



Competence of Health Care Providers on Clinical Management of Myocardial Infarction in Selected Hospitals with Intensive Care Unit Western Kenya

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Abstract

Background: The capacity of healthcare providers to execute an accurate initial assessment is crucial for recognizing the urgency and treatment needs of patients and for creating baseline data from which any changes in patient status may be monitored. In Western Kenya, there is little evidence of studies carried out on the competence of healthcare providers in the clinical management of myocardial infarctions thus this study's main aim was to investigate the competence of healthcare providers in the clinical management of myocardial infarctions. **Material and Methods:** A cross-sectional analytical study design was used. The study population comprised a total sample of 114 healthcare providers. A structured questionnaire and observation checklist were used. Participants will be picked using a systematic sampling method for those who meet the inclusion criteria. The sample size was determined using Fisher's Method. The data collected was compiled using SPSS software version 22. The data was analyzed through the application of descriptive statistical analysis. **Findings:** Variables that positively influenced the competency are specialization (AOR: 15.1; 95% CI: 2.6 – 87.3; $p = 0.002$), knowledge (AOR: 5.4; 95% CI: 1.1 – 26.5; $p = 0.04$) and having a protocol in patient's file (AOR: 10.2; 95% CI: 0.9 – 112.6.5; $p = 0.06$), although the latter was marginally statistically significant. Healthcare provider's qualification (KRCHN) (AOR: 0.04; 95% CI: 0.008 – 0.219; $p = 0.002$), filling of the protocol (AOR: 0.03; 95% CI: 0.001 – 0.585; $p = 0.02$) and use of high dose heparin as opposed to the use of other thrombolytic like Metalase (AOR: 0.1; 95% CI: 0.01 – 0.63; $p = 0.02$) were all negatively associated with healthcare providers competency. **Recommendation/Conclusion:** The study recommends the need of specialized training and knowledge advancement for health care providers on critical care nursing. This study found marginal statistical significance between the factors that influence competence among healthcare providers on clinical management of myocardial infarction.

Keywords: *Myocardial Infarction, Intensive Care Unit (ICU), Competence, Clinical Management, Healthcare Providers*

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1.0 Introduction

Acute myocardial infarction syndrome can be caused by a wide variety of illnesses and circumstances, and a simple history and physical examination are never enough to rule them all out. The acute coronary syndrome can be reliably predicted, however, by high-risk factors including left-arm radiation, sub-sternal placement, and a history of

myocardial infarction (Hollander, Than, & Mueller, 2016)

The capacity of healthcare providers to execute an accurate initial assessment is crucial for recognizing the urgency and treatment needs of patients and for creating baseline data from which any changes in patient status may be monitored. It has been

reported that bad patient outcomes, including death, have resulted from a lack of early, correct assessment (Basu & Sharma, 2016).

Chest pain is a symptom of many etiologies, some of which have high morbidity and mortality (Roche, Gardner, & Lewis, 2015). Before chest pain is adequately treated the actual underlying cause needs to be identified. Broadly the causes of chest pain are differentiated by whether the pain is thought to be cardiac or non-cardiac in origin (Al-Khatib *et al.*, 2017). The cardiac causes can be coronary artery-related pathologies and cardiac structure or functional pathologies. Coronary artery related conditions include angina pectoris, unstable angina or myocardial infarction. The heart structural and functional pathologies that can cause chest pain include pericarditis, pulmonary embolism, mitral valve prolapse; aortic stenosis, aortic regurgitation and cardiomyopathy. The Relief of symptoms after nitroglycerine administration is not specific for anginal pain as previously thought because it is also reported in other causes of chest pain (Roffi *et al.*, 2016). It has also been established that the diagnostic performance of chest pain characteristics for suspected myocardial infarction is limited (Roffi *et al.*, 2016). In Western Kenya, there is an increase in morbidity data, the total number of patients who have been hospitalized with myocardial infarction in selected hospitals from 2015 -2020 is 102 and therefore there is a need for the researcher to investigate the competency of healthcare providers as one of the factors leading to morbidity on the management of myocardial infarction in selected five hospitals in western Kenya.

3.0 Methodology

3.1 Study Design

This study employed a cross-sectional approach to research whereby both qualitative and quantitative data were used. Aga Khan Hospital Kisumu, Jaramogi Oginga Odinga Referral and Teaching Hospital, Kisii Teaching and Referral Hospital, and

Kakamega Teaching and Referral Hospital were the four healthcare facilities selected in Western Kenya where the study was conducted since they had intensive care units that were admitting acute myocardial infarction patients. The study population comprised healthcare providers working in the four facilities working in the critical care units who had worked for more than six months and patient files from medical records between 2017-2020, thus registered nurses, doctors, clinical officers and patients filed in medical records. Random sampling method was used to select four hospitals in western Kenya among health facilities and data has shown that receive more MI patients. Participants were identified using a systemic sampling method whereby participants who had worked for less than six months in the ICU were excluded from the study with the help of the ICU in charge. The census method was used to select patients' health records with MI from 2017-2021 in the four health facilities.

The study sample was determined using fisher's method using the formulae $n = z^2 pq / e^2$, but since the study had less than 10,000 participants, an alternative formula modified by Fischer used (Mugenda & Mugenda, 2003), whereby;

$$n = \frac{z^2 pq}{e^2} + n/N$$

Where,

n = Desired sample population

n = Desired sample size

N = The estimate of population size

$384.16 / (1 + 384.16 / \text{no of staff})$

$$n = \frac{384}{\left[1 + \left\{\frac{(384-1)}{144}\right\}\right]}$$

$$n = 384 / (1 + 384/144)$$

$$= 384 / 3.67$$

$$= 104.63$$

The sample size was added by 10% as follows

$$n = 104 + \left\{\frac{10}{100 \times 104}\right\} = 104 + 10$$

$$n = 114$$

The sample was 114.

A structured questionnaire was used for doctors, clinical officers and nurses working

at each ICU and an observation checklist was used to assess healthcare provider skills in clinical management of MI. The level of competence regarding clinical management strategies of myocardial infarction, medical and surgical management of MI and checklist was used to assess the competence of health care providers. Data was collected for a period of three months between 12th April to 12th July 2022. Data was entered and analyzed using Statistical Package for Social Services (SPSS) version 22. Descriptive statistics were used to examine the data. Descriptive and regression analyses were used to look at how different medical professionals handle the clinical management of myocardial infarction. To avoid ethical consideration issues, codes were used to identify the individual respondents to ensure privacy and anonymity (Creswell & Creswell, 2014). Further permissions were sought from the university and the National Commission of Science, Technology and Innovation (NACOSTI) with reference number 698514.

Results

4.1 Socio-Demographic Characteristics of Respondents

The study population comprises a total sample of 114 who were interviewed and all questionnaires were completed and used for analysis. Most of the participants were in the middle age group of 30 – 39 years (51.8%) with more than a third being younger than 30 years (36.0%). There were more females (55.5%) than males (44.7%). Regarding participants' qualifications, more than half (53.5%) were KRCHN diploma holders, a quarter were (25.4%) and attained undergraduate degrees in nursing while 18.4% were doctors (Table 4.1). A higher proportion (42.1%) had worked for 1 – 5 years compared to 33.3% who had been practising for between 6 – 10 years. The majority (71.1%) had worked in ICU for half to five years with slightly more than a quarter (26.3%) having been in the same department. More than a third (38.6%) had specialized most of who had critical care specialization (54.6%) and accident and emergency (25.0%).

Table 1: Socio-demographic Characteristics

Variable	Categories	n	%
Age group in years	20 – 29	41	36.0
	30 – 39	59	51.8
	40 – 49	11	9.6
	≥ 50	3	2.6
Gender	Male	51	44.7
	Female	63	55.3
Academic Qualification	KRCHN	61	53.5
	BScN	29	25.4
	MScN	1	0.9
	Doctor	21	18.4
Length of time in practice in years	RCO	2	1.7
	1 – 5	48	42.1
	6 – 10	38	33.3
	11 – 15	19	16.7
	16 – 20	5	4.4
Length of time while working in ICU in years	≥ 20	4	3.5
	½ – 5	81	71.1
	6 – 10	30	26.3
	11 – 15	2	1.7
Has specialized qualification	16 – 20	1	0.9
	Yes	44	38.6
Specialization	No	70	61.4
	Accident and Emergency	11	25.0
	Critical Care	24	54.6
	Others	9	20.4

4.2 Healthcare Provider Factors Associated with Competency In the Management Of Mi Patients

Table 2 shows results on determinants of competency of healthcare providers in the management of MI patients after controlling for confounding variables. All independent variables in the bivariate logistic regression with p values ≤ 0.2 were included in the multivariate logistic regression model controlling for confounding variables to determine the healthcare provider's competence in the management of MI patients. Independent variables that positively influence competency are specialization

(AOR: 15.1; 95% CI: 2.6 – 87.3; p = 0.002), knowledge (AOR: 5.4; 95% CI: 1.1 – 26.5; p = 0.04) and having protocol in patient's file (AOR: 10.2; 95% CI: 0.9 – 112.6.5; p = 0.06), although the latter was marginally statistically significant. Healthcare provider's qualification (KRCHN) (AOR: 0.04; 95% CI: 0.008 – 0.219; p = 0.002), filling of the protocol (AOR: 0.03; 95% CI: 0.001 – 0.585; p = 0.02) and use of high dose heparin as opposed to the use of other thrombolytic like Metylase (AOR: 0.1; 95% CI: 0.01 – 0.63; p = 0.02) were all negatively associated with healthcare providers competency.

Table 2: Healthcare Provider Factors Associated with Competency

Determinant	Estimate	COR	AOR	95% CI	P value
Qualification: KRCHN vs Other cadres	-3.20	0.1	0.04	0.008 – 0.219	0.0002
Years of experience: 1 – 5 vs > 6	0.96	0.6	2.6	0.5 – 13.2	0.25
Length of time in ICU: 0.5 – 5 vs ≥6 years	-0.12	0.5	0.8	0.2 – 3.9	0.81
Specialization: Yes vs No	2.71	2.2	15.1	2.6 – 87.3	0.002
Has done life support course: Yes vs No	-1.73	4.2	0.2	0.003 – 9.541	0.39
BLS vs Others	1.58	3.4	4.8	0.2 – 121.5	0.34
ACLS vs Others	1.02	3.4	2.8	0.5 – 14.9	0.24
Has AMI protocol in department: Yes vs No	1.87	11.6	6.5	0.6 – 69.0	0.12
Always/Very often encounters AMI patients vs Sometimes / Rarely or Never	-1.58	3.2	0.2	0.03 – 1.51	0.12
Knowledgeable vs Not knowledgeable	1.69	8.4	5.4	1.1 – 26.5	0.04
MI pathway protocol in file: Yes vs No	2.33	3.2	10.2	0.9 – 112.6	0.06
Pathway protocol filled: Yes vs No	-3.58	4.9	0.03	0.001 – 0.585	0.02
Type of thrombolytic used: High dose Heparin vs Alteplase, Metylase and Streptokynase	-2.53	0.1	0.1	0.01 – 0.63	0.02
Time patient thrombolized: 24 hours after the onset of symptoms vs 36 hours	1.39	4.8	4.003	0.8 – 23.8	0.13
Outcome after use of thrombolytics: Recovered and Discharged vs Reinfarction / Died	-0.63	4.0	0.5	0.1 – 3.2	0.49
The outcome for those where PCI	-0.02	2.7	1.0	0.1 – 7.4	0.98

was used for patients not qualified: Cardiac perfusion Recovered/discharged vs Long-stay in hospital / Died					
What was done where PCI was not available: Conservative management vs Referral / Thrombolytics / Anti-coagulant	-0.95	0.2	0.4	0.04 – 3.56	0.40

Discussion

In this study, even though specialization, knowledge and protocols in patient files had a positive influence on the competence of healthcare providers in the management of myocardial infraction, 61.4% of the participants did not have specialized training while only 23.3 could correctly mention abnormality in lead VI to V6 as both ST depression and T wave inversions. Similar results were observed in research conducted in Turkey and North Cyprus, wherein 79% of nurses had the knowledge to correctly identified 12 lead ECGs displaying a STEMI pattern; however, no nurses were able to fix the proper leads, identify the anatomical location, or determine the amount of ST elevation (Pelter *et al.*, 2016). Academic qualifications and the use of high-dose heparin negatively influenced the competency of healthcare providers in the management of myocardial infraction, this is due to the introduction of thrombolysis (Cador & Weber, 1996).

Conclusion

The study’s aim was to asses the competence of clinical management of MI by healthcare providers. Results of this study showed that majority of the participants (61.4%) did not have specialized training. Only 23.3% correctly mentioning abnormality in lead VI to V6 as both ST depression and T wave inversion. This study found marginal statistical significance between the factors that influence competence among healthcare providers on clinical management of myocardial infraction. Despite the findings, healthcare providers qualification, filling of the protocols and use of high dose heparin as opposed to the use of other thrombolytic like

Metalise had a negative impact on competence among healthcare providers on clinical management of myocardial infraction.

Recommendation

The study recommends the need of training opportunities for health care providers on Critical care nursing and other advanced life support courses such as ACLS, ATLAS, PALS and 12 Lead ECG interpretations to help in the early identification of MI and reduced mortality and thus improve health care provider competence on Management of MI.

Limitation

Since the sample size was so small, no generalizations could be made. This constraint was addressed by the researcher using the census approach.

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