

Evaluation of Cardiopulmonary Resuscitation Knowledge and Its Impact on Practice Among Clinicians at a County Referral Hospital in Kenya

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Abstract

Background: Cardiopulmonary resuscitation (CPR) is a life-saving emergency procedure that ensures oxygen and blood supply in a victim who have had heart and/or breathing stoppage thereby maintaining the viability of vital organs until professional help arrives. All the health care workers should have adequate knowledge and skills to perform the procedure with ease in case of cardiac arrest. Sudden cardiac death in the western countries ranges from 300,000 to 400, 000 annually. This represents 0.36 to 1.28 per 1000 population in Europe and the United States. American Heart Association approximates that 100000 to 200000 adult lives could be saved annually if CPR is initiated early enough. The outcome of a patient with a cardiac event is determined by the knowledge and skills of the resuscitator and the promptness in which the procedure is instituted and the nature of the patient condition among others. **Objective:** To evaluate CPR knowledge and its impact on practice amongst clinicians working at Coast General Hospital, Mombasa Kenya. **Methods:** A descriptive cross sectional study was carried at the hospital in 2015 where a questionnaire was administered to 91 nurses, 27 clinical officers and 24 doctors. **Results:** The study comprised of 142 clinicians; 63.8% (n=90) nursing officers, 19.1% (n=27) clinical officers and 17.1% (n=24) medical officers. Their levels of training were; 57.4% (n=81) diploma, 25.5% (n=36) bachelors degree, 12.8% (n=18) higher diploma, 2.8% (n=4) certificate, and 1.4% (n=2) masters degree. The level of training was significant ($P =0.04$) on the way they rated their CPR practices. It's only a quarter of the clinicians who trained CPR at their respective colleges. A majority 68.8% (n=97) had trained on CPR and the training was significant ($P=0.000$) on the way they rated their CPR practices. Three quarters 75.9% (n=104) were scored below average on specific aspects on CPR knowledge. This was significant ($P =0.001$) on their rating of CPR practices. A third 33.3% (n= 47) of the clinicians had taken more than three years since their last training. This significantly ($P =0.000$) affected the way they rated their CPR practices. **Conclusion:** The CPR practices at Coast General Hospital are significantly affected by the clinicians' knowledge. The hospital administration needs to plan for frequent refresher trainings for all the staff. Professional bodies need to encompass CPR CPD points as a requirement to renewing practicing licences.

Keywords: Cardiopulmonary Resuscitation (CPR), Cardiac arrest, Clinician, Coast General Hospital, CPD (continuing profession development)

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1. INTRODUCTION

Cardiopulmonary resuscitation (CPR) is a life-saving emergency procedure that ensures oxygen and blood supply in a victim who have had heart and/or breathing stoppage thereby maintaining the viability of vital organs until professional help arrives (Field et al. 2010). Patients suffering cardiac disorders, respiratory disorders, metabolic disorders and others like drowning, drug effects and electrocution may benefit from CPR (Banerjee et al.2007).The outcome of a patient with a cardiac event is determined by the knowledge and skills of the resuscitator and the promptness in which the procedure is instituted and the nature of the patient condition among others (Lenjani et al. 2014). Health care providers should be trained on CPR in readiness for any cardiac arrest incident at work place, home or in the community (Robert et al. 2010). The health providers should be trained during their professional studies and thereafter follow-up refresher courses have shown to be critical in skills and knowledge retention (Avisar et al. 2013). CPR retraining must be time specific to avoid knowledge and skills decay (Bhanji et al. 2010). The quality of the resuscitation skills determines the outcome (Bhanji et al. 2010) and implementation of CPR measures within the gold minutes may save many lives (Lenjani et al. 2014). This study sought to determine the cardiopulmonary resuscitation knowledge and its effect on the practice among Clinicians at a Kenyan county referral hospital.

2. Methods

A descriptive cross sectional study design was used to carry out the study at Coast General Hospital in Mombasa City Kenya in 2015. The study participants were doctors, nurses and clinical officers working in medical unit,

surgical unit, maternity, critical care unit, theatres, renal unit and the accident and emergency department. After stratifying them, simple random sampling was used to get 102 nurses, 28 doctors and 27 clinical officers. Practicing and consenting clinicians were included to participate. Medical and nursing students were excluded plus other health workers. A structured questionnaire was administered to the clinicians to gather information on knowledge acquisition, retention and practice. Study instruments were pretested in paediatric wards. Data collected was entered, cleaned and analysed using Statistical Package for Social Science (SPSS) version 20.0. Results were expressed in frequencies and presented in tables, graphs and charts. Chi-square and Fisher's exact statistical test were used to test for significance. Level of significance was set at a p value of less than or equal to 0.05. The study received ethical approval from Kenyatta National Hospital/University of Nairobi (KNH/UON), Ethics and Research Committee. Permission was granted by Coast General Hospital administration and written informed consent was sought from all study participants before participation.

3.0 RESULTS

3.1 Demographic characteristics

3.1.1 Cadre Distribution: More than half of the respondents 63.8 % (n=90) were nurses, 19.1% (n=27) were clinical officers while 17 % (n=24) were doctors (table 1).

3.1.2 Gender: A majority of the respondents 71.1% (n=101) were females (table 1).

3.1.3 Level of Education: A majority 57.4% (n = 81) of the respondents had diplomas, 25.5% (n =36) had bachelor's degree, 12.8% (n=18) had higher diploma, 2.8% (n=4) had certificate while 1.4% (n = 2) had master's degree (table 1).

3.1.4 Years of Experience:

Slightly above quarter 28.9% (n= 41) of the respondents had experience of between one to five years. The years of experience ranged from 1 year to 34 years. The mean years of experience were 13.04 years and a mode of 1 year attributable to the number of medical officer interns and clinical officer interns. Only 1.40% (n=2) of the clinicians had experience of over 30 years (table 1).

Table 1: Demographic characteristics

| VARIABLE | n | PERCENTAGE (%) |
|----------------------------|-----|----------------|
| Cadre Distribution | | |
| Nurses | 90 | 63.8 |
| Clinical Officers | 27 | 19.1 |
| Doctors | 24 | 17 |
| Gender | | |
| Male | 41 | 28.9 |
| Female | 101 | 71.1 |
| Level of Education | | |
| Master's | 2 | 1.4 |
| Bachelor's | 36 | 25.5 |
| Higher Diploma | 18 | 12.8 |
| Diploma | 81 | 57.4 |
| Certificate | 4 | 2.8 |
| Years of Experience | | |
| 0-5 years | 41 | 28.9 |
| 6-10 years | 17 | 12 |
| 11-15 years | 26 | 18.30 |
| 16-20 years | 26 | 18.30 |
| 21-25 years | 21 | 14.80 |
| 26- 30 years | 9 | 6.30 |
| 31-35 years | 2 | 1.40 |

3.2 Clinical Departments

A majority 56.7% (n= 80) of the respondents were from medical surgical departments, 16.3% (n=23) from accident and emergency, 19.1 % (n=27) from special units, and 7.8% (n=11) from maternity department (table 2).

Table 2: Clinical departments

| Variable | N | Percentage (%) |
|---------------------------|----|----------------|
| Department | | |
| Medical Surgical Unit | 80 | 56.7 |
| Accident & Emergency(A&E) | 23 | 16.3 |
| Special Units | 27 | 19.1 |
| Maternity Unit | 11 | 7.8 |

3.4. CPR Training

Majority 68.8% (n=97) of the respondents had trained on cardiopulmonary resuscitation (Table 3).

Table 3: CPR training

| Variable | n | Percentage (%) |
|--|----|----------------|
| Number of clinicians trained on CPR | | |
| Trained | 97 | 68.8 |
| Not Trained | 45 | 31.2 |

3.5. Where respondents got CPR training

Slightly more than a quarter 26.1% (n=37) of the respondents trained CPR in college, 31.7% (n=45) trained in a seminar, 23.9% (n=34) trained on job, 4.9% (n=7) trained privately while 4.9 % (n=7) trained in continuing medical education sessions (Table 4).

Table 4: Place of CPR training

| Variable | n | Percentage |
|------------|----|------------|
| Seminar | 45 | 31.7 |
| College | 37 | 26.1 |
| On the job | 34 | 23.9 |
| Private | 7 | 4.9 |
| CME | 7 | 4.9 |

3.6. Frequency of CPR training

A third 33.3% (n=47) of the respondents had trained on CPR more than three years, 10.6% (n=15) had trained within the last two years, while 24.1% (n=34) had trained within the last one year (Table 5).

Table 5: Frequency of CPR training

| Variable | n | Percentage (%) |
|---|----|----------------|
| Duration since last CPR training | | |
| 1 year | 34 | 24.1 |
| 2 years | 15 | 10.6 |
| More than 3 years | 47 | 33.3 |

3.7. Knowledge on CPR

Five questions were posed to the respondents on specific aspects of CPR. Those who answered above three questions right were rated above average, three questions average and below three questions below average. 75.9% (n=104) scored below average, 18.2% (n=25) average while 5.8% (n=8) scored above average (Table 6).

Table 6: Knowledge on CPR

| Variable | n | Percentage (%) |
|---------------|-----|----------------|
| Below average | 104 | 75.9 |
| Average | 25 | 18.2 |
| Above average | 8 | 5.8 |

3.8 CPR Self Rating

The clinicians were to rate their CPR practices as below average, average or above average. This question was used as the dependent variable by the researcher. 44% (n=62) rated themselves below average, 36.2% rated themselves average while 19.9 (n= 28) rated themselves above average (table 7).

Table 7: CPR Self Rating

| Self rating on CRP practices | Frequency | Percentage (%) |
|------------------------------|-----------|----------------|
| Below average | 62 | 44 |
| Average | 51 | 36.2 |
| Above average | 28 | 19.9 |
| Total | 141 | 100 |

3.9 Bivariate analysis

3.9.1 Association between level of education and self rating of CPR practices

There was a significant ($p = 0.014$) relationship between the level of education and CPR practice self rating. Respondents with higher levels of education and specialization rated their practices higher than those with low levels of education (table 8).

3.9.2 Association between clinical departments and self rating of CPR practices

There was a significant ($p=0.03$) relationship between clinical departments of work and CPR practices self rating. Respondents working in accident and emergency department rated their CPR practices higher than other departments (table 8).

3.9.3 Association between CPR training and self rating of CPR practices

There was a significant [$\chi^2(2, n = 141) = 21.483, p = 0.000$] relationship between CPR training and CPR practices rating. Clinicians who had CPR training rated their CPR practices higher than those not trained (table 8).

3.9.4 Association between duration of last CPR training and CPR practice rating

There was a significant [$\chi^2(6, n=141) = 34.945, p = 0.000$] relationship between duration since last CPR training and CPR practices self rating. Clinicians who had recent training rated their CPR practices higher than those who had trained more than three years (table 8).

3.9.5 Association between CPR knowledge and rating of CPR practices

Knowledge on CPR had a direct relationship ($p = 0.001$) with CPR practices self rating (Table 8). Respondents whose knowledge was scored above average rated their CPR practices higher than those who scored below average.

Table 8: Bivariate analysis

| Respondents characteristics | CPR Practice Self Rating | | | Test of Association | p-value |
|------------------------------------|--------------------------|------------|---------------|---------------------|---------|
| | Below average | average | Above average | | |
| Level of education | | | | | |
| Masters | 1(50.0%) | 0(0.0%) | 1(50.0%) | $f=16.332$ | 0.014 |
| Bachelors | 11(30.6%) | 16(44.4%) | 9(25.0%) | | |
| Higher diploma | 4(22.2%) | 6(33.3%) | 8(44.4%) | | |
| Diploma | 43(53.1%) | 28(34.6%) | 10(12.3%) | | |
| Certificate | 3(75.0%) | 1(25.0%) | 0(0.0%) | | |
| Clinical departments | | | | | |
| Medical surgical | 44 (55.0%) | 28 (35.0%) | 8 (10.0%) | $f=18.673$ | 0.03 |
| Accident & emergency | 4 (17.4%) | 11 (47.8%) | 8 (34.8%) | | |
| Special units | 9 (33.3%) | 8 (29.6%) | 10 (37.0%) | | |
| Maternity | 5(45.5%) | 4 (36.4%) | 2 (18.2%) | | |
| CPR training | | | | | |
| Trained | 30(30.9%) | 43(44.3%) | 24(24.7%) | $\chi^2 =21.483$ | 0.000 |
| Not trained | 32(72.7%) | 8(18.2%) | 4(9.1%) | | |
| Duration since last trained | | | | | |
| 1 year & less | 10 (29.4%) | 10(29.4%) | 14(41.2%) | $\chi^2 =34.945$ | 0.000 |
| 2 years | 4(26.7%) | 7(46.7%) | 4(26.7%) | | |
| Over 3 years | 15(31.9%) | 26(55.3%) | 6(12.8%) | | |
| Not trained | 33(73.3%) | 8(17.8%) | 4(8.9%) | | |
| CPR Knowledge Score | | | | | |
| Below average | 51 (49.0%) | 41 (39.4%) | 12 (11.5%) | $f=20.956$ | 0.000 |
| Average | 9 (36.0%) | 7 (28.0%) | 9 (36.0%) | | |
| Above average | 0 (0.0%) | 2 (25.0%) | 6 (75.0%) | | |

4.0 Discussion

The study assessed cardiopulmonary resuscitation knowledge among clinicians at coast general hospital who included doctors, clinical officers and nurses. The study revealed that health workers with high levels of training with first and second degrees rated their CPR practices higher than those with diploma and certificates in training. This finding is unusual since CPR training is uniform. Avisar et al, (2013) recommends CPR training for all medical students during first year of training and a refresher course and the final year.

The departments of deployment impacted greatly on the CPR knowledge among the clinicians. The clinicians working in Accident and Emergency department rated their CPR practices higher than others working in general wards. This is attributable to the nature of the department meaning there was a lot of on job training that took place.

The study revealed that not every clinician was trained on cardiopulmonary resuscitation. The proportion of the clinicians trained impacted directly on their self rating of CPR practices. This may be attributed to the fact that CPR is not sufficiently trained at college level as indicated in the study. This finding was a clinical anomaly

since all health workers should be sufficiently trained on CPR to handle any cardiac arrest case. Robert *et al*, (2010) recommends that all the health care workers should be trained on cardiopulmonary resuscitation so as to be in a position to handle any case of cardiac arrest.

The study revealed that a majority of the clinicians had trained on CPR but had taken more than two years since their last session of CPR training. This may signify redundancy and may be attributable to the low scores on knowledge. This contrasts the recommendation by the American Heart Association guideline that health workers should have frequent CPR trainings and they must be time specific (field 2010). In a similar study it showed that as time from the last training elapsed, the health workers knowledge on CPR decayed (Rajeswaran *et al*, 2013).

From specific questions asked on CPR, three quarters of the clinicians scored below average. This was a worrying finding since the clinicians were expected to be updated on the CPR knowledge. Lack of refresher courses was attributable to this low score.

From the study it was revealed that a majority of the respondents have no policy in place requiring them to renew/ update their CPR knowledge. This could be attributable to professional bodies not having a requirement on CPR CPD points before renewing professional licence. This contrasts the recommendation by Felsenstein *et al* (2009) guidelines that CPR training is a requirement for renewing professional practicing licence.

5.0 Conclusion and Recommendations

5.1 Conclusion

In conclusion the CPR knowledge by clinicians at Coast General hospital was inadequate and significantly affected their CPR practices.

5.2 Recommendation

There is need to formulate policy frameworks that will guide on CPR trainings within the hospital.

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Competing interests

The authors declare that they have no competing interests.

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