STRADA Jurnal Ilmiah Kesehatan
DOI: 10.30994/sjik.v10i1.741
ISSN: 2252-3847 (print); 2614-350X (online) Vol.10 No.1 May 2021 Page. 952-963

Factors Related To The Incidence of Cesarean Section Surgical Site Infection (CS SSI) at Harapan Jayakarta Hospital in 2019

Shinta Novelia*, Yenny Aulya, Dini Agustini
Universitas Nasional Jakarta, Indonesia
** Correspondent Author: shinta.novelia@civitas.unas.ac.id*

ABSTRACT

Surgical Site Infection (SSI) rates that are still high are an important issue because from this SSI the patient's condition can deteriorate. WHO reports that SSI in the world ranges from 5% -15%, SSI in Indonesia was 55.1% and Cesarean Section (CS) SSI in Harapan Jayakarta Hospital in 2018 was 8%. Objective: To determine the factors related to the incidence CS SSI in Harapan Jayakarta Hospital in 2019. Methodology: The research design is cross sectional approach. The population was 229 people with a sample of 146 people. The sampling technique uses simple random sampling technique. Data were analyzed using chi square t-test to determine the relationship between variables. Results: Chi square test results showed that there was a relationship between age and the incidence of CS SSI (p=0.011), there was no relationship between parity and the incidence of CS SSI (p=0.237), there was a relationship between education and the incidence of CS SSI (p=0,000), there was a relationship between BMI with the incidence of CS SSI (p=0.006), there was a relationship between DM and the incidence of CS SSI (p=0,000), there was a relationship between anemia with the incidence of CS SSI (p=0,000), and there was a relationship between prophylaxis antibiotic and the incidence CS SSI (p=0.01). Conclusions and Recommendations: There was a relationship between age, education, BMI, DM, anemia and prophylactic antibiotics with the incidence of CS SSI. There was no relationship between parity and CS SSI. It is expected that health workers can pay attention to risk factors that can cause surgical site infections and take proper care of wound care.

Keywords: Age, parity, education, BMI, DM, anemia, antibiotic prophylaxis, surgical site infection, Cesarean Section

Received March 18, 2021; Revised April 11, 2021; Accepted April 28, 2021

DOI: 10.30994/sjik.v10i1.741
ISSN: 2252-3847 (print); 2614-350X (online) Vol.10 No.1 May 2021 Page. 952-963

BACKGROUND

The incidence of infection is a serious problem in postoperative patients. This is because it can increase the length of treatment, maintenance costs can even cause death. According to WHO, there were 25 million deaths worldwide in 2011, one third of which were caused by infectious diseases (WHO, 2011). Surgical Wound Infection or Surgical Site Infection (SSI) is an infection of an surgical wound or organ / space that occurs within 30 days after surgery or within 1 year if an implant is present. Sources of bacteria in surgical wound infections can come from patients, doctors and teams, the environment, and including instrumentation (Hidayat, 2010). The World Health Organization (WHO) survey reports that the incidence of surgical wound infections in the world ranges from 5% to 15% (WHO, 2015). WHO data shows that about 5% -34% of total nosocomial infections are surgical wound infections (Haryanti *et al.*, 2013). The National Nosocomial Infection Surveillance (NNIS, 2010) United States America indicates that surgical wound infection is the third most common infection that occurs in hospitals, about 14-16% of total patients in hospital experience surgical wound infections. For obstetric surgery cases Studies that have been carried out in several developing countries found the incidence of surgical wound infection with SC as follows: 12.5% ILO SC in Nigeria, 29.38% ILO SC in Oman and 9.6% ILO SC in Thailand (Novelia, Sia & Songwathana, 2017).

According to the Indonesian Ministry of Health in 2011, the incidence of surgical wound infection in government hospitals in Indonesia was 55.1% (Asyifa, Suarniant & Mato, 2012). The results of Yuwono's (2013) study proved that the incidence of surgical wound infections in Dr. Mohammad Hoesin (RSMH) Palembang was 56.67% consisting of 70.6% superficial incision surgical wound infection, 23.5% deep incision surgical wound infection and 5.9% organ surgery wound infection. Surgical wound infection was found the fastest on the third day and the most were found on the fifth day and the longest was the seventh day. Service quality indicator data obtained from *RSUD* Dr. Djasamen Saragih Pematangsiantar in 2011 (April to September period) there was a number of incidence of surgical wound infection in a room, room C1 which had the highest infection rate, the surgical wounds reaching 8.00% in May and 6.25% in June (Sinaga & Tarigan, 2012).

The incidence of surgical wound infection in the Government General Hospital (RSUP) Dr. Sardjito is in the second place, with 17% data obtained after urinary tract infections (Dahesihdewi, 2015). The results of Rusmawati's research (2013) at Panembahan Senopati Bantul Hospital showed that there was 87% of patients who received surgery were exposed to superficial infections and 13% were affected by deep incision infections due to respondent characteristic factors including age, gender, body weight (BB), length of time. surgery, type of surgery and factors of the operation including medical history, drug use, use of drains, implants, dressings and wound care.

There was an increase in the post-CS SSI incidence in the Department of Obstetrics and Gynecology (Obsgin) in September 2014 more than double compared to the incidence in the previous month, from the range 0.16% - 0.33% to 2.32%, whereas in *RSCM* it should not be more than 2%. Thus, this was already included in the criteria for an extraordinary event (Hakim, 2017). The IPCN-Link RSCM report mentions 10 cases of infection in the Operational Area in the Midwifery and Gynecology Ward in August 2011, 7 cases in September 2011 and 8 cases in October 2011 (Wardoyo, *et al.*, 2011).

Infection in obstetrics is the second cause of maternal death after bleeding in the mother after delivery. Among obstetric surgery patients, surgical wound infection is the most common nosocomial infection that occurs in hospitals (Amenu, 2011). The condition of the incidence of surgical wound infection in several countries is very worrying. In the past 20 years, many developments have been made to find the main problems and causes of surgical wound

DOI: 10.30994/sjik.v10i1.741
ISSN: 2252-3847 (print); 2614-350X (online) Vol.10 No.1 May 2021 Page. 952-963

infection, because this condition prolongs patient care time and the use of services outside the hospital (Elvizar, 2009).

There are two factors that play an important role in influencing the incidence of surgical wound infection, 1) Endogenous factors are factors that exist in sufferers such as age, gender, disease predisposing to surgical wound infection, and previous operations. 2) Exogenous factors are factors outside the patient, such as the length of time the patient is hospitalized, the level of wound hygiene, regular use of antibiotics, duration of antibiotics after cesarean section, length of operation, and the number of personnel in the operating room (Puspitasari, 2011).

One way to reduce the incidence of surgical wound infection is to reduce the factors that can increase the risk of surgical wound infection (Anton, 2006). Factors related to the incidence of labor by cesarean section based on indications of maternal pregnancy were 38 (41.77%) incidents of prolonged labor. Another factor causing the incidence of delivery with cesarean section is an indication that the failure of family planning was 3 (60%) incidents (Dewi, 2012). Based on patient characteristics, the risk of surgical wound infection can be reduced, especially in planned operations by paying attention to age characteristics, diabetes, smoking habits, obsession, infection in other parts of the body, bacterial colonization, decreased endurance, and length of surgical procedures. Hidayat, 2010). From the results of a preliminary study conducted in October, data from the medical records of Harapan Jayakarta Hospital in 2018 showed an incidence of surgical wound infection was 8%. This study aims to determine the factors associated with the incidence of SC wound infection at the Jakarta Hospital in 2019.

METHODS

The research design used was a survey method with a cross sectional approach. The population in this study were all postoperative cesarean section patients in January-December 2019 at Harapan Jayakarta Hospital which consisted of 229 people. The sample used was some postoperative cesarean section patients at Harapan Jayakarta Hospital in 2019 which consisted of 146 respondents. The sampling technique used was simple random sampling. The study was conducted in January 2019. The research instrument used in this study was a checklist sheet and patient medical records obtained from the hospital where the study was conducted. Variables are age, parity, education, BMI, history of diabetes, anemia and prophylactic antibiotics, and caesarean section surgical site infection.

RESULTS

Table 1. Frequency of respondents based on variables

Variabel	f	(%)
CS SSI		
Infected	16	11
Not infected	130	89,0
Age		
At risk	66	45,2
Not at risk	80	54,8
Parity		
At risk	62	42,5
Not at risk	84	57,5
Education		
Low	31	21,2
High	115	78,8
BMI		
Normal	65	44,5

DOI: 10.30994/sjik.v10i1.741
ISSN: 2252-3847 (print); 2614-350X (online) Vol.10 No.1 May 2021 Page. 952-963

Not Normal	81	55,5
History of Diabetes		
Yes	19	13
No	127	87,0
Anemia		
Anemic	47	32,2
Not anemic	99	67,8
Prophylaxys antibiotics		
Given	62	42,5
Not given	84	57,5

Table 1 shows that out of 146 patients, 16 (11%) had CS SSI, 130 people (89.0%) did not experience CS SSI. Based on the age of the 146 respondents, 66 people (45.2%) were included at the risk age, while 80 people (54.8%) were included in the non-risk age. Based on the parity out of 146 respondents, 62 (42.5%) were included in risk parity and 84 people (57.5%) were included in the risk parity. Based on the education, out of 146 respondents, 31 people (21.2%) were included in the Low education while 115 people (78.8%) belong to higher education. Based on the BMI, out of 146 respondents, 65 people (44.5%) belong to normal BMI while 81 people (55.5%) belong to abnormal BMI. Based on the history of DM out of 146 respondents, 19 people (13%) included patients who had a history of DM while 127 people (87.0%) included patients who did not have a history of DM. Based on anemia, out of 146 respondents, 47 people (32,2%) included patients who were anemic while 99 people (67.8%) were included in patients who were not anemic. Based on prophylactic antibiotics, out of 146 respondents, 62 people were included in the patient who was given while 84 people (57.5%) were included in patients who are not given antibiotics prophylactic.

Tabel 2. Relationship between age, parity, education, BMI, history of DM, anemia and prophylactic antibiotics with the incidence of CS SSI

Variabel	**CS SSI**				**Total**		***pValue***	***OR***
	Infected		**Not infected**					
	f	**%**	**f**	**%**	**f**	**%**		
Age								
At risk	12	18,2	54	81,8	66	100	0,011	4,2
Not at risk	4	5,0	76	95,0	80	100		
Parity								
At risk	9	14,5	53	85,5	62	100	0,237	1,9
Not at risk	7	8,3	77	91,7	84	100		
Education								
Low	9	29,0	22	71,0	31	100	0,000	0,158
High	7	6,1	108	93,9	115	100		
BMI							0,006	6,5
Normal	2	3,1	63	96,9	65	100		
Not Normal	14	17,3	67	82,7	81	100		
History of Diabetes							0,000	15,43

DOI: 10.30994/sjik.v10i1.741
ISSN: 2252-3847 (print); 2614-350X (online) Vol.10 No.1 May 2021 Page. 952-963

Yes	9	47,4	10	52,6	19	100		
No	7	5,5	120	94,5	12 7	100		
Anemia								
Anemic	15	31,9	32	68,1	47	100	0,000	45,94
Not anemic	1	1,0	98	99,0	99	100		
Prophylaxys antibiotics								
Given	2	3,2	60	96,8	62	100	0,01	6,0
Not given	14	16,7	70	83,3	84	100		

Based on table 2 shows that out of 80 respondents who have no risk age, most of the respondents (95.0%) did not experience CS SSI. The statistical test results obtained p value 0.011 (P <α), which means that there was a relationship between age and the incidence of CS SSI with an OR = 4.2, meanS that patients who were at risk have a 4 times greater chance of experiencing surgical wound infections than patients who have age were not at risk. Out of 84 respondents who had no risk parity, most of the respondents (91.7%) did not experience the CS SSI. The statistical test results obtained p value 0.237 (P> α), which means that there was no relationship between parity and the incidence of surgical wound infection.

The results of the education analysis with the incidence of the ILO SC show that out of the 115 respondents who had higher education, most of the respondents (93.9%) did not experience the CS SSI. The statistical test results obtained p value 0.000 (P <α), which means that there was a relationship between education and the incidence of SC surgery wound infection with an OR = 0.158 means that patients with low education have a 0.2 times greater chance of experiencing surgical wound infections than patients who have higher education. The results of the analysis of BMI with the incidence of CS SSI show that out of the 81 respondents who had an abnormal BMI, most of the respondents (82.7%) did not experience CS SSI.

Out of the 65 respondents who had a normal BMI, most of them were (96.9%) did not experience CS SSI. The statistical test results obtained p value 0.006 (P <α), which means that there was a relationship between BMI and the incidence of CS SSI with an OR = 6.5, means that patients who have an abnormal BMI have a 7 times greater chance of experiencing surgical wound infections than patients who have a normal BMI. The results of the analysis of the history of DM with the incidence of ILO SC showed that out of the 127 respondents who had no history of DM, most of the respondents (94.5%) who did not experience CS SSI. The statistical test results obtained p value 0.000 (P <α), which means that there was a relationship between the history of DM and the incidence of CS SSI with an OR = 15.43, means that patients who have a history of DM have a 15 times greater chance of experiencing surgical wound infections than patients with no history of DM

DOI: 10.30994/sjik.v10i1.741
ISSN: 2252-3847 (print); 2614-350X (online) Vol.10 No.1 May 2021 Page. 952-963

The analysis of anemia with the incidence of CS SSI shows that out of the 99 respondents who were not anemic, most of the respondents (99.0%) did not experience CS SSI. The statistical test results obtained p value 0.000 (P <α), which means that there was a relationship between anemia and the incidence of CS SSI with an OR = 45.94 means that anemic patients have a 46 times greater chance of experiencing surgical wound infection than patients who were not anemic. The results of the analysis of prophylactic antibiotics with the incidence of ILO SC showed that out of the 84 respondents who were not given prophylactic antibiotics, the majority of respondents were (83.3%) did not experience CS SSI. The statistical test results obtained p value 0.01 (P <α), which means that there was a relationship between prophylactic antibiotics and the incidence of CS SSI with an OR = 6.0 value means that patients who are not given prophylactic antibiotics have a 6 times greater chance of CS SSI compare to patients who were given prophylactic antibiotics.

DISCUSSIONS

The result shows that there was a relationship between age and the incidence of surgical wound infection. The best age to get pregnant or give birth is between 20-35 years. At that age the female reproductive organs have developed and are functioning optimally. Conversely, women under 20 years of age or over 35 years of age are not good at getting pregnant or giving birth, because pregnancies at this age have a high risk of miscarriage, or labor failure, and can even cause death. Older women have a higher risk of childbirth complications than younger women. For women aged 35 years and over, besides physically weakening, there is also the possibility of various risks of health problems, such as high blood pressure, diabetes and various other diseases (Gunawan, S 2010). This is reinforced by the results of research conducted by Sandy, *et al.* (2015) which states that the results that there was a significant correlation (correlation) between age and surgical wound infection experienced by respondents. Delivery with the CS method is a delivery that is more susceptible to infection. This possibility will be strengthened by the age-related condition of the patient such as, if the patient's age is still < 20, the reproductive organs are not fully ready for childbirth. Likewise, when the patient's age is > 35 where the general body condition has decreased due to aging. This proves that age is closely related to the incidence of CS SSI. Researcher's recommendation is to avoid the occurrence of surgical wound infection for the mother's age at risk, always be diligent in carrying out checks so that if there are other complications, treatment can be done as early as possible.

The results of the analysis based on parity showed that there was no relationship between parity and the incidence of CS SSI. Parity or the frequency of mothers giving birth to children greatly affects the health of mothers and children, because the likelihood of maternal morbidity and mortality is higher for mothers who are pregnant for the first time than mothers who already have two or three children. After the fifth child the numbers became very striking. In mothers with high parity, maternal mortality and child mortality are high, due to frequent childbirth, things such as health problems due to malnutrition, anemia, antepartum bleeding, multiple pregnancy, preeclampsia, eclampsia, the occurrence of sagging in the abdominal wall and uterine wall are obtained. also other possibilities that can occur so that from this situation it will be easy to make childbirth difficult (Dita, 2012). This is supported by research conducted by Vianti (2015) which states that out of 1592 patients with cesarean section, 311 patients experienced SSI (19%). The results of multivariate logistic regression analysis, the significant risk factors for the incidence of ILO for parity were [OR = 1.69 (1.19-2.40)]. From this current study results, although parity has no relationship with the incidence of surgical wound infection, parity is still closely related

DOI: 10.30994/sjik.v10i1.741
ISSN: 2252-3847 (print); 2614-350X (online) Vol.10 No.1 May 2021 Page. 952-963

to other factors that influence surgical wound infection. As with age, usually the older the risk, the parity is usually at risk. For example, for the age of more than 35, usually the mother has a parity of more than 3 or including risk parity. Therefore, even though parity does not directly have a relationship with the incidence of CS SSI, parity can indirectly affect the wound healing process and can affect the occurrence of SC surgical wound infection. It is hoped that pregnant women with parity > 3 to always check their health conditions during pregnancy in order to avoid complications of childbirth.

The results showed that there was a relationship between education and the incidence of infection with SC surgery wounds. This is in line with research conducted by Muttaqien et al., (2016) which explains that patients with post-cesarean surgery wound infections have the highest level of elementary education, namely 4 people (20%). Followed by high school education level, namely 3 people (15%), junior high school education level namely 2 people (10%), and at the bachelor level education level namely 1 person (5%). Referring to the test results, it can be explained that the higher the education, the easier the information will be obtained. Patients can find out how to properly care for wounds from various sources of information so that they can prevent surgical wound infections from occurring. This proves that education is very influential with the incidence of SC Surgery Wound Infection. Patients are expected to be aware in seeking and obtaining health information both formally and informally in order to understand how to prevent post-surgical wound infection.

The results showed that there was a relationship between BMI and the incidence of surgical wound infection. BMI (Body Mass Index) is a mathematical formula expressed as body weight (in kilograms) divided by the square of height (in meters) (Arisman, 2011). This is in line with research conducted by Widyastuti (2016) which shows that the correlation between BMI and the wound healing process was significant. In obese people wound healing will occur slowly because the fat tissue is more difficult to fuse, it is easier to infect, and takes a long time to heal. Fat tissue lacks blood supply to resist bacterial infection and deliver nutrients and cellular elements for healing. If the damaged tissue does not immediately get the nutrients it needs, the wound healing process will also be hampered, allowing for infection to occur. From the comparative study above, it is stated that BMI is related to wound healing, meaning that if the wound healing occurs normally it can be said that the patient does not have an surgical wound infection, but if there are obstacles during wound healing such as gore, pus discharge and so on, the patient experiences an surgical wound infection. Pregnant women are expected to control their weight by consuming balanced nutrition in order to avoid the risk of high BMI which can facilitate the occurrence of CS SSI.

The results showed that there was a relationship between the history of DM and the incidence of infection with CS SSI. When pregnant, a mother will instinctively increase her food consumption, so that the mother's weight will automatically increase by 7-10 kg. When the mother's food is added to her consumption, it turns out that insulin production is insufficient, there will be symptoms of diabetes mellitus (Lanywati, 2011). Marsaoly (2016) explained that based on the results of patients with surgical wound infections with a history of comorbidities with diabetes mellitus, they had a higher incidence rate of CS SSI by 19.4%, when compared to those without a history of diabetes mellitus by 8.5%. In patients who have a history of DM, if they have a wound it will be difficult to heal because diabetes can affect the body's ability to heal itself and fight infection. Therefore, if a person is suffering from diabetes mellitus with very high sugar levels it will make the wound healing process slow. Pregnant women with a history of DM must be able to be detected as early as possible. If a mother with DM experiences CS SSI, special care must be taken for the

DOI: 10.30994/sjik.v10i1.741
ISSN: 2252-3847 (print); 2614-350X (online) Vol.10 No.1 May 2021 Page. 952-963

surgical wound and assisted by a good and healthy lifestyle and diet.

The results showed that there was a relationship between anemia and the incidence of surgical wound infection. Anemia usually results from iron deficiency. Iron is part of the hemoglobin molecule. Lack of iron in the body can be caused by many things. Lack of iron in adults is almost always caused by chronic, repetitive bleeding that can come from all parts of the body (Soebroto, 2010). Nurani (2015) explains that there was a significant relationship between anemia and the wound healing process. Anemia condition greatly affects the possibility of surgical wound infection. If the patient has a low hemoglobin level, the wound healing process will be hampered, which may lead to postoperative wound infection. Early detection of this anemia problem is very important during antenatal care. The regular consumption of Fe tablets during pregnancy is a solution so that pregnant women are free from anemia, thereby minimizing the risk of developing CS SSI.

The results of the analysis showed that there was a relationship between prophylactic antibiotics and the incidence of SC surgery wound infection. Prophylactic antibiotics are infection prevention therapy. Prophylaxis is actually divided into two, namely primary prophylaxis and secondary prophylaxis (suppression) or eradication. Primary prophylaxis is intended for prevention of early infection, whereas secondary prophylaxis is intended for prevention of recurrence or reactivation of pre-existing infections (Kurniawan, 2012). This is in line with research conducted by Pratiwi & Huriah (2011) which states that there was a difference in the incidence of clean surgical wound infections in patients with prophylactic antibiotics. Prophylactic antibiotics can reduce the possibility of surgical wound infection. This prophylactic antibiotic administration procedure is a mandatory procedure implemented in health facilities. Health workers should always pay attention to the procedure for giving prophylactic antibiotics both in terms of dose concentration and by the type of antibiotic itself.

CONCLUSSIONS

The results shows that majority of respondents were not at risk of age (54,8%), were not at risk of parity (57,5%), high educated (78,8%), not normal BMI (55,5%), have no DM history (87%), not anemic (67,8%), and were not given prophilaxys antibiotics (57,5%). There was a relationship between age, education, BMI, history of DM, anemia, and prophylaxis antibiotic and the incidence of CS SSI. While, there was no relationship between parity and the inscidence of CS SSI. Future research is needed to explore extrinsic factors which related to the incidence of CS SSI such as duration of surgery, wound treatment, etc.

ACKNOWLEDGEMENT

This study acknowledge Universitas Nasional for support and Harapan Jayakarta Hospital for providing data.

REFERENCES

Alsen, M. A. M., & Sihombing, R. (2014). Infeksi Luka Operasi. *Majalah Kedokteran Sriwijaya*, *46*(3), 229-235.

Adam, J.M.F, Purnamasari. D., (2010). *Diabetes Melitus Gestasional*, Jakarta: Pusat Penerbit Departemen Ilmu Penyakit Dalam FK UI, hal. 1952-1956.

Amenu, D. (2011). Probiotic Properties of Lactic Acid Bacteria from Human Milk. *Medical Microbiology & Diagnosis.* pp. 1-4

American Diabetes Association (ADA). 2014. Foot Care Diabetic. http://www.diabetes.org. diakses tanggal 12 November 2019 .

DOI: 10.30994/sjik.v10i1.741
ISSN: 2252-3847 (print); 2614-350X (online) Vol.10 No.1 May 2021 Page. 952-963

Andira, Dita. (2012). *Seluk-Beluk Kesehatan Reproduksi Wanita*, Jogjakarta: A Plus Book

Arisman. 2011. *Diabetes Mellitus*. Dalam: Arisman, ed. Buku Ajar Ilmu Gizi Obesitas, Diabetes Mellitus dan Dislipidemia, Jakarta: EGC, 44-54.

Asyifa, A., Suarnianti, Mato. (2012). *Faktor-Faktor yang Berhubungan dengan ILO di RSUP DR. Wahidin Sudirohusodo Makassar*. Vol 1 no 2, http://library.stikesnh.ac.id, Diakses 18 Desember 2019.

Cunningham, F. G., Leveno, K. J., Bloom, S. L., Hauth, J. C., Gilstrap, L., & Wenstrom, K. D. (2014). Pregnancy Hypertension. *Dalam F. G. Cunningham, K. J. Leveno, S. L. Bloom, J. C. Hauth, L. Gilstrap, & K. D. Wenstrom (Penyunt.), Williams Obstetrics (24th Edition ed.). New York: The McGraw-Hill Companies*

Dahesihdewi, Andaru. (2015). Surveilans HAI'S di Rumah Sakit. Continuing Nurse Education. Program Studi Profesi Nurse Angkatan XXII. UMY.

Departemen Kesehatan Republik Indonesia. (2011). *Permenkes RI nomor 1961/ MENKES/ PER/ VIII/ 2011*.

Ekaputra, E. (2013). *Evolusi Manajemen Luka*. Jakarta: Trans Info Media.

Faridah, Andayani & Inayati. (2012). Pengaruh Umur dan Penyakit Penyerta terhadap Resiko ILO pada Pasien Bedah Gastrointestinal. Vol. 2 No 2, http://journal.uad.ac.id, retrieved from 14 Desember 2019.

Gunawan S. (2010). *Reproduksi Kehamilan dan Persalinan*. Jakarta: CV Graha

Hakim, S. (2017). Evaluasi Program Penanggulangan Kejadian Luar Biasa Infeksi Daerah Operasi Pasca SC di Departemen Obsgin RSCM. *Jurnal Kebijakan Kesehatan Indonesia: JKKI*, *6*(1), 13-19

Haryanti, L., Pudjiadi, H. A., Ifran K. E., Thayeb, Thayeb, A., Amir, I., Hegar B. (2013). *Prevalensi dan Faktor Resiko Infeksi Luka Operasi Bedah*. Vol. 15 No 4, http://saripediatri.idai.or.id/pdfile/15-4-2.pdf, retrieved from 18 Desember 2019.

Hartanto, Hanafi. (2010), *Keluarga Berencana dan Kontrasepsi,* Jakarta: PUSTAKA SINAR HARAPAN

Hidayat, NN. (2010). *Pencegahan Infeksi Luka Operasi*, http://pustaka.unpad.ac.id, diakses 17 Desember 2019.World Health Organization, (2011). *Global guidelines on the prevention of surgical site infection*. Geneva : World Health Organization.3. Sianipar, D.V.P.,

Kemenkes. (2011). *PERATURAN MENTERI KESEHATAN REPUBLIK INDONESIA NOMOR 1691 / MENKES / PER / VIII /2011*.

Kurniawan, L.,Israr, Y. A. (2012). Pneumonia Pada Dewasa *(pp. 0-14). Pekanbaru, Riau: Fakultas Kedokteran Universitas Riau.*

Lanywati, E. (2011). Diabetes Mellitus *: Penyakit Kencing Manis*, Yogyakarta : Kanisius (Anggota IKAPI).

Luknis Sabri Hastono, Sutanto P. (2010). *Statistik Kesehatan*, Bandung: Raja Grandindo Persada.

Manuaba. (2010). *Ilmu Kebidanan, Kandungan dan KB*. Jakarta : EGC

Marsaoly, S. F. A. (2016). Infeksi Luka Post Operasi Pada Pasien Post Operasi Di Bangsal Bedah RS PKU Muhammadiyah Bantul [skripsi]. *Yogyakarta: Fakultas Kedokteran dan Ilmu Kesehatan, Universitas Muhammadiyah Yogyakarta*.

Menteri Kesehatan RI. (2011). *Peraturan Menteri Kesehatan Nomor 1691/MENKES/PER/VIII/2011 Tentang Keselamatan Pasien Rumah Sakit.*Departemen Kesehatan RI.

Muttaqien, M. I., Hamidy, M. Y., & Rustam, R. P. (2016). *The Overview of Surgical Site Infection of Pasca Caesarean Section at Arifin Achmad General Hospital of Riau*

DOI: 10.30994/sjik.v10i1.741
ISSN: 2252-3847 (print); 2614-350X (online) Vol.10 No.1 May 2021 Page. 952-963

Province 1 January–31 December 2014 Period (Doctoral dissertation, Riau University).

National Institute for Health and Clinical Excellence [NICE]. (2010). *Surgical site infection*. Retrieved from https://www.nice.org.uk/guidance/CG74

National Nosocomial Infections Surveillance (NNIS) System Report. (2010*). Publich Health Service, US Departement of health and Human Service Atlanta*, Georgia.

Notoatmodjo,S., (2010). *Metodologi Penelitian Kesehatan*, Jakarta: Rineka Cipta.

Notoatmodjo, S. (2014). *Pendidikan dan Perilaku Kesehatan*, Jakarta: Rineka Cipta

Novelia, S., Sia, W. S., & Songwathana, P. (2017). Surgical Site Infection among Women Post Cesarean Section: An Integrative Review. *Nurse Media Journal of Nursing*, *7*(1), 46-55.

Novelia, S., Sia, W. S., & Songwathana, P. (2017). Nurses' knowledge and practice regarding the prevention of cesarean section surgical site infection in Indonesia. *GSTF Journal of Nursing and Health Care (JNHC)*, *4*(2).

Nurani, D., Keintjem, F., & Losu, F. N. (2015). Faktor-Faktor Yang Berhubungan dengan Proses Penyembuhan Luka Post Sectio Caesarea. *JIDAN (Jurnal Ilmiah Bidan)*, *3*(1), 1-9.

Pandjaitan, Costy. (2013). *Infeksi Nosokomial di Rumah Sakit harus diantisipasi,* http://repository.umy.ac.id, diakses 18 Desember 2019

Potter, P. & Perry,A., (2010). *Buku Ajar Fundamental Keperawatan* :Konsep, Proses, dan Praktik. 4th ed. R.Komalasari, Jakarta:EGC.

Pratiwi, R. A., & Huriah, T. (2011). *Pengaruh Pemberian Antibiotik Profilaksis terhadap Kejadian Infeksi Luka Operasi Bersih Pasien Bedah di RSU PKU Muhammadiyah Bantul* (Doctoral dissertation, STIKES'Aisyiyah Yogyakarta).

Prawiroharjo, Sarwono. (2010). Pelayanan Kesehatan Material dan Neonatal. Jakarta : Yayasan Bina Pustaka

Prasetya, D.B. (2013). Efektifitas Penggunaan Antibiotik Profilaksis Pada Pasien Sectio Caesarea Elektif Di Rumah Sakit Sidoarjo, Jurnal Ilmiah, Surabaya: Fakultas Farmasi, Universitas Surabaya.

Putra, R.A., & Asrizal. (2012). Tindakan Perawat dalam Pencegahan Infeksi Nosokomial luka Pasca Bedah. diakses 18 Desember 2019 dari file:///C:/Users/user/Downloads/196-642-1-PB%20(1).pdf

Puspitasari, H. A., & Sumarsih, T. (2011). Faktor-faktor yang mempengaruhi Penyembuhan Luka Post Operasi Sectio Caesarea (SC). *Jurnal Ilmiah Kesehatan Keperawatan*, *7*(1).

Pudjiadi Antonius, H., Hegar Badriul, dkk. (2010). Pedoman Pelayanan Medis Ikatan Dokter Anak Indonesia, Jakarta: IDAI.

Pujianti A. (2015) . *Pengaruh Implemantasi SSC Terhadap keselamatan Pasien di RS Khusus mata Yogyakarta*. Aisyiyah Yogyakarta.

Rivai, F., Koentjoro, T, & Utarini, A. (2013*). Determinant of Surgical Site Infection Post-Section Caesarea*. Jurnal Kesehatan Masyarakat Nasional, 8(5),pp.235-240.

Riyadi, S., & Hatmoko. (2012). Standar Operating Procedure Dalam Praktik Klinik Keperawatan Dasar. Yogyakarta; Pustaka Pelajar.

Roeshadi, R.H. (2016). Evaluasi Manfaat Sulbactam/ Ampicillin sebagai Antibiotika Dosis Tunggal dan Multipel Dosis pada Sectio Caesarea Elektif di RSIA Rosiva Medan, Majalah Kedokteran Nusantara, 6 (4)

DOI: 10.30994/sjik.v10i1.741
ISSN: 2252-3847 (print); 2614-350X (online) Vol.10 No.1 May 2021 Page. 952-963

Rusmawati, Henni. (2013). Surveillance Kejadian Infeksi Daerah Operasi Di RSUD Panembahan Senopati Bantul. Karya Tulis Ilmiah strata satu, Universitas Muhammadiyah Yogyakarta, Yogyakarta.

Sandy, T. P. F., Yuliwan, R., & Utami, W. N. (2015). Infeksi Luka Operasi (ILO) pada Pasien Post Operasi Laparotomi. *Jurnal Keperawatan Terapan*, *1*(1), 14-24.

Saipuddin, AB (2018). *Buku Acuan Nasional Pelayanan Kesehatan Maternal dan Nasional*. Jakarta : Yayasan Bina Pustaka Sarwono Prawirohardjo.

Septiari, B..,(2012). *Infeksi Nosokomial*. Yogyakarta: NuhaMedika

Sinaga, E. (2012). *Karakteristik Ibu Yang Mengalami Persalinan Dengan Seksio Sesarea Yang Dirawat Inap Di Rumah Sakit Umum Daerah Sidikalang*. *Repository USU.*

Sitorus, Ronald H. Dkk (2010). *Pedoman Perawatan Kesehatan Ibu dan Janin Selama Kehamilan*. Bandung: CV.Pionir Jaya Bandung

Soebroto, I. (2010). *Cara Mudah Mengatasi Problem Anemia*, Yogyakarta: Bangkit

Sugiyono. (2017). *Metode penelitian Kuantitatif, Kualitatif, dan R & D, Alfabeta*, Cv, Bandung.

Sugyono. (2017). *Metode Penelitian Kebidanan DIII, DIV, S1 dan S2*. Yogyakarta. Nuha Medik

Sutrisno, E., Intang, A., & Suhartatik. (2014). Hubungan Pengetahuan Perawat terhadap Perilaku Pencegahan Infeksi Luka Operasi di RSUD BARRU. Vol. 5 No. 1. dari http://www.library.stikesnh.ac.id, retrieved from18 Desember 2019

Syamsi, N. (2018). STUDI PENGGUNAAN ANTIBIOTIK PROFILAKSIS PADA PASIEN BEDAH GASTROINTESTINAL. *Healthy Tadulako Journal (Jurnal Kesehatan Tadulako)*, *4*(2), 27-33.

Tandra H. (2014*). Life Healthy with Diabetes Mengapa dan Bagaimana*, Yogyakarta: CV Andi Offset

Tenriawaru, A. A. (2017). PENGARUH PENERAPAN SURGICAL SAFETY CHECKLIST DENGAN KEJADIAN INFEKSI LUKA OPERASI PADA PASIEN SECTIO CAESAREA DI RSUD TENRIAWARU KABUPATEN BONE TAHUN 2017. Dari *digilib.unhas.ac.id, retrieved from 20 November 2019*

Tietjen L, Bossemeyer D, McIntosh N. (2011). *Panduan Pencegahan Infeksi untuk Fasilitas Pelayanan dengan Sumber Daya Terbatas*, Jakarta: Yayassan Bina Pustaka

Vianti, R. A. (2015). Comorbidity: apakah merupakan faktor risiko infeksi luka operasi pasca seksio sesarea?. *Pena Jurnal Ilmu Pengetahuan dan Teknologi*, *29*(1).

Waryana. (2010). *Gizi Reproduksi*, Yogyakarta: Pustaka Rahima

Wardoyo, E., Ocviyanti, D., Tjoa, E., Moehario, L. (2014). Infeksi Luka Operasi (ILO) di Bangsal Kebidanan dan Kandungan RSUPN Cipto Mangunkusumo (RSCM): *Laporan Serial Kasus Bulan Agustus-Oktober 2011.* CDK-216/ vol. 41 no. 5, th. 2014

Widyastuti, Y. (2016). Hubungan Antara Index Masa Tubuh (Imt) Dan Kadar Hemoglobin Dengan Proses Penyembuhan Luka Post Operasi Laparatomi. *IJMS-Indonesian Journal on Medical Science*, *3*(2).

Wilson, et al. (2011). Principles and Procedures for Blood Cultures: *Approved Guideline. Vol.27 No.17. Pennsylvania: Clinical Laboratory Standards Institute;.p1-51.*

World Health Organization (WHO). (2010). *Caesarean Section without Medical indication increases Risk of Short-term adverse outcomes for mothers*. *Bull WHO Reproductive Health and Research.*

World Health Organization. (2011). The World Medicine Situation 2011 3ed. *Rational Use of Medicine, Geneva.*

DOI: 10.30994/sjik.v10i1.741
ISSN: 2252-3847 (print); 2614-350X (online) Vol.10 No.1 May 2021 Page. 952-963

Yuan, T.C, et al. (2012). *Incorporating the World Health Organisation Surgical Safety Checklist into Practice at Two Hospitals in Liberia.*

Yuwono, J. (2013) *Pengaruh Beberapa Faktor Risiko Terhadap Kejadian Surgical site infection (SSI) Pada Pasien Laparotomi Emergensi*. Jambi Medical Journal, retrieved from 18 Desember 2019 dari http://eprints.unsri.ac.id/3161/.