

Relationship between Spinal Anesthesia and Hypothermia Incidence among Post Operative Patients in the Operating Recovery Room "JIH" Hospital Yogyakarta

Maryudella Afrida¹, Erika Nurwidiyanti², Marfuah³

^{1,2,3}*Sekolah Tinggi Ilmu Kesehatan Guna Bangsa, DI Yogyakarta, Indonesia*

¹*Corresponding Author : maryudellaafrida89@gmail.com*

ABSTRACT

Introduction: Complications of surgery may lead the patient to experience ill and even death. One of the complications in the patient after surgery with spinal anesthesia is the incidence of hypothermia. Hypothermia can occur as a result of a combination of anesthesia and surgery that causes disturbance in body temperature regulation that can make decreasing body temperature.

Method: This research uses a descriptive correlational method with a retrospective approach, with total sampling technique amount of 106 respondents, using a checklist sheet research instrument. Data analysis techniques spearman rank.

Results: The characteristics of surgery patients with spinal anesthesia in the operating room of Yogyakarta "JIH" Hospital were mostly female, 87.9%, most of whom were adults 74.1%, the highest frequency of surgery with spinal anesthesia duration >2 hours 55.7% and had an incidence of hypothermia 54.7%. Correlational statistical analysis obtained a Cramer's value of 0.371, a correlation coefficient value of 0.348 with a probability value (p-value) of 0.000.

Conclusion: There is a relationship between spinal anesthesia and hypothermia incidence among postoperative patients in the operating recovery room "JIH" Hospital Yogyakarta. The direction of the correlation is positive and closeness is sufficient.

Keywords: *Spinal anesthesia; the Incidence of Hypothermia; Postoperative Patients*

Introduction

Based on data obtained from the World Health Organization (WHO), the number of patients undergoing surgery has increased significantly from year to year. It was recorded that in 2011 there were 140 million patients in all hospitals in the world. In 2012 the data increased by 148 million people, while for the Asian region, surgery patients reached 77 million people in 2012 (Rihiantoro, 2017). In studies in industrialized countries, the incidence of complications of surgery and anesthesia is estimated at 3-16% with a mortality of 0.4-0.8%. The high rate of complications and mortality is a global health concern, assuming a 3% complication rate and a 0.55% mortality rate, nearly seven million patients experience major complications including one million people who die during or after surgery and anesthesia each year (Weiser et al., 2008).

In Indonesia, which is a developing country, according to the 2009 national tabulation data from the Ministry of Health of the Republic of Indonesia, surgery ranks 11th out of 50 disease patterns in Indonesia with a percentage of 12.8%. At RSUP dr. Sardjito Yogyakarta in 2010 – 2011 patients who underwent anesthesia as many as 18,007 patients, 17 patients died perioperatively and 9 of them were related to anesthesia. The mortality rate per 10,000 anesthesia at Dr. Sardjito Hospital for perioperative (9.44) is lower than the average developed country (17.68) while anesthesia-related mortality (5) is higher than the average developed country (2.813) (Pujiono, et al, 2013).

This makes special attention to surgical cases that have various complications that cause morbidity and mortality. Complications of surgery include hypothermia. Hypothermia can be defined as body temperature less than 36°C (Tamsuri, 2007). Patients who undergo surgery are at risk of developing hypothermia (Setiyanti, 2016). In surgery, previously performed anesthesia or anesthesia. Spinal anesthesia is one way to eliminate motor sensation by inserting anesthetic drugs into the subarachnoid space. In spinal anesthesia there is a block in the sympathetic system resulting in vasodilation, this results in heat transfer from the central to peripheral compartments which causes hypothermia (Fauzi, 2014). Spinal anesthesia produces sympathetic block and sensory block to peripheral temperature receptors thereby inhibiting the compensatory response

to temperature, the impact that often occurs after spinal anesthesia is shivering (Masithoh, 2018).

Hypothermia that occurs in surgical patients with spinal anesthesia is caused by 3 mechanisms, namely: redistribution of body heat, heat loss, and inhibition of sympathetic and somatic temperature regulation centers. The higher the block, the greater the thermoregulatory disturbance that occurs. The core body temperature threshold decreased by 0.15°C for each dermatome that had a block (Manunggal, 2014). A preliminary study that was conducted at the Yogyakarta "JIH" Hospital in December 2019, of 15 surgical patients with spinal anesthesia, 40-45% experienced hypothermia in the operating room recovery room at the Yogyakarta "JIH" Hospital. Based on the description above, researchers are interested in researching the relationship between spinal anesthesia and the incidence of hypothermia in postoperative patients in the operating room recovery room at the Yogyakarta "JIH" Hospital.

Method

This type of research is a quantitative research type, with a descriptive design using a retrospective approach, namely conducting a documentation study that has occurred in the past. This study aims to identify the relationship between two variables, namely the variable spinal anesthesia with the incidence of hypothermia in the operating room induction room "JIH" Hospital Yogyakarta. The study was conducted at the Yogyakarta "JIH" Hospital by taking secondary data from the medical records of operating patients in the operating room whose operations were carried out in July-December 2020 and data collection was carried out in December 2020. The sampling technique in this study was total sampling, namely taking samples where the number of samples is the same as the population (Sugiyono, 2016). The data obtained in this study came from secondary data, namely registers and patient medical records.

Result

The results of the study of the relationship between spinal anesthesia and the incidence of hypothermia in postoperative patients in the operating room recovery room at the Yogyakarta "JIH" Hospital are as follows:

Table 1 Frequency Distribution of Respondents by Gender, Age in the Operating Room of the "JIH" Hospital Yogyakarta on 2020

Characteristic	Frequency	%
Gender		
Male	34	32,1
Female	72	67,9
Total	106	100
Age		
Teenager (17-25 years old)	12	11,3
Adult (26-45 years old)	68	64,2
Elderly (\geq 46 years old)	26	24,5
Total	106	100

Source: Primary Data, 2020

On the results of the distribution of the frequency of respondents, the sex of the majority of respondents is female, namely 72 people (67.9%). When viewed from the age group, most of the respondents were adults, namely 68 people (64.2%).

Table 2 Distribution Frequency of Spinal Anesthesia in the Operating Room of "JIH" Hospital Yogyakarta on 2020

Characteristic	Frequency	%
Spinal Anesthesia		
Duration > 2 hours	59	55,7
Duration \geq 1- \leq 2 hours	47	44,3
Total	106	100

Source: Primary Data, 2020

Based on the results of the frequency distribution of spinal anesthesia variables, the most respondents with spinal anesthesia were 59 people (55.7%).

Table 3 Distribution Frequency of Hypothermia in the Operating Room of the Hospital "JIH" Yogyakarta in 2020

Characteristic	Frequency	%
Incidence of Hypothermia		
Yes	58	54,7
No	48	44,3
Total	106	100

Source: Primary Data, 2020

Based on the results of the frequency distribution of postoperative hypothermia variables, most respondents experienced hypothermia, namely 58 people (54.7%).

Table 4 Cross Tabulation of Sex with Hypothermia Incidence in the Operating Room of the Yogyakarta "JIH" Hospital in 2020

Variable	Incidence of Hypothermia				Total	%
	Yes		No			
	f	%	f	%		
Male	7	6,6	27	25,4	34	32,1
Female	51	48,1	21	19,8	72	67,9
Total	58	54,7	48	55,2	106	100

Source: Primary Data, 2020

Based on the cross-tabulation of sex with the incidence of hypothermia, the majority of respondents experienced hypothermia who were female, namely 51 people (48.1%).

Table 5 Cross-Age Tabulation with Hypothermia Incidence in the Operation Room of the "JIH" Yogyakarta Hospital in 2020

Variable	Incidence of Hypothermia				Total	%
	Yes		No			
	f	%	f	%		
Teenager (17-25 years old)	6	5,6	6	5,6	12	11,3
Adult (26-45 year old)	43	40,5	25	23,5	68	64,1
Elderly (\geq 46 years old)	9	8,4	17	16,3	26	24,6
Total	58	54,5	48	45,4	106	100

Source: Primary Data, 2020

Based on the cross-tabulation of age with the incidence of hypothermia, respondents who experienced hypothermia were mostly adults (24-45 years old), namely 43 people (40.5%).

Table 6. Spearman Rank Statistical Test of Spinal Anesthesia Variables and Hypothermia Incidence of Post-operative Patients in the Operating Room of the "JIH" Yogyakarta Hospital in 2020

Variable	Incidence of patient hypothermia post-surgery						Correlation Coefficient	p value
	Less Obedient		Obedient		Total			
	f	%	F	%	f	%		
Anesthesia spinal								
Duration >2 hours	42	39,6	17	16,1	59	55,7		
Duration ≥1- <2 hours	16	15,1	31	29,2	47	44,3	0,371	0,000
Total	58	54,7	48	45,3	106	100		

Source: Primary Data, 2020

Based on the Spearman Rank statistical test, 42 patients (39.6%) experienced hypothermia. Correlation coefficient Spearman Rank obtained 0.371 results, meaning that the two variables have a moderate level of a close relationship. The p-value of 0.000 means that there is a significant relationship between spinal anesthesia variables and the incidence of postoperative hypothermia in patients. The results of the Spearman Rank correlation coefficient with a positive number (+) means that the direction of the relationship between the two variables is unidirectional or positive (+), i.e. spinal anesthesia procedures >2 hours are associated with an increased risk of hypothermia when compared with spinal anesthesia procedures 1- <2 hours.

Discussion

1. Characteristics of respondents who underwent surgery with spinal anesthesia who experienced postoperative hypothermia in the operating room recovery room, Hospital "JIH" Yogyakarta

a. Age

The results of the frequency distribution of age characteristics in this study were mostly adults (26-45 years), as many as 68 of 106 patients (64.2%). The results of cross-tabulation of respondents who experienced the highest incidence of hypothermia were mostly adults (24-45 years), namely 43 of 106 patients (40.5%). In Mubarokah's research (2017), there is a relationship between age and the incidence of hypothermia with a p-value of 0.011. The incidence of hypothermia in addition to being related to age is also influenced by the extent of surgery or the type

of major surgery that opens the body cavity, for example in orthopedic surgery, thoracic and abdominal cavities. Abdominal surgery is known as a cause of hypothermia because it is associated with a long operation, large incisions require fluid to clean the peritoneum (Buggy & Crossley, 2000).

b. Gender

The results of the characteristic frequency distribution in this study were mostly female respondents, as many as 72 of 106 patients (67.9%). The results of the cross-tabulation of respondents who experienced hypothermia the most respondents experienced hypothermia were female, as many as 51 of 106 patients (48.1%). This is by research conducted by Harahap (2014), the number of hypothermia is more common in women than men.

According to Saito (2013), the incidence of hypothermia is more common in women than men because women tend to have weaker muscle strength. A larger body surface area and less muscle mass may make women more susceptible to heat loss. Muscle mass is associated with heat production, and smaller muscle mass will cause a lower heat production capacity and a risk of hypothermia (Prado et al., 2015). The theory put forward by Rosjidi & Isroain (2014), that women are more susceptible to disease/surgical complications than men.

2. Operation with spinal anesthesia in the operating room of the Hospital "JIH" Yogyakarta

The results of the analysis of the frequency distribution of spinal anesthesia in this study were 59 of 106 patients (55.7%). This shows that most of the operations in the operating room of the "JIH" hospital using spinal anesthesia with a duration of >2 hours. In this study, the inclusion criteria for surgery in the major category of the abdominal area, generally this category takes >2 hours. Spinal anesthesia is the anesthesia that is performed on patients who are still conscious to eliminate the conduction process at the ends or sensory nerve fibers in certain body parts (Rochimah, et al, 2011). The purpose of spinal anesthesia according to Sjamsuhidayat & De Jong (2010) spinal anesthesia can be used for surgical procedures, childbirth, acute and chronic pain management. Hanifa's research (2017), shows the same thing, which is 65.2% using spinal anesthesia. Patients with spinal anesthesia duration >2 hours experienced complications of hypothermia as

much as 23.6%. Patients with spinal anesthesia duration <2 hours experienced hypothermia in 41.8%.

3. Hypothermia in patients with spinal anesthesia in the operating room of the Yogyakarta "JIH" Hospital

The results of the frequency distribution of postoperative hypothermia in this study were 58 of 106 patients (54.7 %). This shows that most of the patients who underwent surgery in the operating room of the "JIH" hospital experienced side effects of hypothermia. Hanifa's research (2017), showed the same thing, namely 65.5% of patients experienced hypothermia compared to those who did not experience hypothermia during surgery. By Yulianto & Budiono (2011), the factors that influence the incidence of hypothermia due to the combination of anesthesia and surgery can cause disturbances in the body's temperature regulation function which will cause a decrease in the core body temperature. The same thing is also by Aribowo (2012), hypothermia is caused by the effects of anesthetic drugs that cause thermoregulation disorders.

4. The relationship between spinal anesthesia and the incidence of postoperative hypothermia in the operating room recovery room at "JIH" Hospital Yogyakarta

The results of the analysis using the Spearman Rank test in this study obtained: correlation coefficient of 0.371 and p-value of 0.000. This shows that there is a significant relationship with a moderate level of closeness in both variables. The direction of the relationship shows the direction or positive (+) that is, the more patients who undergo surgery with spinal anesthesia, the more the incidence of postoperative hypothermia.

According to Lissauer (2013), the mechanism of heat loss decreases human body temperature during anesthetic action following a certain pattern/phase, including the redistribution phase. Anesthesia will cause vasodilation. This occurs through two mechanisms, namely anesthetic drugs directly cause vasodilation of blood vessels and anesthetics to lower the vasoconstriction threshold by inhibiting central thermoregulatory function. This vasodilation will result in body heat from the central part of the core temperature flowing to the periphery. Redistribution of body heat causes an increase in peripheral temperature but causes a decrease in core temperature. The decrease in core temperature in this phase occurs rapidly. The core

temperature dropped 1-1.5°C during the first hour. The manifestation that occurs in this phase is hypothermia (Lissauer, 2013).

The results of statistical tests in this study showed that 71.2% of respondents who underwent surgery with spinal anesthesia duration >2 hours experienced hypothermia. In Mubarokah's research (2017), the incidence of hypothermia also occurred in patients who underwent surgery for >2 hours, which was 88.9%. According to Chintamani (2008), the duration of surgery and anesthesia has the potential to have an effect, especially anesthetic drugs with higher concentrations in blood and tissue (especially fat), solubility, and longer duration of anesthesia, so that these agents try to achieve balance with these tissues. . In the theory of the Republic of Indonesia's Ministry of Health (2009), a long duration of surgery causes anesthesia to be longer and increases the length of time exposed to a temperature in the operating room which is constant at 16-18⁰C.

Conclusion

According with the purpose of this study, the researchers concluded that the characteristics of respondents/patients operating with spinal anesthesia who experienced hypothermia in the operating room of the Yogyakarta "JIH" Hospital were the majority of women. The frequency of surgery with spinal anesthesia duration > 2 hours in the operating room at the Yogyakarta "JIH" Hospital was more frequent than the duration of spinal anesthesia 1 - <2 hours. In addition, it was found that most postoperative patients with spinal anesthesia in the operating room recovery room at the "JIH" Hospital Yogyakarta experienced hypothermia events and found a moderate relationship between spinal anesthesia and the incidence of hypothermia in postoperative patients in the operating room recovery room Hospital " JIH" Yogyakarta.

References

- Aribowo, N.K. 2012. *Hubungan Lama Tindakan Anestesi dengan Waktu Pulih Sadar Pasien Pasca General Anestesi di IBS RSUD Muntilan Magelang (Skripsi)*. Poltekkes Kemenkes Yogyakarta (tidak dipublikasikan).
- Buggy & Crossley. Thermoregulation, Mild Perioperative Hypothermia, and Post-anaesthetic Shivering. *British Journal of Anaesthesia*. 2000;84(5):615-28.

- Chintamani, E. S. D. 2008. *Moroney's Surgery For Nurses*. India: Elsevier.
- Depkes RI. 2009. *Profil Kesehatan Indonesia*. Jakarta
- Fajar, K. 2018. Efek *Samping dan Komplikasi yang Mungkin Timbul dari Obat Anestesi*. <https://helohehat.com/hidup-sehat/fakta-unik/dampak-dan-efek-samping-obat-anestesi/> diakses pada tanggal 2 Maret 2020.
- Fauzi, N.A. 2014. *Gambaran Kejadian Menggigil (Shivering) pada Pasien dengan Tindakan Operasi yang Menggunakan Anestesi Spinal di RSUD Karawang Periode Juni 2014*. Jurnal Prosiding Pendidikan Dokter
- Guyton, A. 2007. *Buku Ajar Fisiologi Kedokteran*. Jakarta: Penerbit Buku Kedokteran.
- Hanifa, A. 2017. *Hubungan Hipothermia dengan Waktu Pulih Sadar Pasca General Anestesi di Ruang Pemulihan RSUD Wates Yogyakarta (Skripsi)*. Poltekkes Kemenkes Yogyakarta (tidak dipublikasikan).
- Harahap, A.M. 2014. *Angka Kejadian Hipothermia dan Lama Perawatan di IBS pada Pasien Geriatri Pasca Operasi Elektif Bulan Oktober 2011-Maret 2012 di Rumah Sakit Dr. Hasan Sadikin Bandung*. Jurnal Anestesi Perioperatif Volume 2(1) No: 36-44. Fakultas Kedokteran Universitas Padjadjaran.
- Hardisman, D. 2014. *Gawat Darurat Medis Praktis*. Yogyakarta: Gosyen Publishing
- Hujjatul Islam, A. 2015. *Perbandingan Antara Penggunaan Asam Amino dan Ringer Laktat terhadap Penurunan Suhu Inti Pasien yang Menjalani Operasi Laparatomi Ginekologi dengan Anestesi Umum*. Jurnal Anestesi Perioperatif 2015, 3(3): 139-45.
- Keat Sally, et al. 2013. *Anesthesia on The Move*. Jakarta: Indeks
- Kemenkes RI. 2013. *Riset Kesehatan Dasar*. Jakarta: Balitbang
- Kemendiknas RI. 2010. *Peraturan Menteri Pendidikan Nasional tentang Pencegahan dan Penanggulangan Plagiat di Perguruan Tinggi*. Jakarta: Kemendiknas RI
- Lissauer. 2013. *Glance Neonatologi Edisi Kedua*. Jakarta: Erlangga
- Madjid, A.K.I. 2014. *Faktor yang Mempengaruhi Kejadian Shivering Pasca Anestesi Spinal di IBS RSUD I La Galigo Kab. Luwu Timur Sulawesi Selatan (Skripsi)*. DIV Keperawatan Poltekkes Kemenkes Yogyakarta (tidak dipublikasikan)
- Majid, dkk. 2011. *Keperawatan Perioperatif*. Yogyakarta: Gosyen Publishing
- Mahalia, S.M. 2012. *Efektivitas Tramadol sebagai Pencegah Menggigil Pasca Anestesi Umum (skripsi)*. S1 Kedokteran Umum Uniersitas Diponegoro Semarang

- Makarim, R.F. 2019. *Ini Jenis-Jenis Anestesi yang perlu diketahui*. <https://www.halodoc.com/ienis-ienis-anestesi-yang-perlu-diketahui>. diakses pada tanggal 2 Maret 2020
- Mangu, G., Senapathi, T.G.A. 2010. *Ilmu Anestesi dan Reanimasi*. Jakarta: PT. Indeks.
- Mashitoh, D. 2018. Lama Operasi dan Kejadian *Shivering* Pada Pasien Pasca Spinal Anestesi. *Jurnal Keperawatan Terapan*, Volume 4, NO. 1, Maret 2018: 14-20.
- Miller, C. 2010. *Factors Affecting Blood Pressure and Heart Rate*. Available from: <http://www.livestrong.com/article/196479factorsaffectingbloodpressureheart-rate/>. diakses tanggal 28 Januari 2020.
- Morgan, G. E., & Mikhail, M. 2013. *Clinical Anesthesiology Edisi-5*. New York: MC.Grow
- Mubarokah, P.P. 2017. *Faktor - Faktor yang Berhubungan dengan Hipothermia Pasca General Anestesi di Instalasi Bedah Sentral (IBS) RSUD Kota Yogyakarta (Skripsi)*. Poltekkes Yogyakarta (tidak dipublikasikan).
- Nainggolan, D.H. 2014. Perbandingan Anestesi Spinal Menggunakan Ropivakain Hiperbarik 13,5 mg dengan Ropivakain Isobarik 13,5 mg Terhadap Mula dan Lama Kerja Blokade Sensorik. *Jurnal Anestesi Perioperatif JAP*. 2014;2(1): 45-54. Fakultas Kedokteran Universitas Padjadjaran/Rumah Sakit Dr. Hasan Sadikin Bandung.
- Notoatmodjo. 2012. *Metodologi Penelitian Kesehatan*. Jakarta: PT Rineka Cipta.
- Potter, Perry, 2010. *Fundamental Of Nursing: Concep, Proses, and Practice*. Edisi 7. Vol. 3. Jakarta: EGC
- Pradita, N.A., Jadmiko, A.W. 2016. *Pengaruh Pemberian Terapi Musik Klasik terhadap Tekanan Darah dan Denyut Jantung Pasien Pasca Operasi dengan Anestesi Umum di RS Dr. Moewardi Surakarta (Universitas Muhammadiyah Surakarta)*. <http://eprints.ums.ac.id/2065/> diakses tanggal 5 Maret 2020.
- Prado *et al.* 2015. *Milk kefir: composition, microbial cultures, biological activities, and related products*. *Front Microbial* 6: 1-12.
- Proverawati, A., Kusuma, E. 2010. *Ilmu Gizi untuk Keperawatan dan Gizi Kesehatan*. Yogyakarta: Nuha Medika.
- Pujiono, *et al.* 2013. *Analisis Potensi Bahaya Serta Rekomendasi Perbaikan Dengan Metode Hazard and Operability Study (HAZOP) Melalui Perangkingan OHS Risk Assesment And Control*, Universitas Brawijaya, Malang.
- Putzu, M. 2007. *Clinical Complications, Monitoring, And Management of Perioperative*

Mild Hypothermia: Anesthesiological Features. Acta Biomed. Vol. 78: 163-9.

- Rianto, A. 2015. *Aspek Hukum dalam Penelitian*. Jakarta: Yayasan Pustaka Obor Indonesia.
- Rihiantoro. 2012. Preloading dan Coloadung Cairan Ringer Laktat Dalam Mencegah Hipotensi Pada Anestesi Spinal. *Jurnal Keperawatan*. 8(2).
- Reeder, S.J., Martin, L.L., Griffin, D.K. 2011. *Keperawatan Maternitas: Kesehatan Wanita, Bayi & Keluarga Edisi 18*. Jakarta: EGC
- Rochimah, dkk. 2011. *Keterampilan Dasar Praktik Klinik*. Jakarta: Trans Info Media.
- Rosjidi, C. H., dan Isro'ain. 2014. *Buku Ajar Peningkatan Tekanan Intrakranial & Gangguan Peredaran Darah Otak*. Yogyakarta: Gosyen Publishing.
- Sabiston, D.C. 2011. *Buku Ajar Bedah*. Jakarta: EGC
- Sastoasmoro, S., Ismael, S. 2011. *Dasar-dasar Metodologi Penelitian Klinis*. Jakarta: Sagung Seto.
- Saito, M. 2013. *Mukjizat Suhu Tubuh*. Jakarta: Gramedia Pustaka Utama
- Setiati, et al., 2008. *Hipotermia dalam Lima Puluh Masalah Kesehatan di Bidang Ilmu Penyakit Dalam*. Buku kesatu Interna Publishing. Jakarta: Pusat Penerbitan Ilmu Penyakit Dalam FKUI
- Sjamsuhidajat & De Jong. (2012). *Buku Ajar Ilmu Bedah*. Edisi 3. Jakarta : EGC.
- Soenarjo, dkk. 2010. *Teknik Anestesi Spinal dan Epidural*. Semarang: Ikatan Dokter Spesialis Anestesi dan Reanimasi Cabang Jawa - Tengah
- Susilowati, 2017. *Hubungan Body Massa Index dengan Kejadian Shivering pada Pasien dengan Anastesi Spinal di RS PKU Muhammadiyah Yogyakarta*. (Skripsi). Poltekkes Yogyakarta (tidak dipublikasikan).
- Suswita, 2019. Efektifitas Penggunaan Electric blanket pada Pasien yang Mengalami Hipothermia Post Operasi di Instalasi Bedah Sentral (IBS) Rumah Sakit Umum Daerah Palembang. *Jurnal Ilmiah Kesehatan* 8.48-56.10.35952/jik.v8i 1.137
- Sunyoto, D. 2013. *Metode Penelitian Akuntansi*. Bandung: PT. Refika
- Tamsuri, A. 2007. *Konsep dan Penatalaksanaan Nyeri*. Jakarta: EGC.
- Weiser et al. 2008. *An Estimation of The Global Volume of Surgery: A Modelling Strategy Based on Available Data*. *Lancet* 2008; 372 (9633). 2009: 139-44.
- World Health Organization. 2009. *WHO Guidelines for Safe Surgery: Safe Surgery*

Saves Lives. Switzerland: WHO Press

Yulianti, F.R. 2014. Gambaran Kejadian Menggigil (*Shivering*) pada Pasien Dengan Tindakan Operasi yang Menggunakan Anastesi Spinal Di RSUD Karawang periode Juni 2014. *Jurnal Vol 1, No 2, Prosiding Pendidikan Dokter*.

Yulianto & Budiono. 2011. Desain dan Pembuatan Inkubator Berdasarkan Distribusi Temperature. *Jurnal Gamma*. 8 (1):140-147.