



Factors that Affect the Performance of Health Workers in Providing Comprehensive Emergency Obstetric and Newborn Care

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Abstract:

Background: Comprehensive Emergency Obstetric and Newborn Care (CEmONC) at a tertiary hospital aims to provide sub-specialistic care for life-threatening maternal and neonatal emergency cases. The performance of healthcare workers (HCWs) is a key determinant of the quality of this hospital service, as it could eventually affect the clinical outcome of patients.

Objectives: This study was performed to analyze the factors affecting the performance of HCWs in providing CEmONC services at a tertiary hospital.

Methods: This cross-sectional research used an online questionnaire through Google Form (Google LLC, USA) from June to July 2022 distributed to 198 HCWs who contributed to CEmONC services at a tertiary hospital. A total of 119 HCWs who had worked for more than one year were included. The collected data were then analyzed with bivariate and multivariate analysis.

Results: In this study, 68 HCWs (57.1%) had a good performance in implementing the CEmONC services. The significant factors influencing the performance of HCWs were Quality (adjusted odds ratio [AOR] = 31.914; $p = 0.003$), Quantity (AOR = 15.573; $p = 0.003$), Work effectiveness (AOR = 20.256; $p = 0.003$), Timeliness (AOR = 27.543; $p = 0.001$), and Teamwork (AOR = 6.773; $p = 0.031$). Meanwhile, age, gender, professional background, length of work experience, and commitment were not associated with the performance of HCWs ($p > 0.05$).

Conclusion: The better performance of HCWs was significantly correlated with good quality, adequate quantity, effective work, being on time, and good teamwork. Therefore, this result suggests that hospital managers should conduct periodic monitoring and evaluation regarding the performance of their employees to improve the quality of CEmONC services at the hospital.

Keywords: Emergency hospital services, Healthcare workers, Hospital management, Performance, Tertiary healthcare, Patients.

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1. INTRODUCTION

One of the Sustainability Development Goals (SDGs) is to reduce the global maternal mortality rate (MMR) to less than 70 deaths per 100,000 live births and to reduce the infant mortality rate (IMR) to at least as low as 12 per 1,000 live births by 2030 [1]. In Indonesia, this target is still far from being achieved, where the MMR is 305 per 100,000 live births, and the IMR is 24 per 1,000 live births [2]. Maternal deaths occur due to complications during pregnancy, childbirth, and postpartum, which in most cases are preventable, and the death of newborns is correlated with the quality of maternal care [1]. This issue can be controlled if there is effective and efficient access for patients to emergency obstetric and neonatal care based on the severity of cases [1, 3]. Therefore, strengthening the regionalized referral system is a key government strategy to minimize maternal and neonatal death [4].

The referral network allows communication among healthcare facilities in managing obstetrics patients in the form of Basic Emergency Obstetrics and Newborn Care (BEmONC) at the primary health center and Comprehensive Basic Emergency Obstetrics and Newborn Care (CEmONC) at the hospital [1]. BEmONC is a basic obstetric and neonatal emergency service without any surgical intervention but utilizes vaginal delivery with the use of antibiotics, oxytocin, anticonvulsants, and other therapies, while CEmONC covers all of these services plus surgery and blood transfusions [4]. This 24-hour service broadens access to care for pregnant women with complications who need to be transferred to a higher-level hospital with a wide range of specialized and subspecialty services [5].

In the referral system, a tertiary hospital is the highest-level healthcare facility as the definitive reference for life-threatening cases that provides subspecialty services by fetomaternal and neonatology consultants for high-risk mothers and babies [4, 5]. Therefore, healthcare workers (HCWs) who provide CEmONC services at a tertiary hospital are expected to perform better than those who work in other health facilities.

The success of medical services at a hospital depends on the performance of the HCWs involved. The performance of employees is an indicator of the quality of the services they provide and could impact patient satisfaction. Furthermore, a high level of performance in delivering hospital services could develop a positive patient safety culture so that adverse medical events could be prevented [6]. Many factors affect performance, including the personal charac-

teristics, quality, quantity, commitment, effectiveness, timeliness, and teamwork of HCWs in their workplace [7]. However, there is no previous study concerning the factors affecting the performance of HCWs in providing CEmONC services in tertiary referral hospitals in Indonesia. Therefore, this study aimed to analyze the factors that influence the performance of HCWs in providing CEmONC services in a tertiary hospital.

2. METHODS

This cross-sectional study used an online questionnaire through Google Form (Google LLC, USA) from June to July 2022. The population of this study included all HCWs involved in the CEmONC services in a tertiary hospital in Indonesia, with a total of 198 people. The sample was selected using convenience sampling, in which those who had worked for at least one year were eligible to be included in this study. A total of 129 respondents completed the survey, of which 119 were included. Ten respondents with work experience for less than 12 months were excluded from this study.

Respondents were asked to fill out an informed consent, provide their characteristic data (age, gender, professional background, and length of work experience), and answer five-point Likert scale questions related to the factors affecting performance, which are: quality (2 items), quantity (2 items), commitment (2 items), effectiveness (2 items), timeliness (2 items), and teamwork (2 items). After the data collection period ended, all responses were then analyzed.

Variable age was divided into four categories (≤ 30 years, 31-40 years, 41-50 years, and > 50 years); gender was divided into two categories (male and female); Professional background was divided into four categories (supporting staff, nurses/midwives, non-consultant doctors, and consultant doctors); and length of work experience was divided into three categories (1-5 years, 5-10 years, and > 10 years). Meanwhile, all answers related to quality, quantity, commitment, effectiveness, timeliness, and teamwork were measured by calculating the median score of each variable because the data were not normally distributed. If the respondent scored more than or equal to the median, it was categorized as good quality, adequate quantity, strong commitment, effective, on-time, and good teamwork. Whereas, if they scored less than the median, it was categorized as poor quality, inadequate quantity, weak commitment, ineffective, late, and bad teamwork.

In this study, the collected data were then analyzed using bivariate and multivariate analysis using SPSS

software version 23.0 (IBM Corp., USA) to identify the factors affecting the performance of HCWs in providing CEmONC services at a tertiary hospital. Categorical data were calculated as frequencies (n) and percentages (%). Bivariate analysis with the Chi-square test was initially performed, and the results were reported as Crude Odds Ratio (COR) with 95% confidence intervals (CI). The subsequent multivariate analysis using binary logistic regression included all variables related to good performance with a p-value of less than 0.25 in the previous analysis. The calculations were presented as Adjusted Odds

Ratio (AOR), and statistical significance was set at p-value < 0.05.

3. RESULTS

Among the 119 CEmONC team members at a tertiary hospital, 68 (57.1%) HCWs had a good performance. The demographic and occupational characteristics of the respondents are summarized in Table 1. The HCWs were predominantly 31-40 years old (48.7%), females (84.0%), worked as midwives or nurses (70.6%), and had worked for more than ten years (49.6%).

Table 1. Characteristics of participants (n=119).

Characteristics	Groups	n (%)
Age, years	20 - 30	23 (19.3)
	31 - 40	58 (48.7)
	41 - 50	22 (18.5)
	> 50	16 (13.4)
Gender	Male	19 (16.0)
	Female	100 (84.0)
Professional background	Supporting staff	12 (10.1)
	Midwives/Nurses	84 (70.6)
	Non-Consultant doctors	11 (9.2)
	Consultant doctors	12 (10.1)
Length of work, years	1 - 5	34 (28.6)
	5 - 10	26 (21.8)
	> 10	59 (49.6)
Quality	Poor	49 (41.2)
	Good	70 (58.8)
Quantity	Inadequate	43 (36.1)
	Adequate	76 (63.9)
Commitment	Weak	45 (37.8)
	Strong	74 (62.2)
Effectiveness	Ineffective	43 (36.1)
	Effective	76 (63.9)
Timeliness	Late	40 (33.6)
	On-time	79 (66.4)
Teamwork	Bad	38 (31.9)
	Good	81 (68.1)
Performance	Poor	51 (42.9)
	Good	68 (57.1)

Note: N: frequency; %: percentage.

Table 2. Correlation between the eligible determinants and the performance of HCWs (bivariate and multivariate analysis).

Variables	Performance		p-value*	Crude OR (95% CI)	p-value [†]	Adjusted OR (95% CI)
	Poor, n(%) (N=51)	Good, n(%) (N=68)				
Age	-	-	0.056	-	-	-
20 - 30 years (ref.)	12 (52.2)	11 (47.8)	-	1.00	-	1.00
31 - 40 years	28 (48.3)	30 (51.7)	-	1.169 (0.445-3.073)	0.763	0.620 (0.028-13.904)
41 - 50 years	9 (40.9)	13 (59.1)	-	1.576 (0.484-5.127)	0.878	1.377 (0.023-81.510)
> 50 years	2 (12.5)	14 (87.5)	-	7.636 (1.406-41.488)	0.228	14.031 (0.192-1024.416)

(Table 4) contd....

Variables	Performance		p-value*	Crude OR (95% CI)	p-value†	Adjusted OR (95% CI)
	Poor, n(%) (N=51)	Good, n(%) (N=68)				
Gender	-	-	0.543	-	-	-
Male (ref.)	7 (36.8)	12 (63.2)	-	1.00	-	-
Female	44 (44.0)	56 (56.0)	-	0.742 (0.270-2.043)	-	-
Profession	-	-	0.178	-	-	-
Supporting staff (ref.)	7 (58.3)	5 (41.7)	-	1.00	-	1.00
Midwives/Nurses	38 (45.2)	46 (54.8)	-	1.695 (0.498-5.772)	0.209	0.159 (0.009-2.796)
Non-Consultant doctors	4 (36.4)	7 (63.6)	-	2.450 (0.456-13.161)	0.111	0.036 (0.001-2.162)
Consultant doctors	2 (16.7)	10 (83.3)	-	7.000 (1.044-46.949)	0.304	0.056 (0.000-13.572)
Length of Work	-	-	0.082	-	-	-
1 - 5 years (ref.)	20 (58.8)	14 (41.2)	-	1.00	-	1.00
5 - 10 years	9 (34.6)	17 (65.4)	-	2.698 (0.937-7.773)	0.359	4.028 (0.205-79.314)
> 10 years	22 (37.3)	37 (62.7)	-	2.403 (1.014-5.695)	0.988	1.023 (0.054-19.463)
Quality	-	-	0.000	-	-	-
Poor (ref.)	36 (73.5)	13 (26.5)	-	1.00	-	1.00
Good	15 (21.4)	55 (78.6)	-	10.154 (4.326-23.835)	0.003	31.914 (3.215-316.818)
Quantity	-	-	0.000	-	-	-
Inadequate (ref.)	34 (79.1)	9 (20.9)	-	1.00	-	1.00
Adequate	17 (22.4)	59 (77.6)	-	13.111 (5.269-32.622)	0.003	15.573 (2.507-96.728)
Commitment	-	-	0.001	-	-	-
Weak (ref.)	28 (62.2)	17 (37.8)	-	1.00	-	1.00
Strong	23 (31.1)	51 (68.9)	-	3.652 (1.677-7.952)	0.080	6.222 (0.801-48.308)
Effectiveness	-	-	0.001	-	-	-
Ineffective (ref.)	27 (62.8)	16 (37.2)	-	1.00	-	1.00
Effective	24 (31.6)	52 (68.4)	-	3.656 (1.668-8.016)	0.003	20.256 (2.711-151.345)
Timeliness	-	-	0.000	-	-	-
Late (ref.)	34 (85.0)	6 (15.0)	-	1.00	-	1.00
On-time	17 (21.5)	62 (78.5)	-	20.667 (7.450-57.334)	0.001	27.543 (3.582-211.789)
Teamwork	-	-	0.000	-	-	-
Bad (ref.)	29 (76.3)	9 (23.7)	-	1.00	-	1.00
Good	22 (27.2)	59 (72.8)	-	8.641 (3.535-21.125)	0.031	6.773 (1.188-38.624)

Note: OR=odds ratio; CI=confidence interval; ref.=reference group.

*Chi-square test, all variables with $p < 0.25$ in the bivariate analysis using chi-square test were included in the multivariate analysis.

Binary logistic regression test, significant if $p < 0.05$. Nine variables were remained in the multivariate analysis, $R^2 = 0.817$ (Nagelkerke).

From the bivariate analysis, we identified age, professional background, length of work, quality, quantity, commitment, effectiveness, timeliness, and teamwork as the eligible influencing factors of HCWs' performance for the respective analysis ($p < 0.25$). In the multivariable analysis, the remaining variables contributed to 81.7% of all factors affecting the performance of HCWs. The Omnibus Tests of Model Coefficient results with a p-value of 0.000 demonstrated a significant simultaneous effect of the independent variables on the dependent variable. The Hosmer and Lemeshow test showed a significance of 0.962, which indicated that the tested model had an acceptable goodness of fit. The final model revealed that HCWs with good quality, adequate quantity, effective work, punctuality, and good teamwork were positively associated with good performance, with a p-value less than 0.05 (Table 2). Meanwhile, age, gender, professional background, length of work experience, and commitment were not associated with the performance of HCWs in this study.

4. DISCUSSION

This study was performed to determine the factors affecting the performance of HCWs in providing CEmONC services at a tertiary referral hospital. This healthcare service is part of the integrated maternal and neonatal emergency care referral system, and a tertiary hospital is responsible for handling high-risk maternal and neonatal emergency cases within 24 hours [4]. However, the performance of HCWs plays a critical role in determining the quality of care and is one of the key indicators for the success of healthcare organizations [8]. Performance is defined as the end result of the work done by an employee in carrying out the duties and responsibilities to achieve organizational goals. There are several indicators to assess performance, including personal characteristics, quality, quantity, commitment, effectiveness, and timeliness of the employees while fulfilling their jobs, as well as the teamwork built among team members [7].

In this study, the quality of the HCWs was assessed based on their clinical competence in handling maternal and neonatal emergency cases and their compliance with

applicable standard operational procedures. The present study revealed that the quality of HCWs affects their performance in providing CEMONC services, with an AOR of 31.914 (95% CI 3.215 - 316.818, $p=0.003$). This result is supported by the study of Shahrabaki *et al.*, which concluded that competence in the delivery of healthcare services is a crucial factor that influences the quality of healthcare professionals [9]. Hendarwan *et al.* added that the success of maternity services provided in a healthcare facility in Indonesia was highly dependent on the skills of midwives [10]. Furthermore, a cross-sectional study by Bari *et al.* reported that inadequate knowledge and experience among resident doctors in a tertiary hospital becomes one of the leading causes of medical errors that can eventually affect patient safety [11]. Thus, there is an urgent need to improve the quality of HCWs, one of which is by providing regular management training that can be carried out in the form of 'On The Job Training' or 'In-House Training' [12]. To optimize the expected outcome, hospital managers should conduct an effective assessment and evaluation to ensure that the HCWs are consistently applying the protocols [12, 13].

The current study also revealed that the appropriate number of healthcare team members, as well as the availability of hospital facilities and infrastructure, impact the performance of healthcare workers in providing CEMONC services, with an AOR of 15.573 (95% CI 2.507 - 96.728, $p=0.003$). Kainama *et al.*, in their study, showed that a shortage of nurses in a hospital resulted in a high workload and decreased nurse performance. Meanwhile, the greater the number of nurses in charge of treating patients, the better the performance will be [14]. A study by Naz *et al.* also found that burnout among nurses in a tertiary hospital in Lahore, Pakistan, was led by the shortage of nurses, which increased their workload. This condition can negatively impact the quality of patient care they provide and eventually reduce the health delivery system in the hospital [15]. Thus, managers must also assess the appropriate number of health human resources working in the hospital to prevent and reduce the negative impacts that may arise as a result of work overload. Analysis of the correct number of human resources based on their functions is the primary key to achieving the success of health programs in the hospital [14, 16]. However, it not only requires an adequate number of human resources, but the performance of the HCWs also depends on the physical resources available to support them in completing the necessary tasks. As reported in a national study in Pakistan, inadequate equipment and inefficient use of available resources can negatively affect obstetric care quality in the country [17].

In this study, the preparedness of the operating room team for cesarean section and the zero incidence of neonatal hypothermia indicated the effectiveness of health workers in providing CEMONC services. The result demonstrated that the more effective the work, the higher the performance of HCWs in fulfilling their duties, with an AOR of 20.256 (95% CI 2.711 - 151.345, $p=0.003$). The effectiveness of an employee in performing their job is

crucial to improve the overall outcome [18]. To support the staff to work effectively and efficiently, the managers must provide clear instructions and job descriptions, so the employees know the expected targets. If they are not obeying their responsibilities, it will slow the process of achieving the organizational goals [18, 19]. One of the indicators to assess the performance of CEMONC team members is the absence of hypothermia cases in neonates [5]. This is because the main goal of newborn management as part of hospital healthcare services is maintaining the ideal temperature to support survival and growth of the babies, especially in preterm babies [20]. If the thermoregulation procedures run ineffectively, the risk of newborn death in the hospital will increase [10, 20].

In addition, this study also revealed that the timeliness during which the emergency cesarean section is performed in less than 30 minutes after the initial assessment and the blood for transfusion to high-risk maternal patients is ready within 60 minutes, affects the performance of HCWs, with an AOR of 27.543 (95% CI 3.582 - 211.789, $p=0.001$). Timeliness indicates the work discipline of employees towards response time and whether they following the standard operational procedure. If employees execute their jobs in an undisciplined manner, their productivity will be decreased, and the target achievement will be hampered [21]. For example, in a tertiary hospital where life-threatening cases are commonly found, the laboratory officers must always work fast, especially in providing blood supply for transfusion. It is crucial to treat patients immediately and prevent further blood loss so that the risk of morbidity and mortality among patients can be reduced [10,22]. Therefore, the management teams must construct and evaluate policies that aim to improve the timeliness of employees to improve their performance. If an employee is found to have ignored the organizational rules, corrective disciplinary action is necessary to give a deterrent effect and prevent the recurrence of similar negligence [23].

The present study also found that teamwork positively influenced the performance of health workers who work for CEMONC services in a tertiary hospital, with an AOR of 6.773 (95% CI 1.188 - 38.624, $p=0.031$). In this study, teamwork was assessed through interpersonal communication skills and collaboration between team members in providing services at the hospital. Supporting this finding, the study results conducted by Meisari concluded that cooperation is the most dominant factor in the level of performance among health workers in hospitals, as good teamwork will provide safe and effective care [12]. A study by Abbas *et al.* also revealed that solid cooperation and well-maintained communication among HCWs could lower the risk of medical mistakes and effectively avoid negative impacts on patients [24]. Interprofessional consultation is also crucial in a tertiary hospital, in which healthcare professionals with no suitable competence or authority must consult the specialist doctor in charge so that the risk of death for mothers and babies in the hospital can be prevented [25].

However, this study had a number of limitations. This

study relied on self-reported surveys, which might lead to information bias since participants may not have understood the questions completely. Additionally, because this study was only carried out in one hospital in Indonesia, it was unlikely to generalize it to the actual situation in all tertiary referral hospitals. Therefore, it is suggested for further studies to conduct multicenter studies using a mixed method that is combined with in-depth interviews.

CONCLUSION

To sum up, the factors that influenced the performance of HCWs in providing CEmONC services at a tertiary-level hospital were quality, quantity, effectiveness, timeliness, and teamwork. Meanwhile, age, gender, professional background, length of work experience, and commitment were not associated with the performance of HCWs. This result has significant implications for hospital managers, suggesting that they should monitor and evaluate the performance of their employees periodically. To improve the quality of CEmONC services at the hospital, the managements are suggested to 1) provide a regular competency development program related to advanced maternal and neonatal care, 2) assess the needs of health workers based on the actual workload, 3) build an applicable standard operating procedure that supports employees to work efficiently and effectively, 4) design and implement the appropriate policies regarding work discipline, and 5) provide team building activities for all healthcare providers from various professional backgrounds.

LIST OF ABBREVIATIONS

AOR	= Adjusted Odds Ratio
BEmONC	= Basic Emergency Obstetrics and Newborn Care
CEmONC	= Comprehensive Emergency Obstetric and Newborn Care
CI	= Confidence interval
COR	= Crude Odds Ratio
HCWs	= Healthcare workers
IMR	= Infant Mortality Rate
MMR	= Maternal Mortality Rate
SDGs	= Sustainable Development Goals

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was approved by the Health Research Ethics Committee of RSUP Dr. M. Djamil Padang (Approval No: LB.02.02/5.7/151/2022).

HUMAN AND ANIMAL RIGHTS

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or research committees and with the 1975 Declaration of Helsinki, as revised in 2013.

CONSENT FOR PUBLICATION

Informed consent was obtained from all participants.

STANDARDS OF REPORTING

STROBE guidelines were followed.

AVAILABILITY OF DATA AND MATERIALS

The data that support the findings of this study are available from the corresponding author on special request.

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None.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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