



Institutional Factors Associated with Effective Cardiopulmonary Resuscitation among Health Workers at a County Referral Hospital in Kenya

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Summary

BACKGROUND

Cardiopulmonary resuscitation (CPR) is a very critical practise in the healthcare setting. WHO recommends CPR be initiated within the first three(3) minutes of an arrest. By 2015, mortalities related to cardiac arrest were estimated to be 300, 000 to 370 000 annually[1].

AIM

This study aimed to assess the above factors at a County Referral Hospital in Kenya.

METHODOLOGY

A descriptive cross-sectional design was adopted with a permission from the Institution to collect data. A total of 175 health care providers aged between 18-39 years and had served at the Nakuru County Referral Hospital for more than 6 months participated in the study. Students and staff on internship were excluded. Self- administered questionnaires were used. To gurantee their validity and checklists were practical, a pre-test was done at Thika Level 5 hospital since it shared the same characteristics. Ambiguous questions were rephrased. Data analysis was done using SPSS computer software, version 24 while demographic data were analysed by descriptive statistics.

RESULTS

The study reported inadequate staffing. The response was 92.5% with a majority 69.1 % (n=112) being females. Basically (89.5%) of them were nurses, a profession where females are the majority. Respondents 18-29 years were 36.4% (n=59) while those aged between 30 and 39 years accounted for 32.1%(n=52). The mean age was 32 years. The vast majority of respondents were young (<40 years). Some respondents (51.9% (N=81), indicated that, they did not have all the necessary resources for CPR. Having a BLS/ACLS certificate (p=0.042), a refresher course in the last 2 years (p=0.029) and necessary resources (p=0.034) was significant. All respondents had the minimum required level of education for their profession, ie, 52.8% (n=85) had acquired a diploma in nursing while 31.7% (n=51) had a bachelor's degree. All cadres of health workers participated spreading out across the various departments at the study site. The medical ward had 25.9% (n=42) while 24.7% (n=40) worked in the surgical ward.



CONCLUSION

The study Confirmed that, institutional factors influence effective Cardiopulmonary Resuscitation. Effective CPR improves the patients' outcomes reducing mortality related to cardiac arrest (CA). Early detection of cardiopulmonary arrest and initiation of CPR greatly influence the outcomes of CPR. Lack of debriefing following CPR among Health workers contribute to ineffective and repeated mistakes when conducting CPR. Understaffing in the hospital setting limits the number of personnel who assist in the practice. The fatigue experienced by the rescuer prevents optimal chest compression. The sub-Saharan region lack documented information to enlighten the public about the problem.

RECOMMENDATION

Hospital administrators should guarantee the provision of both human and material resources. Policy makers ought come up with policies to ensure that, all staff members are trained on CPR protocols.

Keywords: Cardiopulmonary resuscitation, Health workers, Outcomes, Return of spontaneous circulation.

[*Afr. J. Health Sci.* 2022 35(1):11-17]

Introduction

Cardiac Arrest (CA) has been recorded to be a health challenge worldwide. The mortalities related to cardiac arrest are high with an estimate of 300 000 to 370 000 annually[1] CPR refers to a sequential chain of measures taken to save and maintain the quality of life of a patient following CA [2].

Research has confirmed that early detection of cardiopulmonary arrest and early initiation of CPR greatly influence the outcomes of CPR therefore. The World Health Organization (WHO) recommends that CPR be initiated within the first three(3) minutes of an arrest to increase the chances of survival and reduce complications related to cardiac arrest[3].

A study done in England revealed that, out of the 828 patients who had undergone CPR only 162 patients survived right to discharge. Among those who survived to discharge;

5 of them went to a vegetative state.

51 died a few days following discharge.

In the UK, out of the 948 patients who were resuscitated only;

32.2% were discharged home

24.5% of the ones discharged died within the same year of discharge.4

In the US, a study revealed that (29%) of the patients who had been discharged to home

following cardiopulmonary resuscitation only (54%) survived up to 31 months following the discharge [5].

The study confirmed the Institutional factors play a vital role in cardiopulmonary resuscitation outcomes. Factors such as policies and resuscitation protocol have an impact on the outcome of resuscitation for critical care patients.

As such, the resuscitation team needs to be updated periodically to enable efficiency in CPR hence improving CPR outcomes [6, 7]

Lack of debriefing following CPR among Health workers also contributed to ineffective CPR which led to a repetition of mistakes among them when conducting CPR. Understaffing in the hospital setting limited the number of personnel who assisted in CPR. The fatigue experienced by the rescuer prevented optimal chest compression affecting the quality and outcomes of CPR.

According to the resuscitation registry in the US, only 17.0% of the total cases of CA survive after CPR until they are discharged out of the hospital. These trends cannot be explained in the sub-Saharan region for lack of documented information to enlighten the public about the problem.

Similarly, very few studies have been researched about CPR in Kenya [8]. The ones that have been conducted in Kenya had majorly focused on paediatrics cardiopulmonary resuscitation [9].



At the Nakuru County Referral Hospital, it was observed that as much as CPR was performed, health workers did not follow the recommended guidelines that were prescribed by AHA. Incidentally, there was no documented data on the practice as well as outcomes of cardiac arrest.

Even though effective CPR is important in the clinical setup, institutional factors that determine CPR remain unexplored. This study, therefore, seeks to assess the institutional factors that determine effective cardiopulmonary resuscitation among health care providers at Nakuru County Referral Hospital.

MATERIALS AND METHODS

Study design and setting

The study adopted a descriptive cross-sectional design. This was carried out at Nakuru County Referral Hospital critical care unit, Accident and Emergency (A&E) department, medical ward, surgical ward, paediatrics wards and theatre.

Inclusion and Exclusion Criteria

All health care providers who had worked in the department for more than 6 months were considered for the study. All students and personnel on internship were excluded from the study.

Study population, Sampling Technique and Sample Size

A census sampling technique was adopted that included 175 respondents.

Data Collection

Permission was sought from Nakuru County Referral Hospital to collect data from the staff. Self-administered questionnaires were used to collect quantitative data from the respondents. The entire data collection process took 8 weeks.

Validation of Tools

To ensure that the research questionnaires were valid and checklists were practical, a pre-test was done at Thika Level 5 hospital. This hospital was preferred since it shares the same characteristics with Nakuru County Referral Hospital. Ambiguous questions were rephrased.

Data Analysis and Presentation.

Data analysis was done using SPSS computer software, version 24 for descriptive analysis to generate frequencies, percentages and tabulations. Demographic data were analysed using descriptive statistics. Thereafter, conclusions were made from the findings.

Ethical Considerations

A proposal was submitted for vetting and validation by the Nairobi Hospital Research Ethics, thereafter, a research permit was obtained from National Commission for Science, Technology and Innovation (NACOSTI). Permission to collect data was also obtained from Nakuru County Referral Hospital administration. This study was conducted according to the guidelines of the Helsinki declaration.

RESULTS

A total of 162 health workers working at Nakuru County Hospital participated in the study. This represented a 92.5% response rate.

Socio-Demographic Characteristics of Respondents

Data on the respondent's gender, age, level of education, profession and department were collected. As presented in (*Table 1 next page 14*), results show that the majority 69.1 % (n=112) were females. This may be attributed to the fact that the majority (89.5%) of the respondents in the study were nurses, a profession where females are the majority. Respondents, 36.4% (n=59) were aged between 18-29 years while those aged between 30 and 39 years accounted for 32.1% (n=52) of the sample. The mean age was 32 years. This result suggests that the vast majority of respondents were young (<40 years).

Slightly above half, 52.8% (n=85) of the respondents had acquired a diploma in nursing while 31.7% (n=51) had acquired a bachelor's degree. The findings, therefore, show that all the respondents had acquired the minimum required level of education for their profession. The vast majority 89.5% (n=145) of respondents were nurses. The results show that all cadres of health workers were involved in the study. A quarter of the respondents 25.9% (n=42) worked in the medical ward while 24.7% (n=40) worked in the surgical ward. This shows that respondents in the study were well spread out across the various departments in the study site.



Table 1: Socio-Demographic Characteristics of Respondents

Variable	Category	Frequency (n)	Per cent (%)
Gender	Male	50	30.9
	Female	112	69.1
Age (years)	18-29	59	36.4
	30-39	52	32.1
	40-49	31	19.2
	50-59	20	12.3
Education	Diploma	85	52.8
	Higher Diploma	17	10.5
	Degree	51	31.7
	Masters	8	5
Profession	Nurse	145	89.5
	Clinical Officers	4	2.5
	Medical officers	8	4.9
	Anaesthetist	5	3.1
Department	ICU	30	18.5
	Medical ward	42	25.9
	Surgical Ward	40	24.7
	Accident & Emergency	28	17.3
	Paediatric Ward	9	5.6
	Theatre	13	8

Institutional Factors and CPR

The respondents were asked to indicate the presence or absence of various institutional items, infrastructure and activities. The majority 71.6% (n=116) indicated that they did not have a BLS/ACLS certificate. Similarly, 87% (n=141) indicated that they had not received refresher courses in the previous two years. Almost half 53.1% (n=86) disclosed that, they had a resuscitation team in their department. However, 56.2% (n=91) stated that, the staffing was inadequate

and 53.7% (n=87) indicated that they did not have all the necessary resources for CPR. Resources that were lacking included a defibrillator, Ambu bags, laryngoscope, medication and CPAP machines. The majority 67.9% (n=110) of respondents reported that there were no debriefing sessions after a CPR. In addition, 68.5% (n=111) lamented that, their institution did not organise continuous professional development sessions to refresh health workers' CPR knowledge and skills.



Table 2: Institutional Factors and CPR

Item or activity	Response	Frequency (n)	Percentage (%)
BLS/ACLS certificate	Yes	46	28.4
	No	116	71.6
Refresher course in the last 2 years	Yes	21	13.0
	No	141	87.0
Resuscitation team	Yes	86	53.1
	No	76	46.9
Adequate staffing	Yes	71	43.8
	No	91	56.2
All necessary resources	Yes	75	46.3
	No	87	53.7
Debriefing sessions after CPR	Yes	52	32.1
	No	110	67.9
Continuous professional development sessions	Yes	51	31.5
	No	111	68.5

The researcher conducted a multiple regression tests between institutional factors and CPR practice. Results in *Table 3* show that having a BLS/ACLS certificate ($p=0.042$), a refresher course within the last 2 years ($p=0.029$) and necessary resources ($p=0.034$) were significant. The beta values show that, having a BLS/ACLS certificate ($\beta =0.521$) was the most influencing factor followed by refresher course ($\beta =0.448$) and resources ($\beta =0.425$). Respondents who had a BLS/

ACLS certificate and those who had a refresher course within the last 2 years were 5.2 times more likely to have good CPR practice. Relatively, those who indicated that staffing was adequate were more likely to have good CPR practice.

Results in *Table 3* show that having a BLS/ACLS certificate ($p=0.007$), a refresher course in the last 2 years ($p=0.000$) and necessary resources ($p=0.000$) were significant.

Table 3 Bivariate analysis of Institutional Factors and CPR practice

Item or activity	Chi-square value	Degrees of freedom	P-value
BLS/ACLS certificate	7.389	1	0.007
Refresher course in the last 2 years	37.915	1	0.000
Resuscitation team	2.060	1	0.151
Adequate staffing	0.204	1	0.652
All necessary resources	22.622	1	0.000
Debriefing sessions after CPR	2.441	1	0.118
Continuous professional development sessions	3.383	1	0.066

Results in *Table 4* show that having a BLS/ACLS certificate ($p=0.007$), a refresher course in the last 2 years ($p=0.000$) and necessary resources ($p=0.000$) were significant.

Item or activity	Chi-square value	Degrees of freedom	P-value
BLS/ACLS certificate	7.389	1	0.007
Refresher course in the last 2 years	37.915	1	0.000
Resuscitation team	2.060	1	0.151
Adequate staffing	0.204	1	0.652
All necessary resources	22.622	1	0.000
Debriefing sessions after CPR	2.441	1	0.118
Continuous professional development sessions	3.383	1	0.066

Significant variables in the bivariate analysis (*Table 4*) were added to a binary logistic regression. Results in *Table 5* show that necessary resources ($p=0.000$) remained significant. The beta coefficient

shows that a unit change of necessary resources would improve CPR skills by 1.746. The odds ratio indicates that respondents with necessary resources were 4.174 times more likely to have good CPR skills.

Table 5 Multivariate analysis of Institutional Factors and CPR Skills

Step 1a	B	S.E.	Wald	df	Sig.	
BLS_ACLS_certificate_	.078	.432	.033	1	.856	1.081
Refresher_course_in_the_last_2_years	23.159	8769.874	.000	1	.998	1.1428
All necessary resources	1.746	.444	15.484	1	.000	4.174
Constant	-42.747	17539.748	.000	1	.998	.000



Discussion

The study found that, the majority of respondents neither had a BLS or ACLS certificate nor a refresher course in the previous 2 years. Although, there was a resuscitation team, inadequate staffing and resources was witnessed. Debriefing session and continuous professional development sessions were lacking. Regression analysis showed that, having a BLS or ACLS certificate, a refresher course previously (2 years) and the necessary resources was significant in influencing CPR practice.

This finding showed that the availability of the necessary resources used during cardiopulmonary resuscitation influenced CPR practice. This concurs with a study conducted by [7] in the UK where the researchers indicated that, lack of adequate staffing in the hospitals contributed to ineffective CPR [7]. Also in agreement with that of [10] in Botswana whereby hospital units sometimes had very few staff members and did not have fully equipped emergency trolleys and/ or other equipments. No CPR teams and neither policies nor guidelines existed. [11] in the USA conducted a study and found that, institutional factors such as understaffing, lack of provision of basic requirements affected the quality of survival rate and outcomes of cardiopulmonary resuscitation.

Conclusion

The study concluded that institutional factors such as lack of BLS or ACLS certification, refresher courses, staffing and necessary resources were associated with poor CPR practice among respondents.

Recommendation

- Strategic management need to lobby for an increase in the number of staff, basic equipment both general and medical supplies in their hospitals to facilitate effective CPR.
- Policy makers set a threshold to ensure that, all staff have been trained on CPR.

Acknowledgement

I wish to thank the Jomo Kenyatta University Nursing department staff for their insightful comments that helped in improving my work. Special thanks to all my respondents for accepting to participate in this study.

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