporation. Exposure to low operating room temperature can cause the patient to become hypothermic, this occurs as a result of the propagation between skin surface temperature and ambient temperature. In addition, the cold intravenous fluids will enter the blood circulation and affect the body's core temperature. Other factors that can cause hypothermia in postoperative patients are the use of inhalation agents, extensive surgical wounds, duration of surgery or induction anesthesia and advanced age (Tanto et al, 2014).

Based on the results of the study, the value of the Chi-Square Test Results was p < 0.000 so it could be concluded that there was a relationship between the administration of inhalation agents and the incidence of postoperative hypothermia in the Recovery Room of Kanjuruhan Hospital, Malang Regency. Most (77.5%) did not use inhalation agents, only 18 respondents used inhalation agents during surgery.

Inhalation anesthesia is an anesthetic method used in addition to other general anesthetic techniques. Inhalation anesthetics are administered through a combination of drugs in the form of gases and/or volatile or volatile liquids administered through an anesthetic device or machine where appropriate.

CONCLUSION

1. Through the Chi Square test, a P value < 0.001 obtained that can be concluded that there is a relationship between Age and Hypothermia Incidence of Postoperative General Anesthesia Patients in the Recovering Room at Kanjuruhan Hospital, Malang Regency.
2. Through the Chi Square test, a P value of 0.623 obtained that can be concluded that there is no relationship between the length of surgery and the incidence of hypothermia in patients after General Anesthesia Operations in the Recovering Room at Kanjuruhan Hospital, Malang Regency.
3. Through the Chi Square test, a P value <0.001 obtained that can be concluded that there is a relationship between the Inhalation Agent and the Hypothermia Incidence of Postoperative General Anesthesia Patients in the Recovering Room of Kanjuruhan Hospital, Malang Regency.

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