

Effectiveness of American Society of Perianesthesia Nurses (ASPAN) on Maternal and Neonates Outcome during Perioperative Enhanced Recovery after Caesarean Surgery (ERACS)

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ABSTRACT

Introduction: Patient comfort is one of the important components that must be considered in providing nursing care, including perioperative nursing services, one of which is temperature comfort. **Objective:** The study aimed to explain the effect of the ASPAN guideline intervention for normothermia (active and passive warming) on maternal and neonates outcomes during perioperative Enhanced Recovery After Caesarean Surgery (ERACS). **Methods:** This research used a quasi-experimental quantitative research design or a quasi-experiment involving a control group and an intervention group. The total number of respondent was 106 people who meet inclusion criteria in which intervention and control group were 58 respondents respectively. Measurement of the intervention group for prevention of hypothermia in cesarean section patients was performed perioperatively (pre-intra-post-surgery). **Results:** The mother's body temperature variable in the intraoperative and postoperative phases was higher in the intervention group than the control group. The shivering condition variable in the control group experienced an increase in shivering during the intraoperative and postoperative phases (1.15 ± 0.41 and 2.17 ± 0.80), while in the intervention group there was a decrease in shivering condition (0.22 ± 0.42 and 0.20 ± 0.41). In the temperature comfort variable after measuring using Thermal Comfort ERACS, the Mean \pm SD value in the intervention group when the intra-operative and post-operative phases was in the neutral category (0.44 ± 0.6 and 0.44 ± 0.65). **Conclusion:** Application of ASPAN Guideline for normothermia during perioperative obtained significant results on the variable of the mother's temperature, the baby's temperature.

Keyword: Comfort, ERACS, hypothermia, perioperative

ABSTRAK

Latar belakang: Kenyamanan pasien merupakan salah satu komponen penting yang harus diperhatikan dalam pemberian asuhan keperawatan, termasuk pelayanan keperawatan perioperative salah satunya dengan kenyamanan suhu. **Tujuan:** Tujuan penelitian ini adalah untuk menjelaskan atau mempelajari pengaruh intervensi ASPAN guideline for normothermia (penghangatan aktif dan pasif) terhadap maternal dan neonatus outcome selama perioperatif Enhanced Recovery After Caesarean Surgery (ERACS) **Metode:** Penelitian ini menggunakan desain penelitian kuantitatif quasy experiment atau eksperimen semu yang melibatkan adanya kelompok kontrol dan kelompok intervensi. Jumlah total sample dalam penelitian ini yaitu 106 yang terdiri dari masing masing 58 responden untuk kelompok control dan intervensi Pengukuran terhadap kelompok intervensi pencegahan hipotermia pada pasien sectio caesarea dilakukan dalam waktu perioperative (pre-intra-pos operasi). **Hasil:** Variabel temperatur tubuh ibu di fase intra operatif dan post operatif lebih tinggi pada kelompok intervensi dibandingkan kelompok kontrol. Variabel kondisi menggigil pada kelompok kontrol terjadi peningkatan kondisi menggigil saat fase intra operatif dan post operatif ($1,15 \pm 0,41$ dan $2,17 \pm 0,80$), sedangkan pada kelompok intervensi terjadi penurunan kondisi menggigil ($0,22 \pm 0,42$ dan $0,20 \pm 0,41$). Pada variabel kenyamanan suhu setelah dilakukan pengukuran menggunakan Thermal Comfort ERACS dilihat nilai Mean \pm SD pada kelompok intervensi saat fase intra operatif dan post operatif berada dalam kategori netral ($0,44 \pm 0,6$ dan $0,44 \pm 0,65$). **Kesimpulan:** Penerapan ASPAN Guideline for normothermia selama perioperatif didapatkan hasil yang signifikan pada variable temperature suhu ibu, temperature suhu bayi.

Kata Kunci: CSL, Dimensi, Kepuasan, Online

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Introduction:

In Indonesia, currently the technique of warming during the cesarean section procedure is usually carried out actively through the provision of warmed air blankets and warm intravenous fluids. No research has been found in Indonesia that examines the effectiveness of more diverse heating techniques to maintain body temperature in normal (36.50C–37.50C) and comfortable conditions. The focus of the management of hypothermia is limited to handling after the patient experiences hypothermia and shivering, where to treat shivering, the anesthesiologist uses intravenous injection of petidine to block motor nerves so as not to cause tremors due to shivering (Novidawasti and Ernawati, 2020) (Kusuma Duarsa *et al.*, 2019). A standardized hypothermia guideline consist of passive and active warming methods was developed by the American Society of Perianesthesia Nurses (ASPAN), that outlined by several articles could effectively maintain normothermia. A more profitable step is in the process of preventing hypothermia during perioperative procedures, where this will have a better impact on patients and health workers on duty.

According to data from the Indonesia Demographic Health Survey (Survei Demografi Kesehatan Indonesia (SDKI)) in 2017, the prevalence of SC/caesarean section births is 17% per 1,000 births that occur (BKKBN *et al.*, 2018). The mortality rate due to cesarean section in infants is 3.5 times higher than normal procedures. As reported by a study in the USA, the neonatal mortality rate delivered by cesarean section procedure is about 13 per 100,000, while the neonatal mortality rate from vaginal birth is only 3.5 per 100,000 normal births (Caughey *et al.*, 2014; Yang and Sun, 2017). The increase in MMR and IMR-(Neonatal) as the most detrimental effect of complications from cesarean procedures is the most undesirable maternal and neonatal outcome.

The hypothermia prevention interventions recommended by ASPAN include active warming through the

administration of warm intravenous fluids, warm physiological cleansing fluids for uterine irrigation during the procedure (Steelman *et al.*, 2018), thermal gown, and forced-air warming (FAW), and disinfect the anesthetic area and incision with warm povidone iodine and warm oxygenation. Meanwhile, passive procedures consist of giving headgear, warm blankets, socks, and cotton robes during the procedure. The literature study conducted also shows that there are currently no studies showing the effectiveness of the ASPAN guideline for normothermia intervention for the prevention of hypothermia during cesarean section procedures. Therefore, the effectiveness of the ASPAN guideline intervention for the prevention of hypothermia in cesarean section patients still requires further explanation. The ASPAN Guidelines are not intended to be absolute standards or requirements, but can be adopted, modified or rejected according to specific clinical needs and limitations (Hooper *et al.*, 2010).

Freedom from cold (hypothermia) is one type of the comfort needed by the patient to support the healing process during the process of being sick. According to Kolcaba's comfort theory, the need for hypothermia-free health services can be realized by providing comforting interventions by paying attention to action variables that can affect the success of actions (intervening variables) that have been arranged to increase comfort (hypothermia-free). experienced by the patient (enhanced comfort) (Kolcaba, Tilton and Drouin, 2006). Therefore, it is very important to plan interventions to prevent hypothermia based on comfort needs and ways to increase comfort based on the development of existing theories. In similar existing studies, no use of Kolcaba's comfort theory approach was found to answer one of these comfort needs, which is temperature comfort, especially in pregnant women who underwent caesarean section with spinal anesthesia. The provision of active and passive heating interventions recommended by ASPAN guidelines for maintaining normothermia with a comfort theory approach

can support the thermal comfort felt by patients. Research is interested to explain the effect of ASPAN guideline to prevent hypothermia in cesarean section patients with ERACS spinal anesthesia.

Methods:

This research used a quasi-experimental quantitative research design involving a control group and an intervention group. Measurement of the intervention group with prevention of hypothermia in cesarean section patients performed perioperatively (pre-intra-post-surgery). The population in this study were all patients/pregnant women who are planned to receive ERACS with spinal anesthesia. The research subjects were selected by non-probability sampling, which was purposive sampling where respondents were selected based on the criteria that had been prepared by the researcher in the form of inclusion criteria and exclusion criteria. In this study, the researcher set the confidence interval at 95% ($Z\alpha = 1,96$) and 80% power ($Z\beta = 0,84$). The mean used was 0,06 and the standard deviation is 0,11 (Meghana, Vasudevarao and Kamath, 2020). The number of patients for each group were 53 patients, so the total number of patients for the two study groups were 106 patients. To use ASPAN guideline some management recommendations must be assessed in patients SC with ERACS spinal anesthesia. Preoperative recommendations; asses for risk factors for perioperative hypothermia, measure patient temperature on admission, determine patient's thermal comfort level, assess for signs and symptoms of hypothermia (eg, shivering, piloerection or cold extremities). In intraoperative phase, the recommendation must review recommendations: identify risk factors for unplanned perioperative hypothermia in all cases, frequent

intraoperative temperature monitoring should be considered cases, assess for signs and symptoms of hypothermia, determine patient's thermal comfort level. Furthermore, in post operative patient management recommendations must be included; identify the patient's risk factors for assessment findings to all members of the healthcare team and measure patient temperature on admission (Hooper *et al.*, 2010).

Inclusion criteria to the study was the patients will be performed SC and spinal anesthesia with ERACS procedure; normal body temperature ($> 36,50C$ and $< 37,50C$).

The independent variables in this study included the patients as control group with covered with regular hospital blanket during all operation periods such as before, during and after surgery. Treatment groups; in the waiting room, patients were given the ASPAN guideline intervention in the form of active and passive warmer techniques (a head turban and sleeping socks made of soft material, a regular hospital blanket). While the dependent variables in this study include maternal outcomes including maternal body temperature during the perioperative period, maternal shivering during the perioperative period, maternal thermal comfort scores during the perioperative period. Neonatal outcomes included the baby's body temperature at birth and the baby's APGAR score 1-5 minutes after birth.

Statistic analysis was conducted using SPSS Statistic 25.0 (IBM corp). descriptive statistic were used for the general characteristics. Mann withney U test was applied to compare the result between two groups. This research had received a research ethical approval from KEPK from the Faculty of Nursing, Universitas Airlangga number 2433-KEPK.

Results:

Table 1 Frequency distribution of respondent characteristics in the control group and the intervention group

| No | Characteristics of Respondents | Intervention Group (n=59) | | Control Group (n=59) | |
|----|--------------------------------|---------------------------|----|----------------------|------|
| | | n | % | n | % |
| 1 | Age (Mean ± SD) | 30.4±5.97 | | 29.02 ± 6.11 | |
| 2 | Education | | | | |
| | ELEMENTARY SCHOOL | 8 | 5 | 5 | 13.6 |
| | JUNIOR HIGH SCHOOL | 22 | 22 | 22 | 37.3 |
| | SENIOR HIGH SCHOOL | 25 | 30 | 30 | 42.4 |
| 3 | Ethnic group | | | | |
| | Java | 45 | 54 | 54 | 76.3 |
| | Madura | 14 | 5 | 5 | 23.7 |
| 4 | Religion | | | | |
| | Islam | 59 | 59 | 59 | 100 |
| 5 | Work | | | | |
| | Housewife | 46 | 51 | 51 | 78.0 |
| | Farmer | 12 | 6 | 6 | 20.3 |
| | Employee | 1 | 2 | 2 | 1.7 |
| 6 | Baby Gender | | | | |
| | Man | 20 | 31 | 31 | 33.9 |
| | Woman | 39 | 28 | 28 | 66.1 |

Table 1 shows that the characteristics of respondents in this study have an average age of 29 and 30 years, the majority of which have junior high and high school education (control 37.29% and 50.85%; intervention 37.29% and 42.37%). Respondents in both groups are mostly Javanese and all are Moslem. Looking at the characteristics of the work, most of them are housewives in both the control group and the intervention group. There are more boys as respondents in the control group (52.5%) and more girls in the intervention group (66.1%).

Table 2 Intervention bivariate analysis
American Society of Perianesthesia Nurses (ASPAN) Guideline For Normothermia on maternal outcome

| No | Variable | Perioperative Phase | Mann Whitney | |
|----|---------------------------|---------------------|--------------|---------|
| | | | Z | P-value |
| 1 | Mother's body temperature | Preoperative | - | 0.026 |
| | | Intraoperative | 2.226 | 0.000 |
| | | Postoperative | - | 0.000 |
| | | | 6,129 | |

| No | Variable | Perioperative Phase | Mann Whitney | |
|----|-----------------------|---------------------|--------------|---------|
| | | | Z | P-value |
| | | | - | |
| | | | 9,191 | |
| 2 | Shivering Condition | Preoperative | - | 0.941 |
| | | Intraoperative | 0.074 | 0.000 |
| | | Postoperative | - | 0.000 |
| | | | 8,389 | |
| | | | - | |
| | | | 9,106 | |
| 3 | Comfort Temperature | Preoperative | - | 0.003 |
| | | Intraoperative | 2,953 | 0.000 |
| | | Postoperative | - | 0.000 |
| | | | 7,884 | |
| | | | - | |
| | | | 8,916 | |
| 4 | Baby Body Temperature | Postoperative | - | 0.000 |
| | | | 8,074 | |
| 5 | Baby's APGAR Score | Postoperative | - | 0.380 |
| | | | 0,878 | |

The results of data analysis in table 3 on the temperature variable of the mother's temperature after the ASPAN Guideline for normothermia intervention during perioperatively shows significant results from the Mann Whitney statistical test, p-value <0.05, which means that there is an effect of the ASPAN Guideline for normothermia intervention on the mother's body temperature during the ERACS procedure. The shivering condition variable in the preoperative phase showed no effect from the ASPAN Guideline for normothermia intervention where p-value = 0.941 (> 0.05). However, the ASPAN Guideline for normothermia intra and postoperative intervention shows a statistically significant effect, which is p-value <0.05. Respondents who receive an intervention on the comfort temperature variable obtained statistically significant different test results as evidenced by p-value = <0.05. The ASPAN Guideline for normothermia intra and postoperative intervention is also significantly affects to the baby's temperature proven by p-value = <0.05 however it insignificantly affects to the baby's APGAR score (p-value = >0.05).

Discussion :

The ASPAN intervention is able to stabilize the mother's body temperature, the comfort of the mother's temperature and the baby's body temperature at birth during the perioperative phase. It is also proven by the trend which shows that the mother's body temperature range is within the normal range for all phases in the intervention group. When comparing the prevalence of hypothermia between the groups, the experimental group could maintain a body temperature of 36 °C or higher during perioperative procedure. The effectiveness of passive warmer clearly shown in the study. On the contrary, respondents in the control group have a downward trend entering the intra and postoperative phases (35° C). These results are similar to previous studies which stated that respondents who received the ASPAN Guideline intervention were in the normal temperature range (36° C) during the perioperative phase until entering the recovery room or slightly higher body temperature than without treatment (Kang and Park, 2020) (Yoo *et al.*, 2013), active and passive heating can prevent shivering in mothers undergoing cesarean section with spinal anesthesia (Ni *et al.*, 2020). ASPAN Guidelines have a significant effect on changes in thermal comfort (Kang and Park, 2020). There has been no previous study that discussed the effect of giving the ASPAN Guideline on temperature comfort in cesarean section patients with the ERACS and spinal-anesthesia method, however, the findings in this study are similar to the results of previous studies where the application of active heating caused an increase in thermal comfort and decreases thermal discomfort (Park *et al.*, 2013)

Patient comfort is one of the important components that must be considered in providing nursing care, including perioperative nursing services. Currently, the component of patient comfort in the operating room that is getting a lot of attention is focusing on reducing pain and anxiety in patients. Beside both comfort needs that have been mentioned, thermal comfort also has a role. Lowering

body temperature under normal conditions according to the World Health Organization (WHO) (which is < 36.50 C) or hypothermia, during procedures in the operating room, is one of the most common complications that occur in patients during surgical procedures and even in the recovery process (Foggle, 2019). Perioperative hypothermia that occurs in patients has an adverse effect on the patient's temperature discomfort, resulting in severe complications, morbidity, and even mortality (Kang and Park, 2020).

Exposure to spinal anesthesia for performing cesarean section causes heat loss in pregnant women due to the effects of anesthetic drugs on the vascular mechanisms that regulate body temperature. Perioperative hypothermia under spinal anesthesia, during cesarean section procedures, has different etiologic pathways, but mostly caused by spinal anesthesia altering thermoregulatory mechanisms in the hypothalamus and reducing the threshold for vasoconstriction of blood vessels causing shivering in the body. Spinal anesthesia reduces the ability of thermoregulatory mechanisms through vasoconstriction below the normal level of sensory block, leading to heat loss by evaporation from the body to the environment (Ni *et al.*, 2020). Procedures that involve abdominal resection also contribute to exposure to body heat that evaporates into the environment and causes hypothermia. Bleeding and amniotic fluid that comes out and wets the cover also makes it easier for the body to lose heat (Dendis and Hooven, 2020).

Perioperative hypothermia (which occurs during surgical procedures) is one of the side effects that is often reported in about 60% of operations for cesarean delivery (cesarean section) under spinal anesthesia which is one type of neuraxial anesthesia (spinal, epidural, or a combination of techniques) (Ni *et al.*, 2020). According to the literature, more than 46% of patients undergoing abdominal surgery, such as cesarean section, experienced hypothermia during surgery, and one-third of the incidence was hypothermic prolonging to the recovery room (Foggle, 2019). Many

caesarean section patients with hypothermia recall the discomfort of feeling cold after anesthesia as one of the worst surgical experiences. This is also in line with the existing conditions where the caesarean section procedure currently uses a lot of neuraxial anesthetic techniques, especially spinal so that the upper half of the mother's body is still conscious and can feel the conditions in the operating room during the procedure, which is exacerbated by the minimal and less than optimal heating intervention. This causes the patient to experience more and more frequent and severe discomfort due to the low body temperature and shivering that may be experienced (Bameri *et al.*, 2018).

Hypothermia during caesarean section can cause several complications including infection of the incision wound, myocardial ischemia, increased risk of coagulopathy (blood clots), shivering, increased length of stay, and patient discomfort (Allen, 2020). Decreased body temperature at birth and APGAR scores are complications in neonatal. Maternal and neonatal complications due to hypothermia during caesarean section procedures can have a detrimental effect and become one of the contributors to the high maternal mortality rate (MMR) and infant mortality (neonatal) (IMR) that occurs in Indonesia (Yang and Sun, 2017).

Many recommendations for pre-warming procedures are suggested to treat hypothermia during caesarean section, even starting pre-operatively, intra-operatively, and post-operatively. The recommended action is active and passive warming recommended by the American Society of Perianesthesia Nurses (ASPAN) (Kang and Park, 2020) and has been widely implemented abroad, one of which is in South Korea (Yoo *et al.*, 2013; Kang and Park, 2020). However, this guideline recommendation has not yet been massively proven by its implementation in Indonesia, this can be seen from the absence of articles that examine the effectiveness of the ASPAN guideline to prevent hypothermia during perioperative, especially perioperative

caesarean section procedures. In the last 10 years, only the ASPAN guideline intervention research on upper extremity surgery with general anesthesia found that none of the intervention group respondents experienced hypothermia (Kang and Park, 2020).

Providing continuous active and passive heating from entering the waiting room to leaving the recovery room seems to help the patient's body relax. Since the patient's head and feet are the main areas of heat loss, covering them with a head covering and socks during the perioperative phase provides a warmer environment and increases their comfort. In summary, the ASPAN Guidelines appear to provide not only physical benefits such as maintaining temperature and reduced shivering, but also psychological comfort. The body temperature of the baby born is closely related to the condition of the mother who received active heating intervention (Horn. EP. *et al.*, 2014).

Hypothermia in neonates is when the newborn's body temperature is below 36.5°C, this condition can cause prolonged hospitalization of the baby. Mothers who have no complaints about basic needs, especially those related to pain and temperature, have a major impact on the continuation of caring for their babies. Many factors are associated with hypothermia in infants such as the weight of the newborn, the baby's environmental conditions. Low weight birth babies have an 8.5 risk for hypothermia (Tasew *et al.* 2018). The impact of temperature is closely related to the comfort of the baby, so this is important to prioritize (V Kumar *et al.*, 2009)

Evaluation of the APGAR Score after being given a combination intervention between active and passive heating does not have a direct effect on the APGAR of newborns (Judy Munday, 2017; Chung, *et al.*, 2012). Maintaining the mother's body temperature during childbirth needs to be a priority because it is closely related to the APGAR score of the newborn (Petsas, Vollmer, & Barnes, 2009). The APGAR score has a strong relationship with the mother's condition such as a decrease in blood pressure

after induction of spinal anesthesia, lengthening the time of anesthesia, lengthening the time of skin incision until the baby is born (Ide Pustaka Setiawan *et al.*, 2019). Shivering postoperatively requires special intervention because of increased oxygen demand (O₂), high risk of hypoxemia, lactic acidosis, and catecholamine release (Bermudez Lopez M. 2018).

Conclusions:

The ASPAN guideline for normothermia intervention (active and passive heating) has a significant influence on the mother's temperature condition, the comfort of the mother's temperature and the baby's body temperature at birth.

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