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Original Article

Quality of Medical Care at the Emergency Departments of Public Hospitals in Kenya

Dr. David Wanikina Muke^{1*}, Dr. Luete Richard², Prof. Gideon Ng'wena Magak, PhD², Prof. Wilson Odero, PhD² & Dr. Charles Ochola Olelo³

¹ Bungoma County Referral Hospital, P. O. Box 14-50200, Bungoma, Kenya

² Maseno University, P. O. Box 3275-40100, Kisumu, Kenya

³ Homabay County Referral Hospital, P. O. Box 52-40300 Homabay, Kenya

* Author for Correspondence ORCID ID: <https://orcid.org/0000-0001-5212-7001>; Email: dwanix@yahoo.co.uk.

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Globally, states are obliged to prioritize quality medical care at emergency departments (EDs). Kenya is not an exception since medical care services are mainly offered in the outpatient departments. However, the quality of care in these outpatient departments has not been evaluated. The aim of this study was to investigate quality of care at EDs of public hospital in Kenya, with a focus on Bungoma County. The study evaluated the availability of infrastructure, equipment, supplies and personnel. Besides, the researcher assessed processes, protocols, and outcomes of care at the Eds in Kenya's public hospitals. A cross-sectional study design was employed, with a sample of 10 ED in-charges and 398 patients. The participants were proportionately recruited from the EDs via probability proportional to size (PPS). Quality of the EDS was measured using the Donabedian model with structure assessed by evaluating availability of infrastructure, equipment, supplies and personnel for emergency care. Process was evaluated by measuring turnaround timelines, assessment of presence and utilization of triage systems, protocols, and guidelines. Outcomes were measured using number of admissions, deaths, left without being seen, unplanned re-attendance, and patient service experience. Data collection was based on WHO observation checklists and with the help of questionnaires. The analysis consisted of descriptive and inferential statistics. The findings revealed that infrastructure availability was 42.0% with all EDs lacking resuscitation rooms and high dependency units. Secondly, imaging rooms were in 40% of the hospitals, blood banks in 50%, and running water in 70%. Third, equipment availability was 34.7% with oxygen source, pulse oximeter, point of care ultrasound and trauma cart being available in 10%. Fourth, regular maintenance of equipment was in 52.5% of the EDs. Finally, availability of supplies for resuscitation was 52% with Supplies for airway management being the least (22%). From the study, it was apparent that trained personnel, equipment,

supplies and processes such of triage systems. This has contributed to prolonged turnaround time and high re-attendance rates. There is need for provision of adequate infrastructure, equipment, personnel, and systems for emergency care in public hospitals EDs in Bungoma County to improve quality of care.

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INTRODUCTION

In public hospitals in Kenya, emergency care to outpatients is available emergency rooms, accident and emergency departments or casualty departments (Reinhardt, 2017). EDs specialize in emergency medicine, the acute care of patients who present without prior appointment; either by their own means or that of an emergency medical service. The existence of EDs begun 50 years ago, having begun in Australia, Canada, New Zealand, United States and United Kingdom [UK] (Bambi et al., 2011). The emergence of EDs were influenced by World War II (Kellermann & Martinez, 2011) and expanded through 1980s and 1990s. Globally, EDs provide the hub of Emergency care systems with patients attending on ad-hoc basis.

Emergency rooms at Outpatient departments in Kenya provide care to several patients seeking acute and emergency care daily (Carter et al., 2014). The departments are faced with an ever-increasing burden of trauma, chronic illness, and communicable diseases, maternal and infant morbidity among other conditions. According to Wachira and Smith (2013), the common cases seen

in the EDs are trauma 24%, lower respiratory tract infection 10%, malaria 10%, peptic ulcer disease 5%, Urinary tract infection 5%, upper respiratory infection, typhoid 4%, hypertension 3%, acute asthmatic attack 3%, and gastroenteritis 3%. There are no studies that have assessed quality of medical care at the public hospitals in Kenya, specifically focusing on Bungoma County. The availability of structure, process and outcomes of the care provided at the emergency departments in Bungoma County is unknown. This study therefore explored the state of quality of emergency care at the emergency departments of public hospitals in Bungoma County through assessing the environment in which the care is provided, the processes or actions at the ED and the outcome as measures of quality at the ED.

MATERIALS AND METHODS

The current study was conducted in Bungoma county, Kenya to determine quality of medical care at the emergency departments. Bungoma County was an ideal study location due to her relatively worse emergency care indicators compared to other counties and the national average from the data obtained from DHIS 2014(KNBS, 2014). Basing on

DHIS 2014, Bungoma County emergency unit receives 51% emergency cases compared to the total visits. A cross-sectional study design was adopted with a sample size of 385 ED patients drawn from emergency departments and patients attending outpatient/emergency departments at the 10 public hospitals in Bungoma County, including Bungoma county referral hospital, Kimilili Sub county hospital, Webuye county hospital, Bumula sub county hospital, Chwele sub county hospital, Bokoli sub county hospital, Cheptais Sub county hospital, Mt. Elgon Sub county hospital, Naitiri Sub county hospital, and Sirisia Sub county hospital.

Tools used for data collection during the study included questionnaires, observational checklists, and time sequence cards. To determine availability of essential supplies and equipment in the ED, WHO observational tool was adopted in the study as well. The WHO observational tool also assisted in reviewing the presence of evidence-based guidelines and protocols. The WHO adopted questionnaire was useful for data collection on availability of structure (infrastructure, personnel, equipment, supplies), process (triage system, care pathways, procedures and interventions done at the ED) and Outcomes (number admitted, referred, discharged, left without being seen/ clinician sign off, and unplanned re-attendance). The time sequence tool, on the other hand, was used to collect data on the timelines (total time spent at registration, time to clinician, total time spent at clinician, total time spent at the laboratory, total time spent at triage, total time spent at the ED, time to initial treatment, total time spent at pharmacy).

Data collection procedure begun with seeking for clearance from the school of graduate studies and Maseno university ethics and review committee approvals followed by relevant Bungoma county director of health and all the medical superintendents of the 10 public hospitals. The medical superintendent then introduced the investigator to the ED in charges, to whom a WHO adopted questionnaire assessing the ED structure, process, and outcomes was administered following informed consent. The investigator then carried out observations using a WHO adopted checklist to confirm availability of supplies and equipment necessary during resuscitation. Data on patient experiences was collected after informed consent

had been obtained from all the sampled participants. The time sequence/turnaround time questionnaire was given at registration and patient allowed to move with it at all the service area points. The service providers were the required to fill in the time they saw the patient. The study material was the decoded and entries made into an electronic format and the research materials.

Those included in the study were patients seeking outpatient emergency care presenting without a prior appointment; Children or minors below 18 years were included voluntarily following request for surrogate informed consent or assent from the caretakers, guardians. The guardians were after giving consent requested to respond to the questionnaire. The data obtained from the respondents was then analysed using Statistical Package for Social Sciences (SPSS) version 28. Descriptive statistics mean and mode were used to analyse data on availability of infrastructure, personnel, supplies, essential emergency equipment, emergency procedures and interventions within the ED. Inferential statistics on the other hand, analysed the relationships between structure process and patient experiences, timelines, and patient service experience.

RESULTS.

The result of this study entailed description of social demographic characteristics of the respondents, description of the structure at the ED by presenting the infrastructure, essential equipment, essential supplies, essential emergency equipment, staffing and staff training in Bungoma County.

Infrastructure

The study showed that on average, the emergency care infrastructure availability at the EDs was at 42%. The research showed that all the healthcare facilities offered emergency care to outpatients at the outpatient departments, all had waiting bays, laboratories and operational power or electricity to run crucial pieces of equipment. In 7 (70%) of the EDs there were triaging areas, running water, and procedure rooms while 5 (50%) of the EDs had blood banks. Additionally, the study showed that radiology and imaging units were found in 4 (40%) of the hospitals in the county. The research also

discovered that only 2 (20%) of the EDs had observation room with beds and only 1 (10%) of the EDs had resuscitation areas. However, the study showed that no emergency department had areas designated to provide category 1, 2, or 3 care also

known as High Dependency Units. Notably, on the 10 public hospitals in the county, only 2 hospitals- Bungoma County Referral Hospital and Webuye hospital-had above 50% of the infrastructure vital for emergency care at the ED (See *Table 1*).

Table 1: The mean infrastructure availability for emergency care at the EDs.

CATEGORY N=10	Hospital (%)
Designated emergency care area	0 (0)
Waiting bay	10 (100)
Triage area	7(70)
Resuscitation area	1 (10)
Priority areas 1,2,3 and High Dependency Unit	0 (0)
Procedure room	7(70)
Laboratory	10 (100)
Imaging and radiology	4(40)
Observation room with beds	2(20)
Running water	7(70)
Electricity/operational power generator	10(100)
Blood bank	5(50)

Essential Emergency Equipment

The study showed that on average, the average essential emergency equipment availability was at 37.7 in the ten emergency departments. 6 (60%) of

EDs in public hospitals has essential emergency equipment list presented during the study. Other emergency equipment the study focused on include the nebulizer, functional anaesthesia machine, functional x-ray machine, oxygen cylinders and pulse oximeter, among others See *Table 2*)

Table 2: The availability of emergency equipment.

CATEGORY N=10 /	Hospital (%)
O ₂ source + tubing and mask	1 (10)
Emergency cart/tray	5 (50)
Trauma cart / tray	1 (10)
Functional pulse ox meter	1 (10)
Electrocardiogram machine	0 (0)
Point of care ultrasound machine	1(10)
Presence of nebulizer	4(40)
Functional anaesthesia machine	4 (40)
Functional X-ray machine	4 (40)
Essential equipment list	6 (60)

Maintenance of Emergency Equipment

The study found out that only 4 (40%) of the hospitals (Bungoma county hospital, Chwele sub-

county, Kimilili sub-county, and Webuye county hospital) were in a working order (See *Table 3*).

Table 3: The mean ability to maintain emergency equipment.

CATEGORY N=10	Hospital (%)
Emergency equipment in working order	4 (40)
Access to repair incase equipment fails	8 (80)
Access to repair within health facility	8 (80)
Access to repair outside the facility	7 (70)
Information on supply, repair, and spare parts available	1 (10)
Agreement with supplier on maintenance	5 (50)
Training of HCW on equipment use	3 (30)

Notably, many hospitals (60%) had above average capability to maintain essential emergency equipment.

Emergency Department Staffing

The overall staff availability by cadre in the county was 47.5% of all category's personnel. Medical officers were available in 80% of the hospitals in Bungoma County (See *Table 4*).

Table 4: The mean emergency department staffing available at the hospitals.

Category N=10	Hospital (%)
List of extra personnel for disaster times	0 (0)
Emergency physicians	0 (0)
Medical officer	8 (80)
Internist physician	2 (20)
General surgeon	2 (20)
Orthopaedic surgeon	0 (0)
Radiologist	0 (0)
Paediatrician	1 (10)
Radiographer	4 (40)
Sonographers	2 (20)
Anaesthetist	5 (50)
General nurses	10 (100)
Laboratory personnel	10 (100)
Pharmacist/pharmaceutical personnel	10 (100)
Health records and information officer	10 (100)
Emergency nurses	0 (0)
Casuals	10 (100)
Drivers	10 (100)

The study found the aggregate number of staff available for emergency care at the EDs in public hospitals in Bungoma County to be 320 personnel. The cadre registered during the study was 46 general nurses, 74 clinical officers, 40 laboratory technicians and 39 casual workers.

Process Intervention at the ED

Interventions were distributed in the order of 90% for respiratory rate for pneumonia, 80% for pulse rate for pneumonia, 10% for SPO₂ in pneumonia, 80% for mental state assessment, 90% for empiric antibiotics, 100% for Haemoglobin, GXM, RBS, urinalysis, 100% for medical records, and 10% for policy training (See *Table 5*).

Table 5: The interventions possible at ED in Bungoma County.

CATEGORY N=10 /	Hospital (%)
Respiratory rate for pneumonia	9 (90)
Pulse rate for pneumonia	8 (80)
SPO2 in pneumonia	1 (10)
Mental state assessment in pneumonia	8 (80)
Empiric antibiotics for pneumonia	9 (90)
Haemoglobin, GXM, RBS, urinalysis	10 (100)
Keep medical records	10 (100)
Policy on training staff on emergency care	1 (10)

Availability of Guidelines for Emergency Care

obstetric 40%, surgery 10%, anaesthesia 10% and referral 50% as shown in *Table 6*.

The distribution for emergency care were observed as follows; basic life support 20%, pain relief 40%,

Table 6: The distribution of available guidelines for emergency care at the EDs.

CATEGORY N=10	Hospital (%)
Basic Life Support	2 (20)
Pain relief	4 (40)
Obstetric	4 (40)
Surgery	1 (10)
Anaesthesia	1 (10)
Referral	5 (50)

Mean Timeline at the EDs**Table 7: The mean times at the EDs.**

Item/hospital	County mean
Time at registration	3.90
Time at triage	3.95
Time to clinician	29.44
Total time at clinician	43.08
Total time at laboratory	55.61
Total time at pharmacy	6.40
Time to treatment	99.56
Total time at ED	111.61

Ability to Perform Emergency Procedures

the least procedure effectively handled at 10% (See *Table 8*).

The mean procedures were led by acute burn management at 90% while chest tube insertion was

Table 8: The mean procedures performed with the EDs in the County.

CATEGORY N=10	Hospital (%)
Airway management	7 (70)
Removal foreign body ENT	7 (70)
Chest tube insertion	1 (10)
CPR	8 (80)
Peripheral Venous cut down	5 (50)
Acute burn management	9 (90)
Wound debridement	8 (80)
Closed fracture management	4 (40)
Open fracture management	2 (20)
Joint dislocation treatment	6 (60)
Amputation	2 (20)
Aesthetic blocks	6 (60)
Ketamine anaesthesia	3 (30)

Outcomes

The outcomes are represented in *Table 9*. Patient Service experience of Care.

Table 9: The mean scores for patient services experience.

item/ hospital N=398	Max Expected score											All hospitals
		Kimilili	Bungoma	Bumula	Chwele	Mt. Elgon	Naitiri	Webuye	Bokoli	Cheptais	Sirisia	
Overall care	5	3.84	3.65	3.63	3.67	4.07	3.81	3.69	3.56	3.57	3.65	3.71
Got services needed	4	3.27	3.00	2.97	3.22	3.11	3.06	2.86	2.81	2.93	2.71	2.99
Respectful staff	5	3.75	3.87	3.97	4.22	4.00	4.38	3.94	4.19	4.14	3.88	4.03
Answer patient questions	5	3.98	3.96	4.00	4.17	4.15	4.31	4.09	4.00	3.86	3.94	4.05
Ease of access	5	3.73	3.45	3.19	3.94	3.81	3.63	3.64	3.75	3.71	3.76	3.66
Interpretive services	5	3.86	3.67	4.06	4.11	4.11	4.00	3.83	3.81	3.79	4.00	3.92
Time to get appointment	5	3.56	3.23	3.28	3.94	3.85	3.31	3.13	3.38	3.79	3.29	3.48
Time at the waiting bay	5	3.53	3.06	3.53	3.28	3.67	3.06	3.02	3.63	3.57	3.59	3.39
Asked if on medication	2	1.73	1.75	1.84	1.89	1.74	1.62	1.78	1.81	1.64	1.71	1.75
Confirmed identity	2	1.81	1.80	1.84	1.89	1.89	1.75	1.80	1.87	1.64	1.88	1.82
Saw hand washing stations	2	1.58	1.57	1.56	1.61	1.59	1.62	1.75	1.69	1.57	1.65	1.62
Notices hand washing signs	2	1.28	1.39	1.50	1.44	1.41	1.50	1.55	1.44	1.36	1.35	1.42
Got follow-up care information	3	2.02	2.30	1.78	2.44	2.15	2.25	2.66	2.44	2.57	1.53	2.21
Kept informed on care planned	3	2.06	2.32	2.31	2.61	2.63	1.87	2.41	2.50	2.43	1.88	2.30
Involved in making decisions on care	3	2.09	2.38	2.25	2.56	2.56	2.25	2.55	2.50	2.36	1.94	2.34
Treatment clearly explained	3	2.55	2.68	2.63	2.89	2.63	2.81	2.70	2.81	2.71	2.53	2.69
Mean	3.69	2.79	2.76	2.77	2.99	2.96	2.83	2.84	2.89	2.85	2.71	2.84
Mean patient service experience		75.6	74.7	75.2	81.2	80.3	76.7	76.9	78.2	77.4	73.4	76.9

CONCLUSION AND RECOMMENDATIONS

The study evaluated the quality of medical care at emergency departments in hospitals in Bungoma County using the Donabedian model. The Model entail structure, process, and outcomes approaches. The study found average percentage infrastructure availability in the county, major inadequacies in areas designated as emergency care areas, and the inability to maintain supply and repair.

The study prescribes numerous recommendations based on the structure, process, and outcome principles. On the structure, the researcher recommends development of norms and standards for the infrastructure, essential emergency equipment, staging in the EDs, and essential supplies (Hughes, 2012). Additionally, the county should allocate adequate resources to construct designated EDs and provide essential emergency equipment and supplies as per developed standards and norms. Finally, on structure, the county health department should undertake audit of skills and deploy qualified staff at the emergency departments (Sills et al., 2011)

On process, the study recommends development of triage systems and patient categories to ensure patients are assigned triage scores premised on the triage category. Besides, the county health department should develop emergency protocols and ensure the patients are managed with the emergency care pathways (Kellermann et al., 2013). Moreover, the study suggests the health department in the county should develop supply guidelines for emergency care at the EDs.

Still considering outcomes, the study recommends the hospitals should carry out patient perception surveys at the EDs annually to determine patient experiences and strive to improve patient experience (Kellermann & Martinez, 2011). Similarly, the county health department should develop specific indicators for monitoring the care provided in the EDs (Wachira & Martin, 2011). Finally, the Bungoma County should implement the recommendations in this study to improve the quality of emergency care at the emergency departments.

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