

Assessing Patient-Care Knowledge and Practice to Prevent Nosocomial Infection Post- Caesarean Section in District Hospitals

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ABSTRACT—*In developing countries, incidence of maternal mortality due to nosocomial infection during and after childbirth is considered high. Such phenomenon was also evidenced in hospitals which may be due to difficulty to access skilled care and/or quality disparity in healthcare provided. This study was performed to explore the current knowledge and practice of nursing/midwifery care for mothers post-Caesarean delivery in two district hospitals in Malang, East Java, Indonesia. The study was designed as a quantitative cross-sectional survey and observation of patient-care practices. The population and sample studied were all nurses/midwives providing patient-care in Delivery Unit of Department of Obstetrics and Gynecology. The results showed that there was gap between expected and actual knowledge and skill mastery, with concurrent incidence rate of 44% nosocomial infection post-Caesarean section. In conclusion, several aspects of knowledge; skills and attitudes including aseptic wound care were in need of improvement to control nosocomial infection post-Caesarean delivery.*

Keywords---- nosocomial, nurses, midwives, post-sectio, Caesarea

1. INTRODUCTION

In developing countries, including Indonesia, incidence of maternal mortality is considered high. WHO estimates that maternal mortality ratio in Indonesia approximately 190 per 100,000 live births [1]. One of identified causes is nosocomial infection during and after childbirth by Caesarean section. In Indonesia, reports from a hospital in Padang, West Sumatera showed an increased profile of nosocomial infection prevalence from 9.1% in 1996; 10.6% in 2002; and 10.8% in 2011 [2]. A study conducted in Jakarta and Yogyakarta, West and Central Java showed that nosocomial infections occurred in 9.8% and 4.26%, respectively [2]. Such differences in nosocomial infection rates may be due to quality disparity of provided care by health personnel. Many other factors contributed to nosocomial infections, e.g health team measures and behavior including those of the nurses; protocols pre- ; during as well as post-Caesarean section e.g. caring postoperative wound and infection prevention; hospital environment and normal flora as well as clinical condition of the patients [3-6].

Good practice of nursing/midwifery care in post sectio Caesarea settings can reduce the incidence of nosocomial infections [4, 7]. Successful patient-care can be developed and established through knowledge management [3, 8, 9]. Thus, identifying knowledge required to prevent nosocomial infection post-Caesarean section should be performed in order to design effective measures/training. This study was carried out to explore the current knowledge and practice of patient-care for mothers post-Caesarean delivery in two district hospitals in Kabupaten Malang.

2. METHODS

2.1 Design

This study was designed as a cross sectional survey and observation of patient-care practice conducted at the Obstetrics and Gynecology Delivery Room, Post-partum Unit of District Hospitals of Kanjuruhan-Kepanjen (Dahlia and Bougainville Rooms) and Wlingi (Brawijaya Room). This study was completed from October 2013 to January 2014.

2.2 Ethical Considerations

Application of ethical approval to conduct research was submitted to the District Hospitals of Kanjuruhan-Kepanjen and Wlingi for ethical approval. The research proposal was submitted to the Research and Social Engagement Institute

of Airlangga University, Human Research Ethics Committee for ethical approval (Approval No.76-1107/H-3.13/PPd/2012). Oral explanation given prior conducting the study followed by written cover letter distributed to the participants were done to clarify the purpose of the study. Questionnaires were distributed to and the filled-forms collected from the participants. Participation was voluntary, completed with signed informed consent and the information provided was treated as confidential and anonymous.

2.3 Participants

The study was conducted in two District hospitals own by the government, both were located in Kabupaten Malang-East Java, categorized as Class-B hospital based on number of beds (200-246 beds) and accredited by the Ministry of Health Republic of Indonesia for 16 health services and ISO 90012008. The study participants were all of staff delivering patient-care in Department of Obstetrics and Gynecology and a number of patients of post-Caesarean section in District Hospital Kanjuruhan-Kepanjen and Wlingi. The inclusion criteria for the staff samples were that they must be state registered nurses/midwives with at least one-year working experience. The selected staff and patients were based on signed informed consent to participate in the study, 22 staff from Kanjuruhan-Kepanjen Hospital and 24 from Wlingi Hospital. Staff who were on leave for any reasons were excluded from the study. Patient samples observed for questionnaire pre-testing were all patients hospitalized in Obstetrics and Gynecology Delivery Room and as long as they were cared by staff at Obstetrics and Gynecology Delivery Room, Post-partum Unit.

2.4 Instruments

The questionnaire was developed as short sentences, using simple language to construct clear and unambiguous items. The questionnaire was developed based on literature search, with the main tools related to nosocomial infection in patients *post-Caesarean* delivery and consisted of two parts: part A: demographic information of the respondents; part B: knowledge on nosocomial infection prevention which was further categorized into: (1) overview of nosocomial infection prevention; (2) anamnesis and health assessment; (3) diagnosis; (4) plan (5) implementation; and (6) evaluation. The questionnaire consisted of 40 multiple questions provided with 4 options with one best answer for each questions. Before launching the survey, rigorous pretesting through personal interviews with 35 nursing practitioners and 35 patients in Kanjuruhan-Kepanjen Hospital and 2 academics experts (Professor Nursalam and Dr. N. A. Damayanti, Nursing Education Program, Airlangga University, Surabaya, Indonesia), took place to validate the questionnaire.

Observational sheets, constructed as Yes/No items, consisted of two parts: part A: demographic information of the respondents; part B: practice on nosocomial infection prevention which was further categorized into: (1) assessment; (2) diagnosis; (3) plan; (4) intervention; and (5) evaluation.

Both questionnaires and observational sheets were collated and analyzed descriptively.

2.5 Data Analysis

The results of questionnaire and observations were further analyzed to group the participants' knowledge and practice as based on 1 to 5 scales, i.e. 1 = very good, 2 = good, 3 = fair, 4 = less than adequate, 5 = not satisfactory at all. Descriptive statistics were used to describe demographic characteristics and findings.

3. RESULTS

3.1 Participants Demographics

We assessed the demographic profile of our participants (Table 1). As data showed, only 15% of staff delivering nursing care to Caesarean patients was with nursing education background, whereas the rest of 85% came with midwifery trainings.

Table 1: Demographic characteristics

Variable		N (%)
Age (yr)	21-25	13 (27)
	26-30	5 (11)
	31-35	8 (17)
	36-40	8 (17)
	41-45	10 (21)
	46-50	2 (4)
Education	Vocation 1 yr	4 (8)
	Vocation Midwifery (3 yrs)	35 (74)
	Vocation Nursing (3 yrs)	6 (13)
	BSc Nursing (4 yrs)	1 (2)
Tenure (yr)	1-5	18
	6-10	8
	11-15	3
	16-20	7
	21-25	7
	26-30	3

3.2 Knowledge on Nursing Care of Nosocomial Infection Post-Caesarean Section

The knowledge of staff giving nursing care to the patients with section Caesarea particularly on the general idea of nosocomial infection prevention was mostly adequate (Table 2). However, their deeper and more detailed knowledge of nosocomial infection prevention were categorized as less than adequate. The staff were lack of crucial knowledge about (1) criteria; signs and symptoms of infection both in general and in surgery; (2) required data to establish diagnosis of infection; (3) goals of nosocomial infection prevention; (4) documentation of nursing/midwifery care plan; (5) consequences if action not undertaken; (6) who should be part of nursing/midwifery care planning team; (7) risk factors for bacteremia; (8) which patients at high risk of nosocomial infection; (9) priority/focus of nosocomial infection care; and (10) supervision to ensure appropriate action or intervention.

At the implementation stage, staff delivering nursing/midwifery care to the post–Caesarean section patients were also deficient of knowledge in (1) disinfection and sterilization including hand hygiene and tools disinfection and sterilization; (2) actions to improve patient immune system; (3) requirements for screening and isolation of patients; (4) self-protection protocols during surgical wound care; and (5) procedure of aseptic wound care. The staff knowledge of what to do to prevent and stop transmission of nosocomial infection is also need to be improved (Table 2).

Table 2: Knowledge of staff in preventing nosocomial infection in patients with Caesarean section

Variable	Category, N (%)				
	Very good	Good	Satisfactory	Less than adequate	Not satisfactory at all
Overview					
– Assessment	2 (4.3)	18 (39.1)	26 (56.6)	–	–
– Diagnosis	1 (2.2)	20 (43.5)	18 (39.1)	6 (13)	1 (2.2)
– Planning	7 (15.2)	10 (21.7)	26 (56.5)	3 (6.5)	–
– Implementation	3 (6.5)	99 (19.6)	29 (63)	5 (10.9)	–
– Evaluation	22 (47.8)	15 (32.6)	7 (15.2)	1 (2.2)	1 (2.2)
Assessment					
– Anamnesis	–	–	29 (63%)	–	17 (36.9)
– Vital signs	–	38 (82.6)	–	–	8 (17.3)
– Physical assessment	42 (91.3)	–	–	–	4 (8.6)
– Nosocomial infection criteria	–	–	–	27 (58.6)	2 (4.3)
– Required objective data	42 (91.3)	–	–	–	4 (8.6)

– Infection sign & symptoms	–	–	–	21 (45.6)	25 (54.3)
– Surgical infection criteria		–	–	25 (54.3)	21 (45.6)
– Surgical infection sign & symptoms	–	–	–	18 (39.1)	28 (60)
– Validation of subjective & objective clinical data	–	37 (80.4)	–	–	9 (19.6)
Diagnosis					
– Subjective & objective clinical criteria	–	–	31 (67.3)	–	15 (32.7)
– Interpretation of laboratory data	45 (97.8)	–	–	–	1 (2.2)
– Identification of required supportive measures	42 (91.3)	–	–	–	14 (8.7)
– Working diagnosis	40 (86.9)	–	–	–	6 (13.1)
– Required data to establish diagnosis	–	–	–	22 (47.8)	24 (52.2)
Planning					
– Goals of infection prevention	–	–	–	23 (50)	23 (50)
– Documentation				25 (54.3)	21 (46.7)
– Characteristics of planning	44 (95.6)	–	–	–	2 (4.4)
– Essentials in planning	–	–	31 (67.3)	–	15 (12.7)
– Self-directed/individual planning	45 (97.8)	–	–	–	1 (2.2)
– Important notice	42 (91.3)	–	–	–	4 (8.7)
– Consequences if action not undertaken	–	–	–	2 (4.3)	44 (95.7)
– Member(s) of planning team	–	–	30 (65.2)	–	16 (34.8)
– Risk factors of bacteremia	–	–	–	19 (41.3)	27 (58.7)
– Patients with high risk of nosocomial infection	–	–	–	16 (34.7)	30 (55.3)
– Priority/focus of nosocomial infection care	–	–	28 (60.8)	–	18 (39.2)
– Supervision of intervention	–	–	–	17 (36.9)	29 (53.1)
Implementation					
– Disinfection and sterilization	–	–	28 (60.8)	–	18 (39.2)
– Actions to improve immune system	–	–	–	24 (52.1)	22 (47.9)
– Hand wash for disinfection	–	–	32 (69.5)	–	14 (30.5)
– Duration of hand washing	–	–	–	12 (26)	34 (74)

– Tools sterilization and disinfection	–	–	–	32 (69.5)	12 (30.5)
– Requirements for screening and isolation of patients	–	–	–	26 (56.5)	20 (43.5)
– Self-protection protocols during surgical wound care	–	–	–	20 (43.4)	26 (66.6)
– Procedure of aseptic wound care	–	–	–	17 (36.9)	29 (63.1)
– Solutions for wound irrigation	42 (91.3)	–	–	–	4 (8.7)
– Aims of educational measures in nosocomial infection prevention	43 (93.4)	–	–	–	3 (6.6)
Evaluation					
– Activities to monitor prevention of nosocomial infection	–	39 (84.7)	–	–	7 (13.3)
– Criteria of successful prevention of nosocomial infection	42 (91.3)	–	–	–	4 (8.7)
– Terminating transmission of nosocomial infection	–	–	27 (58.6)	–	19 (41.4)
– Suppressing and controlling nosocomial infection	40 (86.9)	–	–	–	6 (13.1)

3.3 Skills in Patient-Care to Prevent Nosocomial Infection Post-Caesarean Section

Overall, the practice of nursing/midwifery care for post-Caesarean section patients were considered good, however all skills could be improved (Table 3). Majority of staff (80%) delivering nursing/midwifery care for mothers post-Caesarean section showed good skills in disinfection and sterilization; hand hygiene; self-protection protocols during surgical wound care; and procedure of aseptic wound care.

Table 3: Observation of practice skill of staff in preventing nosocomial infection in patients with Caesarean section

Variable	Category*, N (%)				
	Very good	Good	Satisfactory	Less than adequate	Not satisfactory at all
Proper hand washing	6 (13)	37 (80)	3 (7)	–	–
Sterile or aseptic preparation of tools	–	30 (65)	16 (35)	–	–
Wearing masker to prevent saliva splash	6 (13)	37 (80)	3 (7)	–	–
Sterile/aseptic wound care	6 (13)	37 (80)	3 (17)	–	–

*: based on completeness, sequence and time of completion of the protocols

3.4 Incidence and Time of the Appearance of Wound Infection Post–Caesarean Section

In one of the hospitals studied, hospital official reports showed 12.7% (124/977) and 13.8% (156/1,120) patients post–Caesarean section experience nosocomial infection during the past two years prior this study. During the course of our observational study, in the same hospital, documented and validated (blood culture assay) incidence of wound infection post–Caesarean section was in total 44% (19 of 43 observed patients). Type of bacteria involved in such nosocomial infection, single or mixed, were *Acinetobacter baumannii* (9 patients; 47%); *Staphylococcus aureus* (7 patients; 37%); *Pseudomonas stutzeri* (3 patients; 16%); *Serratia liquifaciens* (2 patients; 10%) and *Salmonella arizona* (2 patients, 10%). The infections approximately began on day 3 post–Caesarean section (3 patients, 7%); day 6 (9 patients, 20.9 %) and day 9 (7 patients, 16.3 %).

4. DISCUSSION

The demographic profile of our participants showed that majority of staff caring the Caesarean patients were with midwifery trainings background (Table 1). Such condition may be due to staff recruitment and remuneration system applied by the hospitals for the Department of Obstetrics and Gynecology and the interest of fresh graduates of nursing and midwifery education institutes. Assuming that midwives competent in delivering care for mothers especially during and after childbirth, the common policy in recruiting staff for caring mothers in Department of Obstetrics and Gynecology is to choose midwives instead of nurses. Nowadays in Indonesia, majority of nurses graduate with Bachelor degree whereas midwives with Diploma (Vocation) degree, which brings consequences in payment of salary i.e. individuals with Diploma degree are paid cheaper. Limited financial resources such as in Class B hospitals may influence the number of nurses employed to care patients post-Caesarean section. Another plausible reason is the rather low interest of the nurses to work in Department of Obstetrics and Gynecology in hospitals which also located in outskirt areas (e.g. the hospitals chosen for this study).

This study showed that employed staff caring mothers post-Caesarean section have inadequate knowledge on signs-symptoms and risk factors of infection; goals of nosocomial infection prevention; priority/focus of nosocomial infection care; and ensuring appropriate action or intervention. This study also showed that there was discrepancy between knowledge and skill mastery. The differences between knowledge and skills of tools sterilization/disinfection; handwash-masker application; and post-Caesarean wound care were of note. The knowledge in such areas were categorized as satisfactory to not satisfactory at all, whereas the observed skills were very good to satisfactory, which indicate that staff may not thoroughly understand the reasons why and what the correct protocols are of their practices in relation to prevention of nosocomial infection. The lack of many aspects of knowledge on nosocomial infection may be contributed by staffs' education prior employment. Vocational degree, whether nursing or midwifery studies, in Indonesia mostly emphasizes achievement of skill competencies in practical works rather than building knowledge [10]. The adequacy of provision of lectures focusing on nosocomial infection relevant to local problems and achievement of competence in prevention and stopping transmission of nosocomial infection, especially in post-Caesarean cases, needs to be further studied during nursing and midwifery educations.

With such competencies, the nosocomial infection was detected in ~44% of the patients, which started on day 3; 6; or 9 post-Caesarean section. Such number may not reflect annual incidence rate of nosocomial infection in the hospitals' Department of Obstetrics and Gynecology. Nevertheless, compared to our national data which on average 6.6% [2], such overall high incidence rate faced in the hospitals we studied demands urgent intervention.

Given the cognitive and skill competencies of the staff as described previously, the obvious measure to facilitate control of nosocomial infection post–Caesarean section is to conduct in-house training. The in-house training should address the identified gap of detailed knowledge, skill and attitude associated with nursing care to prevent nosocomial infection. Because the hospitals we studied are also sites used to train students undertake nursing and midwifery education, meaning that staff may serve as preceptors, it is of paramount important to rectify the staff competencies on nosocomial infection prevention. The successful training will improve hospitals ability to control nosocomial infection not only locally, but also nationally as the graduates nurses and midwives may work in other hospitals or as private practioners nationwide. A quasi-experimental study was designed and performed, resulted in improvement of knowledge, skill and attitude of the staff as well as reduction of the incidence of nosocomial infection rate post–Caesarean section [11, 12]. After in-house training the staff competencies increased from “less-than-adequate” to “very good” on all variables.

5. CONCLUSION

This study found that several aspects of knowledge; skills and attitudes were in need of improvement; e.g. criteria; signs and symptoms of infection both in general and in surgery; priority/focus of nosocomial infection care; disinfection

and sterilization including hand hygiene and tools disinfection and sterilization; and what to do to prevent and stop transmission of nosocomial infection. This study indicates that merely access to hospitals or births attended by “skilled” health personnel do not guarantee best outcomes of nosocomial infection prevention post–Caesarean section. Assessing staff competencies prior and during work employment followed by proper training to fill the gap between expected and actual competencies may improve control of nosocomial infection. Because the type and quality of service and actual problems associated with nosocomial infection post–Caesarean section may differ among hospitals, similar studies should be performed in other hospitals to facilitate identification of causes and viable solutions.

6. CONFLICT OF INTERESTS

The author declares that there is no conflict of interest regarding the publication of this paper.

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