Effect of Health System Factors on Integration of Non-Clinicians in Obstetric Emergency Response in Bungoma County Referral Hospital

ANNE NANJEKHO WAKORA
Department of Paediatrics and Child Health, University of Nairobi, Kenya

Abstract- ***Health system factors play a pivotal role in integrating non-clinicians' duties in obstetric emergencies. This study examined the effect of health system factors on integration of non-clinicians in obstetric emergency response at Bungoma County Referral Hospital (BCRH). Using a cross-sectional survey design, the study quantitatively and qualitatively examined variables among 93 non-clinicians through questionnaires and interviews. Results showed health system factors significantly influenced the integration process (R^2 = 0.226, F = 51.099, p = 0.00). The standardized coefficient Beta of 0.475 (t = 7.148, p < 0.05) indicated that a unit change in health system would result in 47.5% increase in ability to integrate non-clinicians in emergency obstetric response. The study recommends that National and County Governments invest more in health systems and equip non-clinicians on their optimal utilization.***

Keywords: Health System Factors, Non-clinicians Integration, Obstetric Emergency Response, Bungoma County Referral Hospital

I. INTRODUCTION

Emergency care is an integrated platform for delivering accessible, quality and time-sensitive health services for acute illness and injury across the life course (World Health Assembly, 2019). The WHO emergency care systems framework emphasizes integrated emergency care from pre-hospital settings through tertiary care centers (WHO, 2021).

Globally, over 80% of maternal deaths result from obstetric emergencies (UNFPA, 2012). Though most are unpredictable, they can be prevented or treated in properly networked and equipped facilities. In 2015, 303,500 women died during childbirth and 2.7 million babies died within their first month due to obstetric emergencies and complications (NFHS 4 Fact Sheet, 2017).

In sub-Saharan Africa with high Maternal Mortality Ratios (MMR), only 46% accessed obstetric emergency care by skilled professionals, leaving 54% unaccounted for (Ameh et al., 2016). Kenya was among 11 countries contributing 65% of global maternal deaths in 2008 and one of 23 sub-Saharan African countries making insufficient progress toward the fifth Millennium Development Goal (WHO, UNICEF, UNFPA and World Bank, 2010).

In Kenya, obstetric emergencies constitute principal causes of maternal morbidity and mortality, translating to 362 maternal deaths per 100,000 live births (Ameh et al., 2016). Bungoma County has had higher MMR of 488 deaths per 100,000, far exceeding the SDG Target 3.1 of 70 per 100,000 live births (WHO, 2015; KDHS, 2014; DHIS, 2015).

Obstetric emergencies are life-threatening health problems for pregnant women and babies arising during pregnancy, labour and birth (WHO, 2016). Globally, 10.7 million women died from obstetric emergencies in two decades (Geleto et al., 2018), with nearly 15% of pregnancies ending in fatal perinatal complications. While maternal mortality rates have dropped recently, changing health needs, growing public expectations, and ambitious health goals are raising the bar for health systems to produce better outcomes (Kruk et al., 2018), justifying the need for strengthening BCRH's emergency response through non-clinician integration.

Non-clinicians are hospital personnel who interact with patients but do not dispense medical advice or carry out procedures (Brookings, 2014). They work behind the scenes forming an important support system without which emergency response would be ineffective (NAIC, OWEs Survey, 2021). About half

of all healthcare workers are non-clinical staff including patient navigators, human resource officers, record officers, maintenance officers, registration clerks, drivers, cleaners, cooks, accountants, and procurement officers.

This study focused on non-clinicians along the continuum of care for pregnant and labouring mothers: hospital administrators, human resource staff, procurement officers, supplies officers, gatekeepers, cleaners, drivers, registration clerks, patient navigators, and accountants working in antenatal clinic, labour ward and postnatal ward where obstetric emergencies occur.

Evidence demonstrates that investment in emergency obstetric care can significantly reduce avoidable maternal and newborn deaths. This study investigated the effect of health system factors on integration of non-clinicians in obstetric emergency response at BCRH.

II. STUDY AREA AND METHODOLOGY

2.1 Study Area

The study was conducted at Bungoma County Referral Hospital (BCRH), a level five public health facility under Bungoma County Government. Bungoma County, one of three counties in former Western Province, neighbours Kakamega, Mt Elgon, Busia, Uganda, and Trans-Nzoia, covering 3,032 km² with a population of 1,670,570 (2019 census).

BCRH has 223 bed capacity and approximately 800 health personnel (doctor-to-population ratio 1:6.7, nurse-to-population ratio 1:6), with non-clinicians forming nearly half the workforce. It operates 24-hour emergency medical and trauma services, blood transfusion satellite, caesarean delivery section, imaging services, and trauma care. The maternity unit serves approximately 600 mothers monthly and is a referral center for all Bungoma County health facilities.

Research was conducted in maternal and newborn departments: Antenatal Clinic (ANC), Maternity ward, Postnatal ward, and Gynaecological ward (Female ward), where obstetric emergencies are handled.

2.2 Study Design

A cross-sectional descriptive survey design was employed to describe, explain and validate various aspects of the phenomenon, providing a statement of affairs with the researcher having no control over variables.

2.3 Study Population

The study captured non-clinicians working in aforementioned departments from January to May 2023: hospital administrators, accountants, registration clerks, gatekeepers, drivers, procurement and supplies officers, and cleaners.

2.4 Sample Size Determination

The quantitative study population of non-clinicians was estimated at 176. Sample size was calculated using Fischer's formula (1998):

$n = z^2(pq)/e^2$

Where: n = Sample size; z = 1.96 (95% confidence level); p = 0.5; q = 0.5; e = 0.05

$n = (1.96)^2(0.5)(0.5)/(0.05)^2 = 93$

Table 1: Sampled Non-Clinicians in BCRH

S/No	Non-clinicians	Number
1	Hospital administrators	1
2	Human resource Officer	1
3	Accountant	1
4	Procurement & supplies	4
5	Clerical officers	14
6	Drivers	7
7	Gate keepers	14
8	Cleaners	45
9	Records officers	4
10	Medical Engineer	2

2.5 Sampling Procedure

Purposive sampling selected participants on duty during data collection.

2.6 Data Collection Procedures

2.6.1 Quantitative Data Collection

Ninety-three non-clinicians were interviewed using semi-structured open-ended questionnaires with research assistants to assess: competency to identify obstetric emergency signs and symptoms, available resources and capacity, and challenges encountered in integration.

2.6.2 Qualitative Data Collection

Key Informant Interviews (KII) were conducted with hospital managers and policy makers including Medical Superintendent, Nursing Officer in charge of hospital and Obs/Gyne departments, gynaecologist, hospital administrators, human resource officer, and procurement officers to establish factors facilitating or limiting integration.

Focused Group Discussions (FGD) validated structured interview outcomes, as integrating non-clinicians in obstetric emergency response was a new initiative requiring questions not easily answered in written surveys.

The cross-sectional study used in-depth interviews with 93 non-clinicians from mentioned departments. Verbal permission was obtained from Medical Superintendent, administrator, and Nursing Officer in charge. Participants were conveniently selected based on availability and willingness.

Interviews were conducted in English and/or Kiswahili by trained research assistants using interview guides capturing information on knowledge about obstetric emergencies, signs, symptoms, causes, attitudes about integration, experiences, fears, and decision-making. Interviews were scheduled to avoid interfering with daily activities and were audio-recorded with consent. Five research assistants and two guides conducted interviews.

2.7 Data Analysis

Upon reaching saturation, data was checked, cleaned, edited, entered into Excel database, and analyzed using SPSS version 22.0 through descriptive and inferential statistical analysis.

III. RESULTS AND DISCUSSION

Table 2:Linear Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of Estimate
1	.475[a]	.226	.222	.45563

Note. [a]Predictors: (Constant), Health System Factors

Table 3: ANOVA Results

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	10.608	1	10.608	51.099	.000[b]
Residual	36.329	175	.208		
Total	46.937	176			

Note. [a]Dependent Variable: Integration of Non-clinicians in Emergency Obstetric Response. [b]Predictors: (Constant), Health System Factors

Table 4: Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	Beta	Std. Error	Beta		
(Constant)	1.942	.335		5.801	.000
Health system factors	.552	.077	.475	7.148	.000

Note. Dependent Variable: Integration of Non-clinicians in Emergency Obstetric Response

The model summary showed R^2 value of 0.226, indicating health system factors explained 22.6% of variation in integration process in emergency obstetric response at BCRH.

The ANOVA test was statistically significant ($F = 51.099$, $p = 0.00$), indicating the linear regression model had good fit and was appropriate for

determining linear association between health system effects and non-clinician integration in emergency obstetric response.

Health system factors had standardized coefficient Beta of 0.475 ($t = 7.148$, $p < 0.05$), implying a unit change in health system would result in 47.5% increase in ability to integrate non-clinicians in emergency obstetric response system.

IV. CONCLUSION

Findings indicate health system factors significantly influenced non-clinician integration in obstetric emergency response at BCRH. It is critical to adopt a dual approach maintaining inventory and observing maintenance of health systems including technology and infrastructure to reinforce ongoing digital transformation in healthcare, particularly at BCRH and throughout Bungoma County.

According to Kraus et al. (2021), this aligns with evolving healthcare information management landscape where combination of digital and hard copy records is increasingly recognized as efficient and comprehensive.

Equipping non-clinical staff with essential skills ensures optimal utilization of available health system resources, directly contributing to improved patient outcomes and overall system efficiency (WHO, 2018).

V. RECOMMENDATIONS

1. The County Government of Bungoma should allocate and ring-fence more budgetary resources to procure modern and necessary health support systems enhancing non-clinician integration in obstetric emergency response at BCRH.
2. The National Government should exempt taxation on health systems, especially machinery and software, making them affordable for Bungoma County Government and other counties.
3. Non-clinical staff should be trained regularly on utilization of new software and machinery, reducing accidents from their usage while enhancing efficacy and effectiveness.

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