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Predictors Of Length of Stay of Patients at The Emergency Departments of Level 5 Government Hospitals in Nairobi City County, Kenya

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Background: Emergency department (ED) length of stay (LOS) is a key indicator of healthcare quality and operational efficiency. Prolonged EDLOS contributes to overcrowding, delayed treatment, increased healthcare costs, poor patient outcomes, and reduced patient satisfaction. This study investigated the predictors of EDLOS among patients attending two level 5 government hospitals in Nairobi City County, Kenya.

Methods: The study was a hospital based cross sectional analytical study, carried out in one month (22nd April- 19th May 2025). The study considered 412 patients selected through systematic random sampling from the emergency departments of the two hospitals. Seven emergency department clinicians and nurse managers were purposively selected for qualitative interviews. Data was collected using structured questionnaires, patient treatment records, and key informant interview guides. Descriptive statistics summarized patient characteristics and ED performance indicators. Chi-square tests assessed associations between independent variables and EDLOS, while multivariable logistic regression identified independent predictors of prolonged EDLOS. Statistical significance was set at $p<0.05$.

Results: The mean EDLOS was 334.6 minutes (5.6 hours), with only 48.1% of patients completing emergency care within the recommended four-hour benchmark. The mean time to triage was 20.0 minutes, and the average waiting time before clinical consultation was 72.6 minutes. Occupation was the only socio-demographic factor significantly associated with prolonged EDLOS ($p=0.047$). Clinical predictors included triage category ($p<0.001$) and patient disposition ($p<0.001$). Staffing levels, fewer doctors ($p < 0.01$) or three or fewer nurses ($p < 0.01$) were significantly associated with prolonged EDLOS. Qualitative findings identified diagnostic delays, inpatient bed shortages, high patient volumes, and staffing constraints as major contributors to prolonged ED stays.

Conclusion: More than half of patients experienced prolonged EDLOS exceeding the recommended four-hour benchmark. Prolonged stays were primarily influenced by clinical acuity, patient disposition, and health system factors, particularly staffing levels and resource availability. Strengthening emergency department staffing, improving patient flow, enhancing diagnostic services, and optimizing bed management may reduce EDLOS and improve emergency care delivery in Kenya.

Index Terms: Emergency departments, Length of stay, Emergency care, Triage, Predictors, Public hospitals; Kenya.

I. INTRODUCTION

Timeliness of health services is one aspect of provision of quality health care alongside, safety, efficiency, effectiveness and patient centeredness. Emergency care is an essential component of resilient health systems and contributes significantly to reducing morbidity and mortality from acute illnesses and injuries[1]. The World Health Organization (WHO) estimates that more than half of deaths and over one-third of disability-adjusted life years in low- and middle-income countries (LMICs) are attributable to conditions requiring timely emergency

care[2]. Efficient emergency departments (EDs) therefore play a critical role in improving patient outcomes by ensuring rapid assessment, diagnosis, stabilization, and initiation of definitive treatment [3].However, increasing patient demand, limited resources, and health system inefficiencies have contributed to prolonged emergency department length of stay (EDLOS), which remains a major challenge worldwide. [4–8]

Length of stay in the emergency department, commonly defined as the time from patient registration or arrival to discharge, admission, transfer, or death, is widely recognized as an important indicator of healthcare quality and operational efficiency[9]. Internationally, 4 to 48 hours benchmarks have been adopted in several healthcare systems to monitor ED performance and improve patient flow[9–12]. Prolonged EDLOS has consistently been associated with overcrowding, delayed diagnosis and treatment, increased healthcare costs, higher inpatient mortality, reduced patient satisfaction, staff burnout, and inefficient utilization of hospital resources Consequently, reducing unnecessary delays in emergency departments has become a major priority for health systems seeking to improve the quality, safety, and accessibility of emergency care[13,14].

Several factors influence EDLOS and may be broadly categorized into patient-related (demographic and clinical), and hospital-level determinants.

Patient demographic characteristics, including age, socioeconomic status, educational level, and residence, influence healthcare-seeking behaviors and may affect the complexity of care required. Clinical characteristics such as disease severity, triage category, comorbidities, diagnostic investigations, and patient disposition are frequently reported as significant determinants of prolonged stays[15]. Hospital-related factors, including staffing levels, availability of diagnostic services, inpatient bed capacity, consultation delays, and organizational efficiency, further influence patient throughput and overall emergency department performance. While these determinants have been extensively investigated in high-income countries, their relative contribution varies considerably across healthcare settings because of differences in health systems, disease burden, infrastructure, and available resources[7,15].

In sub-Saharan Africa, emergency medicine remains an evolving specialty, with relatively few countries having established specialist training programs and organized emergency care systems[16]. Many public hospitals operate with shortages of trained emergency physicians, nurses, diagnostic equipment, and inpatient beds, limiting their capacity to provide timely care[17,18] These challenges are further compounded by increasing urbanization, rising burdens of non-communicable diseases, trauma, infectious diseases, and recurrent public health emergencies, all of which increase demand for emergency services.

Kenya Primary Healthcare Strategic Framework (2019) effectively acknowledged Primary Health Care as the centre piece of a quality health delivery system and a tool for primary and secondary disease prevention. Kenya in 2023 passed several acts of parliament pertaining to healthcare financing and this has impacted positively towards strengthening emergency care through Universal Health Coverage (UHC), health sector reforms, and expansion of county referral hospitals. Nevertheless, emergency medicine remains underdeveloped within many public health facilities, particularly regarding standardized performance monitoring and quality improvement initiatives[20]. Although indicators such as waiting time, door-to-provider time, and emergency department length of stay are routinely monitored in many developed healthcare systems, these measures are not consistently evaluated within Kenyan public hospitals [16]. Consequently, evidence on factors contributing to prolonged EDLOS remains limited, despite increasing patient volumes and pressure on emergency care services.

Previous studies conducted in Kenya have primarily focused on patient satisfaction, emergency department utilization, or service availability, with relatively few examining predictors of EDLOS using comprehensive patient-level and hospital-level data[20–22]. Furthermore, little evidence exists comparing emergency department performance across county referral hospitals serving large urban populations. Understanding the determinants of

prolonged EDLOS is essential for identifying operational bottlenecks, optimizing resource allocation, improving patient flow, and informing evidence-based interventions aimed at strengthening emergency care delivery.

This study therefore investigated the predictors of emergency department length of stay among patients attending Mbagathi County Referral Hospital and Mama Lucy Kibaki Hospital in Nairobi City County. The findings provide evidence that can guide hospital managers, county governments, and national policymakers in developing strategies to improve emergency department efficiency, enhance patient outcomes, and strengthen emergency care systems within Kenya and other similar resource-constrained settings.

II. MATERIALS AND METHODS

A hospital-based cross-sectional analytical study was conducted to determine the predictors of emergency department length of stay (EDLOS) among patients seeking emergency care at Mbagathi County Referral Hospital and Mama Lucy Kibaki Hospital in Nairobi City County, Kenya. The two Level 5 county referral hospitals provide comprehensive emergency care services and serve a large proportion of Nairobi's urban and peri-urban population. Both facilities operate 24-hour emergency departments and form part of the county referral system supporting Kenyatta National Hospital. The study population comprised all patients presenting to the emergency departments of the two hospitals during the one-month study period. Patients of all age groups who received emergency care and consented to participate were eligible for inclusion. For pediatric patients and those unable to provide consent, caregivers or legally authorized representatives were interviewed. Patients who declined participation or whose emergency conditions required immediate life-saving interventions without the possibility of obtaining informed consent were excluded from the study. Additionally, seven purposively selected key informants, comprising emergency department physicians and nurse managers, participated in qualitative interviews to provide contextual information on factors influencing patient flow and emergency department operations. The sample size was determined using Cochran's formula for estimating proportions at a 95% confidence level, assuming a prevalence of 50% and a precision of 5%. After adjusting for a 10% non-response rate, the minimum sample size was 412 participants. Probability proportional-to-size sampling allocated 260 participants to Mama Lucy Kibaki Hospital and 152 participants to Mbagathi County Referral Hospital based on average emergency department attendance. Eligible participants were selected using systematic random sampling throughout the study period, while key informants were selected purposively based on their leadership roles and experience in emergency care.

Data collection

Data were collected using a structured interviewer-administered questionnaire developed from published literature and the study objectives. Information obtained included socio-demographic characteristics, clinical presentation, triage category, mode of arrival, diagnostic investigations, treatment received, disposition, and time intervals throughout the patient's emergency department journey. A patient treatment card was used to capture consultation findings, diagnoses, investigations, and final disposition from attending clinicians. Data on registration time, triage time, consultation time, and discharge or admission time were recorded directly from hospital records to calculate emergency department length of stay. Semi-structured interviews were conducted with key informants to explore organizational and operational factors influencing patient flow.

Study variables

The primary outcome variable was emergency department length of stay, defined as the time elapsed from patient registration in the emergency department to discharge, admission, referral, transfer, or death. Consistent with internationally accepted emergency care performance standards[6], EDLOS was categorized as 4 hours or less and longer than 4 hours.

Independent variables included socio-demographic characteristics (age, sex, education level, marital status and occupation), clinical characteristics (triage category, diagnosis, comorbidities, disposition, and

number of diagnoses), and intervening factors i.e. hospital related and other factors (number of healthcare workers on duty, utilization of diagnostic services, mode of arrival, and mode of payment).

Data analysis

Data were entered, cleaned, and analyzed using the Statistical Package for the Social Sciences (SPSS) version 26.0. Descriptive statistics were used to summarize participant characteristics and emergency department performance indicators. Continuous variables were summarized using means and standard deviations or medians and interquartile ranges where appropriate, while categorical variables were presented as frequencies and percentages.

Associations between independent variables and emergency department length of stay were assessed using Pearson's chi-square test. Variables demonstrating statistical significance at the bivariate level were entered into multivariable logistic regression models to identify independent predictors of prolonged emergency department length of stay while controlling for potential confounding variables. Adjusted odds ratios (AORs) with 95% confidence intervals (CIs) were reported, and statistical significance was considered at $p < 0.05$.

Qualitative interview data were transcribed verbatim and analyzed using thematic content analysis. Emerging themes were triangulated with quantitative findings to provide a comprehensive understanding of factors influencing emergency department length of stay.

Ethical considerations

Ethical approval for the study was obtained from the Kenyatta University Ethics Review Committee (Reference No. PKU/2992/12016). Research authorization was subsequently granted by the National Commission for Science, Technology and Innovation (NACOSTI) and the Nairobi City County Health Department before commencement of data collection. Administrative approval was obtained from both participating hospitals. Written informed consent was obtained from all adult participants before enrolment. Assent was obtained from eligible minors, while consent for children was provided by parents or legal guardians. Participant confidentiality was maintained through anonymized data collection, unique study identification numbers, secure storage of research records, and restricted access to study data. Participation was voluntary, and respondents were free to withdraw from the study at any stage without affecting the healthcare services they received.

III. RESULTS

Participants demographic characteristics

A total of 412 patients were enrolled in the study, including 152 (36.9%) from Mbagathi County Referral Hospital and 260 (63.1%) from Mama Lucy Kibaki Hospital. In addition, seven key informants, comprising emergency department physicians and nurse managers, participated in qualitative interviews to provide insights into operational factors influencing emergency department (ED) length of stay. Patients represented diverse demographic groups, with no significant differences in age, sex, marital status, or educational attainment between those with 4 or less hours and prolonged (>4 hours) ED stays. Occupation was the only socio-demographic characteristic significantly associated with ED length of stay (p=0.047), with self-employed patients more likely to remain in the ED for more than four hours than those employed in the public sector.

Clinical characteristics of patients

Quality of healthcare services was the most frequently reported/cited factor influencing patients' choice of hospital (38.9%), followed by availability of services (28.2%), convenient location (18.0%), treatment cost (14.6%), recommendations from relatives or friends (8.8%), and referral from another health facility (2.9%). As demonstrated in figure 1 below, both hospitals utilized the South African Triage Scale (SATS) supported by electronic and manual medical record systems. Overall, 51.5% of patients were triaged as yellow, 21.6% as orange, 16.5% as green, and 10.4% as red. Mama Lucy Kibaki Hospital recorded a higher proportion of yellow-category patients (58.8%) than Mbagathi County Referral Hospital (38.8%).

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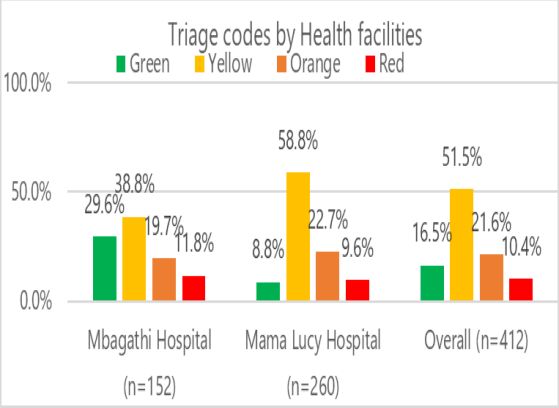

Figure 1: *Triage codes by Health facilities*

Medical conditions accounted for the largest proportion of ED presentations (46.8%), followed by surgical conditions (22.1%), pediatric emergencies (18.7%), and gynecological conditions (10.2%). Nearly one-quarter (24.3%) of patients presented with more than one diagnosis. Laboratory investigations were the most commonly utilized diagnostic service (57.0%), followed by radiological investigations (43.0%) and specialist consultations (15.0%). Following emergency care, 43.9% of patients were discharged home, 40.1% were admitted to inpatient wards, 7.5% were referred to other health facilities, while 3.2% died during emergency department management. A further 2.2% left the department before being seen by a healthcare provider.

Hospital characteristics and emergency department performance

Staffing levels differed between the two hospitals as illustrated in table 1 below. Overall, the average number of healthcare providers available per shift included 1.83 doctors, 3.51 nurses, and 1.20 emergency medical technicians, supported by approximately four students

Table 1: Number of workforce/health providers per shift

Variables	Mbagathi Hospital Mean	Mama Lucy Hospital Mean	Overall Mean
Number of Doctors per shift	1.24	2.17	1.83
Number of Nurses per Shift	2.20	4.27	3.51
Number of EMTS per shift	1.54	0.00	1.20
Number of students per shift	6.46	2.64	4.05
Total workforce per shift	11.45	9.08	10.59

Table 2: Time Spent in each activity in patient management.

Variables	Mbagathi Hospital N	Mean	Mama Lucy Hospital N	Mean	Overall N	Mean
Time to Triage (in min)	152	22.77	260	18.34	412	19.97
Waiting time (in min)	152	86.35	260	64.62	412	72.64
Time to consultation (in min)	152	108.74	260	81.95	412	91.83
Total Length of stay	152	409.83	260	290.67	412	334.63

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As illustrated in table 2 above, the mean time from patient registration to triage was 19.97 minutes, while the average waiting time before consultation was 72.64 minutes. Patients waited an average of 91.83 minutes before initial clinical assessment. The overall mean emergency department length of stay was 334.63 minutes (5.6 hours).

Figure 2 below illustrates that only 48.1% of patients completed their emergency care within the internationally accepted four-hour benchmark, while 51.9% remained in the emergency department for more than four hours. Compliance with the four-hour target was considerably higher at Mama Lucy Kibaki Hospital (58.5%) than at Mbagathi County Referral Hospital (30.3%).

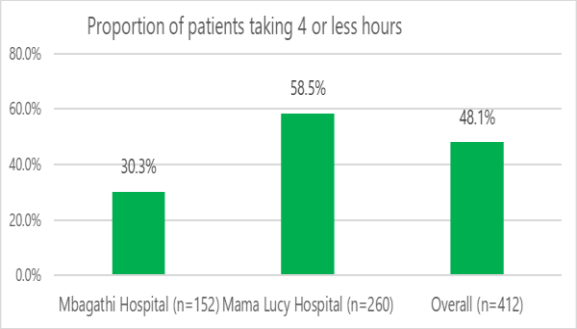

Figure 2: Distribution of patients with various length of stay

Most patients (61.4%) arrived at the emergency department on foot, while 16.3% arrived by ambulance, 13.6% by wheelchair, and 8.7% on stretchers as shown in figure 3 below.

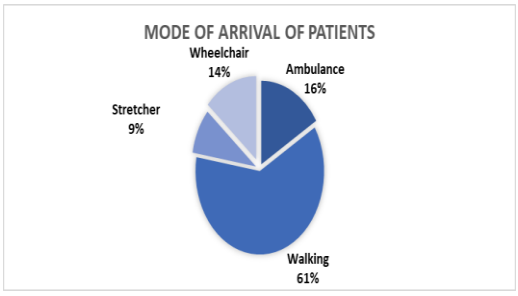

Figure 3: Mode of arrival of patients to the ED

The majority (87.1%) of these patients were accompanied by relatives or caregivers, where the rest came in alone. Figure 4 below summarizes that approximately two-thirds (65.3%) financed their healthcare through out-of-pocket payments, whereas only 34.7% were covered by health insurance. Mama Lucy Kibaki Hospital had more patients not being registered on the national insurance platform.

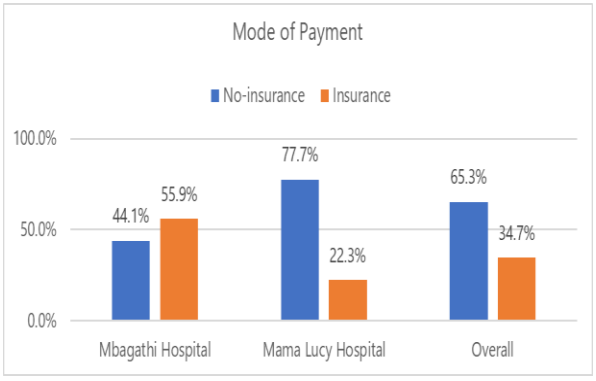

Figure 4: Mode of payment for services

Factors associated with emergency department length of stay

Chi-square analysis demonstrated that most socio-demographic variables, including age, sex, marital status, and educational level, were not significantly associated with prolonged ED length of stay ($p>0.05$). Occupation remained the only significant socio-demographic predictor ($\chi^2=9.61$, $p=0.047$).

Among clinical variables, triage category showed a strong association with ED length of stay ($\chi^2=22.73$, $p<0.001$). Patients classified as orange were substantially more likely to remain in the emergency department for longer than four hours (74.2%) than patients triaged as green, yellow, or red. Patient disposition was also significantly associated with ED length of stay ($\chi^2=36.03$, $p<0.001$). Patients requiring hospital admission were significantly more likely to experience prolonged stays compared with those discharged home or referred elsewhere.

Hospital-related factors also significantly influenced ED length of stay. Patients attending shifts staffed by three or fewer nurses were 2.88 times more likely to remain in the emergency department beyond four hours than those managed during shifts with higher nurse staffing levels. Similarly, fewer doctor availability per shift was associated with prolonged ED stays (OR = 3.60, $p < 0.01$). These findings suggest that workforce shortages contributed

substantially to emergency department congestion and delays in patient management.

Qualitative findings

Key informants consistently identified several organizational barriers contributing to prolonged emergency department stays. Major themes included inadequate staffing, delays in obtaining laboratory and radiological investigations, prolonged specialist consultation times, shortages of inpatient beds leading to delayed admissions, and increasing patient volumes that exceeded departmental capacity. Participants also highlighted limited emergency care infrastructure and resource constraints as important contributors to overcrowding and reduced patient flow.

Overall, the qualitative findings complemented the quantitative analysis by demonstrating that prolonged emergency department length of stay results from an interaction between patient acuity, hospital resource limitations, and operational inefficiencies.

IV. DISCUSSION

Internationally, the threshold on the definition of acceptable length of stay at the emergency departments can range from 4-48 hours[6]. This study examined the predictors of emergency department length of stay (EDLOS) among patients attending Mbagathi County Referral Hospital and Mama Lucy Kibaki Hospital in Nairobi City County, Kenya. The findings demonstrate that more than half of patients remained in the emergency department for longer than the internationally accepted four-hour benchmark that was adopted by this study, indicating persistent inefficiencies in patient flow and emergency care delivery. In Kenya there are national guidelines to help improve the quality of emergency care in urban and rural hospitals but there are no documented guidelines set to standardise EDLOS in hospitals unlike in UK and Australia [6,11]. This could be attributed to the fact that being a developing country, our public hospitals haven't been standardised and experience challenges that are unique to each one of them. This study used 4 hours as the threshold that has been applied in the UK, England and Australia [6,11] .

The overall mean EDLOS of approximately 334 minutes-5.6 hours (0.25-60.5hrs) exceeded the four-hour benchmark adopted in many high-income countries as an indicator of efficient emergency care. Only 48.1% of patients completed their emergency care within four hours, suggesting substantial delays in patient management. Similar findings have been reported in several low- and middle-income countries (LMICs).

The length of stay in this study is comparable to Indonesia's 330 minutes[23], Korea's 343 minutes [24] more than Bungoma County's 111 minutes [20], Ethiopia's 4 hrs[25] , United states 167 minutes [26] and less than Botswana's median of 9.6 hours [18], South Africa's 6 hrs [27] Canadians 8.5-25.6 hours [28]. The variations could be resultant from variations in the study designs, sample sizes, and presenting characteristics of patient visiting the emergency departments. Whereas prolonged emergency department stays are attributed to increasing patient volumes[5,17,18], limited healthcare resources, inadequate staffing, and constrained inpatient bed capacity, In contrast, hospitals in well-resourced healthcare systems generally report higher compliance with the four-hour target due to established emergency medicine systems, efficient patient flow protocols, and greater availability of healthcare personnel and diagnostic services.

In this study Prolonged EDLOS was significantly associated with patient occupation, triage category, patient disposition, and hospital staffing levels, highlighting the multifactorial nature of delays in these hospitals' emergency departments.

Among socio-demographic characteristics, occupation was the only factor significantly associated with prolonged EDLOS. Self-employed patients were more likely to remain in the emergency department beyond four hours than those employed in the public sector. This finding may reflect, affordability of investigations, or delays in decision-making regarding treatment and admission. However, age, sex, marital status, and educational level were not significantly associated with EDLOS, suggesting that operational and clinical factors play a more important role than patient demographics in

determining emergency department efficiency. Similar observations have been reported in previous studies, which found limited associations between demographic characteristics and emergency department throughput after adjusting for clinical severity.

Clinical characteristics were among the strongest predictors of prolonged EDLOS. Patients triaged as orange were significantly more likely to remain in the emergency department beyond four hours than those categorized as green, yellow, or red. Although red-category patients represented the highest-acuity emergencies, they often received immediate assessment and treatment, reducing delays in clinical decision-making. Conversely, orange-category patients frequently required extensive diagnostic investigations, prolonged observation, specialist consultation, or stabilization before disposition, contributing to longer stays. Comparable findings have been reported internationally, where higher-acuity patients requiring complex investigations and multidisciplinary management consistently experience longer emergency department stays.

Patient disposition was another important determinant of EDLOS. Patients requiring hospital admission experienced significantly longer stays than those discharged home or referred to other facilities. Delayed admission is widely recognized as a major contributor to emergency department overcrowding because admitted patients continue occupying treatment spaces while awaiting inpatient beds. Similar findings have been documented in emergency departments in the region and worldwide where lack of insurance, acuity scale levels, older age, utilization of laboratory and radiology services[5,7,15,18,23,29] were found to be associated with longer ED stay. The qualitative findings from this study further supported this observation, with healthcare providers identifying delayed transfers to inpatient wards as one of the principal operational challenges affecting patient flow.

Hospital-related factors also demonstrated a significant influence on EDLOS. Lower numbers of doctors and nurses during clinical shifts were associated with prolonged patient stays, underscoring the importance of adequate workforce capacity in emergency care delivery. Staffing shortages increase waiting times for triage, clinical assessment, diagnostic investigations, and treatment, ultimately reducing departmental efficiency. Strengthening human resources for health therefore remains a critical strategy for improving emergency department performance within Kenyan public hospitals.

Qualitative interviews provided additional insight into the operational challenges contributing to prolonged EDLOS. Healthcare providers consistently identified shortages of healthcare personnel, delays in laboratory and radiological investigations, limited emergency department space, increasing patient volumes, and inadequate inpatient bed capacity as major contributors to delayed patient flow.

The findings of this study have important implications for health policy and hospital management. As Kenya continues implementing Universal Health Coverage and strengthening emergency care systems, reducing emergency department length of stay should become a key quality improvement priority.

This study has several strengths. It combined quantitative patient-level data with qualitative perspectives from emergency healthcare providers, providing a comprehensive understanding of factors influencing EDLOS. Inclusion of two large county referral hospitals enhances the relevance of the findings to urban public health facilities in Kenya. However, several limitations should be acknowledged. The cross-sectional design precludes causal inference, and the findings may not be generalizable to private hospitals or rural healthcare settings. In addition, data were collected from only two hospitals within one county, and operational factors may differ across other regions of Kenya. Despite these limitations, the study provides valuable evidence to inform policy, resource allocation, and quality improvement initiatives aimed at strengthening emergency care delivery.

Overall, the study demonstrates that prolonged emergency department length of stay in Nairobi's public referral hospitals is primarily driven by clinical acuity, patient disposition, and health system factors, particularly workforce shortages and

operational inefficiencies. Addressing these challenges through targeted investments in human resources, diagnostic services, patient flow management, and hospital capacity will be essential for improving emergency care efficiency and achieving better patient outcomes in Kenya.

V. CONCLUSION

This study found that more than half of patients attending the emergency departments of Mbagathi County Referral Hospital and Mama Lucy Kibaki Hospital experienced prolonged emergency department length of stay (EDLOS) exceeding the adapted recommendation of four-hour benchmark. Prolonged EDLOS was significantly associated with patient triage category, disposition, and hospital staffing levels, highlighting the influence of both clinical complexity and health system capacity on emergency department efficiency.

These findings emphasize that prolonged EDLOS results from an interaction of patient complexity and broader health system constraints rather than a single isolated factor. These results provide important evidence to inform hospital management strategies and policy interventions aimed at strengthening emergency care services and advancing Universal Health Coverage in Kenya.

VI. RECOMENDATIONS

From our research findings we recommend that hospital administrators should invest in adequate staffing, optimize patient flow processes, expand diagnostic capacity, and implement evidence-based emergency department performance monitoring systems. Routine measurement of indicators such as waiting time, time to consultation, and EDLOS would facilitate continuous quality improvement and support timely interventions aimed at reducing overcrowding and improving patient outcomes. This can be achieved by total digitization of the department, workforce development, and adoption of standardized care protocols. Strengthening inpatient bed management and admission processes to minimize delays in patient disposition will also reduce the length of stay finally, we recommend that multi-centre studies be conducted to validate these findings and evaluate interventions for reducing emergency department length of stay.

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REFERENCES

[1] J. Razzak, M.F. Usmani, Z.A. Bhutta, Global, regional and national burden of emergency medical diseases using specific emergency disease indicators: analysis of the 2015 Global Burden of Disease Study, BMJ Glob. Health 4 (2019) e000733. https://doi.org/10.1136/bmjgh-2018-000733.

[2] WHO, Fact sheet: Quality health services, 2020. https://www.who.int/news-room/fact-sheets/detail/quality-health-services (accessed February 28, 2021).

[3] K.B. Negasi, A. Tefera Gonete, M. Getachew, N.T. Assimamaw, B. Terefe, Length of stay in the emergency department and its associated factors among pediatric patients attending Wolaita Sodo University Teaching and Referral Hospital, Southern, Ethiopia, BMC Emerg. Med. 22 (2022) 203. https://doi.org/10.1186/s12873-022-00740-3.

[4] N. Al Nhdi, H. Al Asmari, A. Al Thobaity, Investigating Indicators of Waiting Time and Length of Stay in Emergency Departments, Open Access Emerg. Med. OAEM 13 (2021) 311–318. https://doi.org/10.2147/OAEM.S316366.

[5] G. Alemu, K. Negari, K. Rodamo, A. Tadewos, Factors associated with the length of stay in emergency departments in Southern-Ethiopia, BMC Res. Notes 12 (2019). https://doi.org/10.1186/s13104-019-4271-7.

[6] J. Andersson, L. Nordgren, I. Cheng, U. Nilsson, L. Kurland, Long emergency department length of stay: A concept analysis,

Int. Emerg. Nurs. 53 (2020) 100930. https://doi.org/10.1016/j.ienj.2020.100930.

[7] S.M. Hosseininejad, H. Aminiahidashti, S.M. Pashaei, I. Goli Khatir, S.H. Montazer, F. Bozorgi, F. Mahmoudi, Determinants of Prolonged Length of Stay in the Emergency Department; a Cross-sectional Study, Emergency 5 (2017) e53. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5325925/ (accessed March 7, 2024).

[8] Ö. Sir, G. Hesselink, M. Van Den Bogaert, R.P. Akkermans, Y. Schoon, Risk Factors for Prolonged Length of Stay of Older Patients in an Academic Emergency Department: A Retrospective Cohort Study, Emerg. Med. Int. 2019 (2019) e4937827. https://doi.org/10.1155/2019/4937827.

[9] P. Anderson, R. Petrino, P. Halpern, J. Tintinalli, The globalization of emergency medicine and its importance for public health., Bull. World Health Organ. 84 (2006) 835–839. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2627492/ (accessed March 11, 2024).

[10] S. Mason, E.J. Weber, J. Coster, J. Freeman, T. Locker, Time Patients Spend in the Emergency Department: England's 4-Hour Rule—A Case of Hitting the Target but Missing the Point? Ann. Emerg. Med. 59 (2012) 341–349. https://doi.org/10.1016/j.annemergmed.2011.08.017.

[11] C. Sullivan, A. Staib, S. Khanna, N.M. Good, J. Boyle, R. Cattell, L. Heiniger, B.R. Griffin, A.J. Bell, J. Lind, I.A. Scott, The National Emergency Access Target (NEAT) and the 4-hour rule: time to review the target, Med. J. Aust. 204 (2016). https://www.mja.com.au/journal/2016/204/9/national-emergency-access-target-neat-and-4-hour-rule-time-review-target (accessed July 10, 2025).

[12] T. Tenbensel, L. Chalmers, P. Jones, S. Appleton-Dyer, L. Walton, S. Ameratunga, New Zealand's emergency department target - did it reduce ED length of stay, and if so, how and when?, BMC Health Serv. Res. 17 (2017) 678. https://doi.org/10.1186/s12913-017-2617-1.

[13] S.L. Bernstein, D. Aronsky, R. Duseja, S. Epstein, D. Handel, U. Hwang, M. McCarthy, K.J. McConnell, J.M. Pines, N. Rathlev, R. Schafermeyer, F. Zwemer, M. Schull, B.R. Asplin, The effect of emergency department crowding on clinically oriented outcomes, Acad. Emerg. Med. 16 (2009) 1–10. https://doi.org/10.1111/j.1553-2712.2008.00295.x.

[14] A.M. Chang, A. Lin, R. Fu, K.J. McConnell, B. Sun, Associations of Emergency Department Length of Stay With Publicly Reported Quality-of-care Measures, Acad. Emerg. Med. 24 (2017) 246–250. https://doi.org/10.1111/acem.13102.

[15] D. van der Veen, C. Remeijer, A.J. Fogteloo, C. Heringhaus, B. de Groot, Independent determinants of prolonged emergency department length of stay in a tertiary care centre: a prospective cohort study, Scand. J. Trauma Resusc. Emerg. Med. 26 (2018) 81. https://doi.org/10.1186/s13049-018-0547-5.

[16] J.A. Lee, G. Wanjiku, N. Nduku, A.R. Aluisio, R. Kharel, J.T. Simiyu, B.W. Wachira, The status and future of emergency care in the Republic of Kenya, Afr. J. Emerg. Med. 12 (2022) 48–52. https://doi.org/10.1016/j.afjem.2021.11.003.

[17] T. Ayenew, M. Gedfew, M.G. Fetene, A.T. Telayneh, F. Adane, B.T. Amlak, B.S. Workneh, M.A. Messelu, Prolonged length of stay and associated factors among emergency department patients in Ethiopia: systematic review and meta-analysis, BMC Emerg. Med. 24 (2024) 212. https://doi.org/10.1186/s12873-024-01131-6.

[18] K. Siamisang, J.T. Tlhakanelo, B.B. Mhaladi, Emergency Department Waiting Times and Determinants of Prolonged Length of Stay in a Botswana Referral Hospital, Open J. Emerg. Med. 08 (2020) 59–70. https://doi.org/10.4236/ojem.2020.83007.

[19] Kenya Primary Healthcare Strategic Framework, (2019). https://www.partners-popdev.org/member-resources/kenya-primary-health-care-strategic-framework-2019-2024/

[20] D.W. Muke 2019, Quality Of Medical Care At The Emergency Departments Of Bungoma

County Public Hospitals, Kenya, (not published.).

[21] C.S. Katuti, Patient Level of Satisfaction with Perceived Health Service Quality in Nyandarua County Referral Hospital, (2018). https://ir-library.ku.ac.ke/handle/123456789/18946 (accessed March 14, 2021).

[22] L.K. Knight, U. of Nairobi, Factors Influencing Customer Satisfaction At The Accident And Emergency Unit In Kenyatta National Hospital, Nairobi, Kenya. By Knight Kavere Lekolool A Research Project Report Submitted In Partial Fulfillment For The Award Of The Master Of Arts Degree In Project Planning And Management Of The University Of Nairobi. 2013, 2013. http://erepository.uonbi.ac.ke/handle/11295/63634 (accessed February 28, 2021).

[23] H.I. Kusumawati, J. Magarey, P. Rasmussen, Analysis of factors influencing length of stay in the Emergency Department in public hospital, Yogyakarta, Indonesia, Australasia. Emerg. Care 22 (2019) 174–179. https://doi.org/10.1016/j.auec.2019.06.001.

[24] H. Kwon, Y.J. Kim, Y.H. Jo, J.H. Lee, J.H. Lee, J. Kim, J.E. Hwang, J. Jeong, Y.J. Choi, The Korean Triage and Acuity Scale: associations with admission, disposition, mortality and length of stay in the emergency department, Int. J. Qual. Health Care 31 (2019) 449–455. https://doi.org/10.1093/intqhc/mzy184.

[25] A.A. Ahmed, S.A. Ibro, G. Melkamu, S.S. Seid, T. Tesfaye, Length of Stay in the Emergency Department and Its Associated Factors at Jimma Medical Center, Southwest Ethiopia, Open Access Emerg. Med. 12 (2020) 227–235. https://doi.org/10.2147/OAEM.S254239.

[26] A.M. Stey, H.K. Kanzaria, R.A. Dudley, K.Y. Bilimoria, M.M. Knudson, R.A. Callcut, Emergency Department Length of Stay and Mortality in Critically Injured Patients, J. Intensive Care Med. 37 (2022) 278–287. https://doi.org/10.1177/0885066621995426.

[27] K. Mashao, T. Heyns, Z. White, Areas of delay related to prolonged length of stay in an emergency department of an academic hospital in South Africa, Afr. J. Emerg. Med. Rev. Afr. Med. Urgence 11 (2021) 237–241. https://doi.org/10.1016/j.afjem.2021.02.002.

[28] L. Salehi, P. Phalpher, R. Valani, C. Meaney, Q. Amin, K. Ferrari, M. Mercuri, Emergency department boarding: a descriptive analysis and measurement of impact on outcomes, Can. J. Emerg. Med. 20 (2018) 929–937. https://doi.org/10.1017/cem.2018.18.

[29] A.G. Belayneh, Y.Z. Temachu, M.A. Messelu, M.H. Gebrie, Prolonged length of stay and its associated factors at adult emergency department in Amhara region comprehensive specialized hospitals, northwest Ethiopia, BMC Emerg. Med. 23 (2023) 34. https://doi.org/10.1186/s12873-023-00804-y.