Interprofessional collaboration practices enhance the achievement of comprehensive obstetric and neonatal emergency care program indicators in hospitals

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Abstract
Background: Maternal and infant mortality rates are still a problem in developing countries, including Indonesia. The practice of interprofessional collaboration in comprehensive emergency obstetric and neonatal care service (CEmONC) is an attempt to overcome the problem, but there is no evidence of research results to measure the indicators of the CEmONC program. Aim: The purpose of the study is to analyze the achievement of CEmONC program indicators on the practice of interprofessional collaboration. Settings and Design: This is a qualitative research with an embedded single case design. The study was conducted at a private type C teaching hospital in Yogyakarta. Methods and Material: Data were collected using observation, in-depth interviews, and documentation study. The main informants were doctors and health workers who provided services in CEmONC cases. The supporting informants were patients and families, midwives who referred the patients and hospital management. The number of main informants was 38 people, while supporting informants was 15 people. Data analysis used: Data analysis used was thematic analysis. Results: The results of the achievement of the CEmONC program show that response time was fast in the emergency room, a mothers' condition was more stable so that a non-emergency caesarean section was performed, a blood bank prepared the blood supply, early breastfeeding was initiated even though the baby did not
reach the mother’s nipple, the baby was healthy, and the mother was treated with care. **Conclusions:**
The practice of interprofessional collaboration can improve the achievement of CEmONC program indicators, so it is recommended that this should be implemented in every hospital.

**Keywords:** interprofessional collaboration practice, obstetric, neonatal, emergency, program

**Key Messages:**
The practice of interprofessional collaboration can improve the achievement of CEmONC program indicators, so it is recommended that this should be implemented in every hospital.

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**Introduction**

Maternal and infant mortality rates are important indicators in the Sustainability Development Goals. The number of maternal deaths which occur due to delay, near-death cases, and maternal morbidity has decreased but it is still not as expected. The maternal mortality rate (MMR) in developing countries is 20 times higher, namely 239/100,000 live births, compared to the MMR in developed countries, namely 12/100,000 live births. Infant mortality is mainly dominated by neonatal mortality, most commonly due to perinatal asphyxia (40%, 95% CI 39-42, in South Asia; 34%, 32-36, in sub-Saharan Africa) and severe neonatal infection (35%, 34 -36, in South Asia; 37%, 34-39 in sub-Saharan Africa), followed by preterm birth complications (19%, 18-20, in South Asia; 24%, 22-26 in sub-Saharan Africa). This condition is not much different from the condition in Indonesia.

The Ministry of Health of the Republic of Indonesia has launched various programs to reduce maternal and infant mortality rates. One of the programs is Expanding Maternal and Neonatal Survival with the goal to strengthen the Basic Emergency Obstetric Neonatal Services in Community Health Centers and Comprehensive Obstetric Neonatal Emergency Care Services (CEmONC) in hospitals. The strengthening program is carried out by including CEmONC as an element of the national hospital accreditation standards, namely standard 1 (24-hour CEmONC program in hospitals and their monitoring and evaluation) and standard 1.1 (resources for providing CEmONC services). CEmONC quality indicators are good if there is no delay in section caesarean, no delay in blood supply, no maternal and infant deaths, and early initiation of breastfeeding is carried out.

Interprofessional collaborative practice (ICP) is the key to safe and quality care, but it requires a thoughtful approach to be successful. The benefits of ICP practice based on the results of various
Systematic reviews are reduced complications, clinical errors, mortality, length of stay, conflict, staff turnover, and hospital admissions\(^7\text{--}^{12}\). However, there are no studies that analyze the ICP on the achievement of the CEmONC program. Based on this background, this study aims to analyze the implementation of the ICP on the achievement of the CEmONC program.

**Subjects and Methods**

Main informants and supporting informants are determined by means of purposive sampling through expert sampling methods and heterogeneous purposive sample, which pay attention to four aspects, namely setting, actors, events and process\(^{13}\). The inclusion criteria for main informants were doctors and health workers who were members of the CEmONC team or provided services for CEmONC cases that were observed in the emergency department, midwifery clinic, delivery rooms, operating rooms, intensive care units, baby rooms, and postpartum wards of PKU Muhammadiyah Gamping Hospital, Yogyakarta. The inclusion criteria for supporting informants were patients or their families who had cases of CEmONC and were hospitalized, midwives who had referred CEmONC patients, and hospital management. The exclusion criteria were determined if the patient was not willing to be an informant or if the patient was a hospital employee. The number of informants was determined until data saturation occurred\(^{14}\).

This type of research is qualitative research with an embedded single case design, namely a case study that contains more than one sub-unit of analysis\(^{15}\). The units of analysis were the health profession, the patient or the patient's family, the midwife who referred the patient, and hospital management. This research setting was carried out in a class C hospital with full accreditation which is used as teaching hospital for prospective doctors and health professions, but has not yet received 24-hour CEmONC status from the Health Office. The data collection of this research used several methods, namely in-depth interviews, observation, and documentation study. Various methods were used because in addition to using triangulation of data sources, triangulation of methods was also conducted to increase data credibility. In addition, the researchers also conducted member checks to increase the credibility of the data\(^{16}\). Dependability in a research is fulfilled by means of peer debriefing between researchers. Audit trail used were logbook and note field to fulfill confirmability\(^{17}\). The study has obtained ethical clearance from the Research Ethics Committee of 'Aisyiyah Yogyakarta University through letter Number: 1283/KEP-UNISA/X/2019 dated October 28, 2019. Data analysis used was thematic analysis\(^{13}\) followed by template analysis\(^{18}\) and matrix analysis\(^{19}\).
Results

The numbers of informants were 53 people, which consisted of 38 main informants and 15 supporting informants. The main informants consisted of 3 obstetricians and gynecologists, 2 pediatricians, 2 anesthesiologists, 1 emergency specialist, 1 general practitioner, 8 midwives, 12 nurses, 1 anesthetist, 2 medical laboratory technology experts, 2 nutritionists, 2 pharmacists, and 2 physiotherapists. The supporting informants consisted of 7 patients/family members of the patients, 4 midwives who referred the patients, and 5 members of hospital managements (Managing Director, Committee for Quality Improvement and Patient Safety). Characteristics of the informants can be seen in Table 1.

Patients were treated in the hospital for about 1 to 6 days, in class II and III treatment rooms. 5 people were referred from public health center, 2 patients were referred from Pratama clinic, 3 people had experience of being treated in a hospital, while 4 people had no experience of being treated in a hospital. Only 1 patient did not use health insurance.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>CEmONC</th>
<th>ICP Team</th>
<th>Patient/Patient's Family</th>
<th>Midwives who referred the patients</th>
<th>Hospital Management</th>
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<tbody>
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<td>Gender:</td>
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<tr>
<td>Male/ Female</td>
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<td>1/6</td>
<td>0/4</td>
<td>4/1</td>
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<td>Age (range in years)</td>
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<td>21-53</td>
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<td>Education:</td>
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<td>SMA / SMK</td>
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<td>D3</td>
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<td>Work experience (range in years)</td>
<td>1-30</td>
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This study obtains seven themes, namely emergency response time, preparation for caesarean section surgery, risk of maternal death, healthy babies, early initiation of breastfeeding, blood supply, and exclusive breastfeeding. Each of them is described as follows.

The theme of emergency response time was obtained from the results of a documentation study of the Committee for Quality Improvement and Patient Safety which reached a value of 99.6% in less than five minutes. It was observed that eclampsia emergency management could be done in less than five minutes. This was also made clear at the time of the interview results. The Emergency Medical Specialist stated that CEmONC emergency services in the emergency department used triage criteria, namely red, yellow, and green. The response time for red cases were zero to five minutes. Red cases are life threatening, such as decreased consciousness, cases of seizures, circulatory airway priming...
disorders, chest pain, shock. For example, eclamptic patients with seizures would have been served in less than five minutes. Response time is an indicator of quality in emergency departments. This can be seen from the time of registration to the starting time of vital sign examination and history taking, doctor's examination, registration, and triage. The Emergency Medical Specialist doctor's statement was reinforced by the results of an interview with the emergency department supervisor nurse who stated that the initial treatment of CEmONC patients and five-minute resuscitation for patients had been achieved. There is a plan to improve the resuscitation time to three minutes. The emergency department nurse also stated that eclampsia patients were in the red category so that less than five minutes resuscitation could be accomplished. The midwife on duty stated that she came to the emergency room if there was a CEmONC patient for a maximum of 5 minutes.

Obstetrics and gynecology specialists reinforced the statement of the Emergency Medical Specialists, nurses and midwives who declared that the handling of eclampsia cases was good because they were often exposed to such cases so that their abilities were much better. However, the general practitioner on duty in the emergency department felt very uneasy, not least because he was not ready to handle cases related to obstetrics. Obstetrics and gynecology specialists and medical emergency specialists could be contacted so that management of eclampsia patients could be carried out. Midwives who referred the CEmONC patients reinforced the notion that the response time in the emergency department was fast, about five to ten minutes. The patients also said that the response time in the emergency department was fast, and that the team acted deftly and swiftly.

The emergency caesarean section is regulated in the standard operating procedures number: 62/VK/PONEK/VII/2019 dated July 30, 2019, which includes the arrival of obstetrician and gynecologist specialists, pediatricians and anesthetists to the hospital in 30 minutes. Based on the report of the Committee for Quality Improvement and Patient Safety in 2019, there was no delay in emergency caesarean section. Based on the observation result of emergency services for eclampsia in a mother who was giving birth, an elective caesarean section was performed, which was scheduled at 10:00 Western Indonesian Time because the mother's condition was more stable.

Based on the results of the interviews, it was found that the preparation for emergency caesarean section surgery could be done in 30 minutes. The Pediatrician stated that the ICP team was ready for 24 hours, which included Pediatric Specialists, Obstetrics and Gynecology Specialists, Anesthesia Specialists as well as nurses and midwives. The operating rooms could be used for 24 hours, so that the standard response time could be met. The Obstetrics and Gynecology Specialist doctors confirmed the statement of the Pediatrician who expressed that the response time for surgery, blood preparation in the laboratory, and preparation for surgery to post surgery was good. In some cases, the surgery only took between 30 to one hour. Anesthetist Specialists reinforced the
statements of the Pediatricians, Obstetrics, and Gynecologists Specialists who revealed that in an emergency case, a surgery should not take too long. For example, if there is fetal distress, the surgery should not take more than 15 minutes, and everything must be ready as the team is ready for 24 hours. Three midwives stated that the time was correct, in approximately 30 minutes, the patient had been treated. The results of the interview were also verified after it was confirmed by the patient’s family that the caesarean section team was alert, and the preparation took about 30 minutes.

The theme of maternal mortality risk was obtained from the report of the Committee for Quality Improvement and Patient Safety in 2019 which stated that there were no maternal deaths due to bleeding, eclampsia, or sepsis. We observed an emergency service for eclampsia in a mother who was giving birth, and the mother and the baby survived, even though the mother was admitted to the intensive care unit for 24 hours. The results of the interviews also showed that there were no maternal deaths in 2019. The results of interviews with Obstetrics and Gynecology Specialists stated that the mortality rate for mothers and babies was low, but the rate of caesarean section was high, so it must be corrected. The midwife stated that there were no cases of mothers who died due to eclampsia in this hospital in 2019. According to the President Director of the hospital, there was a maternal death in 2018, so he was invited two to three times by the Health Office.

The theme of healthy babies was obtained from the 2019 Patient Safety and Quality Improvement Committee report, which showed that there were no infant deaths. Also, during observation, all babies who were born were healthy.

The theme of early initiation of breastfeeding was based on the observation that early initiation of breastfeeding was assisted by a baby nurse. Two patients stated that they had conducted early initiation of breastfeeding. When the operation was still in progress, early breastfeeding was immediately initiated. The report of the Committee for Quality Improvement and Patient Safety in 2019 showed that the percentage of incidences in which early breastfeeding was not initiated amounted to 0.2%. Those occurrences were caused by the condition of the mother and the baby. The results of interviews with three nurses and midwives stated that the conditions of the mother that caused early initiation of breastfeeding to not be conducted were, for example, low pain threshold, decreased awareness of mothers, mothers with rubella, and mothers with hypertension. A patient’s family confirmed that a baby born with asphyxia did not receive early initiation of breastfeeding. This can be understood by the patient and her family. Another patient stated that after the baby was born, it was placed on the mother’s stomach for a while, then cleaned.

The theme of blood supply was based on the 2019 Patient Safety and Quality Improvement Committee report which stated that there was no delay in the provision of blood supply. The observation showed that before the operation of the caesarean section, the Obstetrics and
Gynecology Specialists signed a letter requesting a blood supply and it could be provided by the Laboratory Unit. This was also reinforced by the results of interviews with medical laboratory technology experts who stated that blood was available for 24 hours, especially for CEmONC patients and cases of caesarean section because it had become the hospital’s standard operational procedures. In one hour, blood preparation should be ready. The process for cross matching took 45 minutes. Three midwives and anesthetist administrators confirmed the claim of medical laboratory technologists who stated that blood was available for 24 hours, and there were tens of supplies for each blood group.

The theme of exclusive breastfeeding was based on the 2019 Patient Safety and Quality Improvement Committee Report which showed that there were no newborns who did not receive exclusive breastfeeding during hospitalization. Based on observations, postpartum mothers gave breast milk directly to their babies, except for babies with problems. Mothers were taught to breastfeed babies, while babies who had problems were assisted by oral therapy by a physiotherapist. The nurse also provided education on how to breastfeed.

**Discussion**

This study obtains seven themes, namely emergency response time, preparation for caesarean section surgery, risk of maternal death, healthy babies, early initiation of breastfeeding, blood supply, and exclusive breastfeeding. Six of the themes are program indicators set out in the national hospital accreditation standards, namely the number of delays in cesarean section operations of more than 30 minutes, the number of delays in the provision of blood supply of more than 60 minutes, the mortality rate for mothers and babies, and the incidence of not initiating early breastfeeding in newborn babies. The theme of exclusive breastfeeding is a local indicator set by the PKU Muhammadiyah Gamping hospital. Other local indicators based on the report of the Committee for Quality Improvement and Patient Safety are the inability to treat low birth weight babies of 1500 to 2500 grams, and the inability to manage low birth weight babies of 1500 to 2000 grams. Each theme is discussed as follows.

Response time is an indicator of quality in emergency departments. This can be seen from the time of registration to the starting time of vital sign examination and history taking, doctor’s examination, registration, and triage. The results of observations and interviews with the ICP team as well as with midwives who referred the patients indicated that the initial management of CEmONC patients and patients who went through five minutes of resuscitation had been achieved. The results of this study support the response time of the Pediatric Emergency Unit Dr. Hasan Sadikin which has a geometric average of 4.07 minutes. This is consistent with the results of systematic review that most studies conduct to deal with problems related to emergency medical services to
contribute to a decrease in response time and time to get resources. Response time is one of the Key Performance Indicators because it is believed to provide a good indication of the quality and timeliness of care provided by services.

The incidence of no early initiation of breastfeeding was based on the Quality Improvement and Patient Safety Team's report, which stated that such incident amounted to 0.2%, while based on the KBY supervisor's report, all early initiation of breastfeeding was carried out 100% in infants who were eligible for early initiation of breastfeeding (966 out of 1170 infants). The implementation of early initiation of breastfeeding had been carried out according to the target, but for patients with caesarean section, the time for early initiation of breastfeeding had not been optimal due to the limited workforce. Babies who did not receive early initiation of breastfeeding were constrained by low birth weight, maternal conditions such as general anesthesia and vomiting, asphyxia babies, and mothers with severe pre-eclampsia or eclampsia. The results of this study support a study which have found that collaborative interprofessional practice in Alabama is associated with increased initiation of early breastfeeding in the hospital, fewer use of epidural anesthesia for pain management, and lower number of incidence of delivery with caesarean section.

The report of the Committee for Quality Improvement and Patient Safety in 2019 showed that there were no newborn babies who were not exclusively breastfed during hospitalization. Based on observations, postpartum mothers gave breast milk directly to their babies, except for babies with problems. Mothers were taught to breastfeed babies, while babies with problems were also assisted by oral therapy by physiotherapy. Exclusive breastfeeding is the foundation of children's survival and children's health because it provides essential nutrients that are irreplaceable for children's growth and development. It serves as a child's first immunization by providing protection from respiratory infections, diarrheal diseases and other potentially life-threatening illnesses. Exclusive breastfeeding also has a protective effect against obesity and certain non-communicable diseases later in life.

The achievement of all indicators of the CEmONC program shows that interprofessional collaborative practices can improve the quality of the CEmONC program. The results of this study support Ogburn's results which have suggested that collaborative care between obstetricians and midwives at the Indian Health Service has contributed to improved health outcomes for mothers and babies. The results of this study also support the result of a research which have stated that team-based collaborative care promotes better health outcomes and fosters safer and more effective health care for the population served.

The conclusion of this study is that there are seven themes, namely emergency response time, preparation for caesarean section surgery, risk of maternal death, healthy babies, early initiation of breastfeeding, blood supply, and exclusive breastfeeding. These themes show that the practice of...
interprofessional collaboration can improve the quality of the achievement of CEmONC program indicators in hospitals. However, further research is still needed to reveal other factors that influence the successful achievement of the CEmONC program.

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