Relationship between Triage Patients Related Factors and 48 Hours Outcomes at the Accident and Emergency Department, Kenyatta National Hospital

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ABSTRACT

Context: The goal of triage is to prioritize patients who require the most urgent care and increase efficiency when resources are insufficient to treat all patients as per their degree or grade of injury. An effective and efficient emergency center triage system should be able to sort both trauma and non-trauma patients according to the level of acuity and involves treatment as per the physiological parameters, either coded as red, orange, yellow, green, or black. Kenyatta National Hospital has adopted the South African Triage Score (SATS), which has proven effective in monitoring the patient's physiological parameters. It involves using a score form called triage early warning scores (TEWS). Emergency triage is an effective way to speed up the triage process, decrease waiting times, and boost patient outcomes in first-world nations. Low-income or limited-resource situations present unique obstacles that substantially affect the selection and application of the most suitable triage scale and the success of its implementation.

Aim: The objective of the study was to determine the relationship between triage patients related factors and 48 hours outcomes at the Accident and Emergency Department, Kenyatta National Hospital

Methods: The study was a cross-sectional study involving the triaged and coded patients flagged by scores using the Triage Early Warning Score (TEWS). A sample of 385 patients were from the accident and emergency department at Kenyatta National Hospital, whereby a structured interview questionnaire and patient outcomes observation checklist were used.

Results: The study indicated that patient-related factors significantly influenced the management outcome of triaged patients' (t-statistic=0.210, p-value = 0.039 < 0.05).

***Conclusion*:** It is, therefore, important to note that patient-related factors impact the outcome of triaged and coded patients in the accident and emergency department at Kenyatta national hospital. The hospital management reviews the triage process and policy to ensure that the patients can be followed up easily; using an online queue system guide, monitoring of the patient system and subsequent follow-up that reduces waiting time.

Keywords: Triaged, patient factors, Kenyatta National Hospital, accident, and emergency department

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1. Introduction

Patients needing rapid medical attention may first get health care in an emergency room. Death or permanent impairment may arise from failure to provide timely, appropriate care to such patients *(Sunyoto et al., 2014).* Implementing an effective emergency triage tool can relieve pressure on already overworked emergency services by ensuring patients receive the most appropriate amount and quality of care according to their clinical status and need. Among these is the South African Triage Scale (SATS). In order to improve the efficacy of the emergency department, this system was made for use by non-specialist (nursing) staff to identify patients at increased risk of mortality (*Rosedale et al., 2011).* It has been linked to beneficial outcomes like shorter wait times, shorter lengths of stay, and lower mortality rates in the institutions where it has been assessed, including both urban and rural facilities in South Africa, where it was established, and elsewhere *(Sunyoto et al., 2014).*

The SATS has three parts: The Triage Early Warning Score (TEWS) paperwork, the discriminator list, and the senior healthcare professional's final judgment. Patients are given ratings based on their vital signs. Both the subject's movement and awareness are factored into the total score. After the process, the scores are tallied and recorded as a whole. The discriminator list consists of conditions that place a patient in the appropriate category (emergency (red), very urgent (orange), or urgent (yellow)) regardless of the triage early warning scores *(Wallis et al., 2006).*

The SATS's third component gives control of the system to a seasoned healthcare leader. The red code indicates an emergency and requires immediate attention, the orange code requires up to 10 minutes, the yellow code

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requires up to 60 minutes, and the green code requires up to 240 minutes. Of those individuals, 166 (48%) were seen in the optimal amount of time *(Soogun et al., 2017).*

The South African Triage Scale (SATS) comprises the Triage and Early Warning Score (TEWS), comprised of measurements of mobility, respiration rate, heart rate, systolic blood pressure, temperature, degree of awareness, and presence of injury. The other two parts of the SATS are a set of clinical differentiators and the expert verdict of a licensed medical doctor. Therefore, the SATS considers physical signs and symptoms in addition to injury and mobility status. Médecins Sans Frontières has implemented the triage scale in Ghana and other countries outside of South Africa. Although the South African Triage Scale is useful in trauma situations, it has yet to be compared to other trauma scoring systems for firearm injuries *(Aspelund et al., 2019).*

A study conducted at Kenyatta National Hospital found that patients scoring 6 had an increased risk for unfavorable outcomes like death, cardiac arrest, or unscheduled admission to the intensive care unit. Six hundred and thirty-four cases were reviewed in a study published in 2006 using the modified early warning score (MEWS), and researchers found that seventeen percent of the population had triggered the call-out algorithm for review. Five percent of these individuals required unexpected admission to a critical care unit (ICU) *(Gardner-Thorpe et al., 2006).* According to the triage early warning scores, there were instances of under-triage for patients with scores of 7 and over-triage for patients with scores >7 *(Mutahi, 2019)*. Similar results were obtained in the United States using the early warning score, where patients admitted to the ICU scored higher than those admitted to the normal wards. Mean, maximum, and median scores were all greater in the deceased compared to the living *(Liu et al., 2020)*.

Regarding patient-related factors, patient health status might be a factor that controls the outcomes. Patients in a Swedish study had a median age of 66, and 86.4% had a history of medical conditions, most of which were related to the cardiovascular system (28.6%). These conditions included hypertension, stroke, myocardial infarction, and heart failure. The second most prevalent set of prior diagnoses was psychiatric, including conditions like anxiety, depression, and substance abuse (17.8%) *(Magnusson et al., 2020).*

Patients with a history of circulatory diagnoses, such as prior stroke, myocardial infarction, or hypertension, were more likely to be determined to need hospitalization for treatment. Green triage was most often connected with no transport. Patients transported to the hospital were more likely to be evaluated for abdominal/flank pain and injury/head trauma than those not evacuated *(Magnusson et al., 2020).*

Factors about the patients were another class of those examined, all of which influenced the triage decisions. This study found that patients rated vital signs, type of injury, and pain as the most relevant elements in triage. In contrast, gender and history of disease were rated as the least important. In this regard, *Anderson and Wittwer (2004)* found in a study that the position of the patient, the patient's overall condition, the patient's potential risk, the patient's discomfort, laboratory findings, and physical examinations are among the most significant and useful elements in triage decision-making *(Anderson & Wittwer 2004).*

According to *Burr's (2006)* study, patients' pre-existing conditions, mechanism of injury, and vital signs are the most influential elements in triage decision-making. In contrast, age and gender are the least influential. Another study reports that a patient's vitals, chief complaint, disease history, and clinical examinations are the most influential aspects of the triage process *(Patel, 2008).* Other studies have found that patient-specific clinical criteria, such as the nature of the illness or injury and the severity of its symptoms, are major contributors to triage decision-making *(Thompson & Dowding, 2001).* Considering this, decisions in the emergency department are based on how the patient feels physically and mentally.

2. Significance of the study

Overcrowding in emergency rooms due to a rise in the number of people using these facilities over the past few decades is a problem worldwide. Approximately 12% of the worldwide disease burden is attributable to trauma, making it an extremely time-sensitive condition. Low- and middle-income countries are disproportionately hit by trauma's health and economic consequences. Over six million people worldwide lose their lives every year as a direct result of catastrophic injuries. Injury causes up to 16% of all disabilities worldwide, with a death incidence that is two to three times higher in low- and middle-income countries (9-12% and 5.5%) *(Wesson et al., 2014).*

According to a study of low- and middle-income nations, the annual cost of injury-related direct medical expenses was 15% of gross domestic product per capita. The rates of injury and death from injuries are increasing, despite improvements in trauma care and the growth of preventative initiatives. This issue is exacerbated in underdeveloped nations when only emergency services provide access to the healthcare system. Overcrowding has been demonstrated to negatively affect the healthcare system, as evidenced by higher expenses, lower efficiency and quality of care, and more adverse events and deaths *(Wesson et al., 2014).*

Patients with abnormalities in their physiological parameters are at a higher risk for severe adverse outcomes (unplanned admission to the intensive care unit, cardiac arrest, or death), proving the necessity of constant monitoring *(Klepstad et al., 2019).*

There is a need for further investigation into the factors influencing the outcome of triaged and coded patients at Kenyatta National Hospital, and this investigation should include both trauma and medical emergencies, as suggested by a study on the utility of triage scores conducted there *(Mutahi, 2019).* This study confirms the World Health Organization's earlier claims that emergency treatment in low and middle-income nations is an understudied subject. The causes are many, but they boil down to a lack of institutionalized emergency triage procedures, a dearth of trained researchers, and a bias toward treating trauma

patients in hospitals. These middle-income low-resource countries are conducting research that may help close significant knowledge gaps.

The emergency care and trauma systems at Kenyatta National Hospital (KNH) have implemented a mandated triage mechanism to help the accident and emergency nurses assess patients. The largest referral hospital in the region has adopted the South African Triage Scale (SATS) system. Triaged and coded patients at Kenyatta National Hospital's emergency room have not been the subject of a published study. Because there is a dearth of research in this field, this study aims to identify the relationship between patient-related factors and 48 hours outcomes at the accident and emergency department of Kenyatta National Hospital. Based on the results of this research, a decision support system will be developed to treat patients triaged as "orange" and at risk of deterioration while receiving treatment.

3. Aim of the study

The study aimed to determine the relationship between triage patient-related factors and 48 hours outcomes at the Accident and Emergency Department, Kenyatta National Hospital.

4. Subjects & Methods

4.1. Research Design

The study was a cross-sectional study. In a cross-sectional study, the investigator measures the outcome and the exposures in the study participants at the same time. The participants in a cross-sectional study are just selected based on the inclusion and exclusion criteria set for the study. Once the participants have been selected, the investigator follows the study to assess the exposure and the outcomes.

4.2. Study setting

The research was carried out at Kenyatta National Hospital. Kenyatta National Hospital is the largest public hospital in East and Central Africa, with 1800 tertiary care beds. There are a total of 50 patient rooms, with ten specialized for surgery patients. Kenyatta National Hospital has two emergency departments, one dedicated to pediatric medical emergencies and the other to trauma and medical emergencies; it also has three critical care units, twenty outpatient clinics, twenty-four operating rooms, and a pediatric filtration clinic. Kenyatta National Hospital's customer base extends across the country and into East Africa. In 2016 and 2017, Kenyatta National Hospital's emergency room treated between 31,978 and 61,840 patients, admitted between 20,267 and 21,731 patients, and treated an average of about 4,000 patients per month.

The acute and emergency department has a triage area run by a South African Triage Scale trained nurse and a medical officer as a team leader, as well as resuscitation rooms A and B (Resuscitation Room A, Resuscitation Room B), two trauma theaters (1 & 2), acute rooms number 9, and specialized review rooms for surgical, obstetrical, and medical patients. Four separate consultation rooms are also available for use in non-emergency situations. The South African Triage Scale and Triage Early warning score are used at the triage desk to classify all patients, except pediatric medical and maternity patients, who present to Accident and Emergency at Kenyatta National Hospital.

4.3. Subjects

A systematic random sample of patients who were properly coded and triaged upon arrival at the Kenyatta National Hospital's emergency room was recruited for this study. A systematic random sampling technique was adopted to obtain the requisite sample from the target demographic, which involves selecting respondents on different days of the week over a two-month period. After adding 10% to get the total up to 395, the total was divided by the total number of days in the two months, which was 56, yielding a sample size goal of 7. The average number of patients triaged and coded monthly is 3,900, so we split that figure by 28 (representing four weeks) to obtain 139. Then we divided that number by 48 (representing the maximum amount of time allowed to review the outcome), resulting in 3. After triaging 395 patients, the researcher randomly picked 395 more patients to be coded by putting the numbers 1-3 on pieces of paper, folding them, and selecting a number at random. The researcher also completed a daily checklist for a total of two months.

Inclusion criteria

- All triaged and coded patients presented at the accident and emergency department.
- Triaged and coded patients who consented.

Exclusion criteria

- Any triaged and coded patient referred to other facilities on arrival and thus unable to continue with follow-up.
- Patients brought in death or certified as death upon arrival to accident and emergency.

Sample size determination: Sample size was calculated using the Fisher's formula *(Fisher et al., 1935).*

$$n = \frac{Z^2(1-P)}{d^2}$$

Where,

n= desired sample size (if the population exceeds 10,000).

Z=Standard normal deviation at the required confidence interval. In this case, it was 1.96.

P=The % of the proportion in the target population estimated to have characteristics being measured since its unknown 50% is used.

q= (1-p)

Hence q= (1-0.5)

d=The level of statistical significance is 0.05 =95% ci

Hence

n= (1.96)2 * (0.5) (0.5)/ (0.05)2

n= 3.8416*(0.25)/ (0.0025)

n= 0.9604/ 0.0025 = 385

n = 385

4.4. Tools of data collection

4.4.1. Structured Interview Questionnaire

It was used to capture the respondents' demographic data, such as age, gender, marital status, and level of

education. Other variables included the triage category, patient's health status on arrival, and triage early warning score (initial) were identified; the research assistants filled this in after getting consent from the respondents.

4.4.2. Patient Outcomes Observation Checklist

A checklist was also used in order to identify the patients' outcomes. It included four sections that included the intervention needed for each patient after review of after triage, such as resuscitation, intubation then, ventilation, oxygen supplementation, emergency surgery, fluid or blood resuscitation, and pain control. The second section includes the patient outcomes after an intervention, such as admission to the critical care unit (CCU), to a high dependency unit (HDU), general word, or referral.

The third section includes the triage early warning scores (TEWS), which comprise measurements of mobility, respiration rate, heart rate, systolic blood pressure, temperature, degree of awareness, and presence of injury. A possible sum score ranges from 0-16. The patients' score was classified accordingly to routine (below 3), urgent (3-4), very urgent (5-6), and emergency (above 7). The fourth section included the patients' outcome after 48 hr. of intervention, such as admission to the critical care unit (CCU), high dependency unit (HDU), or general word.

4.5. Procedures

The Kenyatta National Hospital's Accident and Emergency research team contacted patients who satisfied the inclusion criteria and followed them. At the same time, they were in Accident and Emergency or the adult wards (which include a trauma theater, resuscitation rooms (acute medical and surgical holding sections, and specialist review rooms for surgical patients). Staff at the Kenyatta National Hospital's accident and emergency were well-versed in the South African Triage Scale/Triage Early Warning Scores charts. It used them to triage every patient who came in. Patients who met the inclusion criteria were triaged and observed for 48 hours. Patients were tracked based on the interventions they received, the intervals between those interventions, and the patient's final triage and coding status.

The research assistants were trained in data collection, identifying the respondents, and filling out the questionnaires accurately. Two research assistants were recruited during the whole process. Piloting of the research instruments was done at Kakamega County referral hospital as they were using a triage process similar to Kenyatta National Hospital, ten percent of the total sample was used to test the reliability of the research instrument.

The first step in the triage procedure is to ask the patient, their family, or a legal guardian why they are at the emergency room. The triage practitioner has already begun quickly screening the patient for any emergency clinical indications as this question is being asked and answered. Medical personnel followed the ABC-C-C-DO (airway, breathing, circulation, coma, convulsions, dehydration, other) algorithm for children. The patient was given a red priority level and rushed to the resuscitation area if critical clinical indications were detected.

If no critical symptoms were observed during the examination, the researcher looked for very urgent (orange) or urgent (yellow) indicators instead. Vitals were taken, Triage Early Warning Scores were computed, essential further investigations were checked, and the patient's triage priority was revised regardless of their presence. A Triage Early Warning Score is not required at triage if the patient exhibits any emergency indications. As soon as possible, the patient be transferred to the resuscitation bay. Finally, the clinical nurse practitioner or senior doctor could override the final triage priority assigned.

A panel of experts determined the validity of an instrument to determine the extent to which the study instruments accurately measured what was intended to measure according to the study's aim. The pilot tests were used to test the feasibility of the research process. The research instruments were checked for completeness to ensure all data was captured and all the required parts were completed. The questionnaires and checklist were coded for easy follow-up, so no questions were left out. The pilot study used 10% of the total sample size or 39 people. Due to its similarities to KNH, the pilot study was conducted in the Kakamega County referral hospital.

The validity of a tool is the extent to which it measures the constructs it is intended to measure *(Porter, 2010).* According to *Mugenda and Mugenda (2008)*, validity refers to how accurately the findings of a study reflect the phenomenon being investigated. The summary of the validity test is shown in Table 1.

Table (1): Instrument validity testing.

Factors	KMO test	Barlett's test of sphericity		
		Chi-Square	Df.	Sig.
Management outcome of triaged patients.'	0.996	311.67	3	0.034
Patient-related factors	0.813	302.87	3	0.022

Extraction Method: Principal Component Analysis. Table 1 displays the results of the chi-square test used to determine the significance of Bartlett's test. All the variables are significant at the 0.00 level of significance. Hence the null hypothesis is rejected. Table 1 shows that the Kaiser-Meyer-Olkin (KMO) sampling statistic indicates a KMO value greater than 0.5, indicating that the sample size is large enough to assume a normal distribution. Bartlett's sphericity test, which examined whether or not the "item to item correlation matrix based on the replies obtained from respondents for all the effective variables was an identity matrix," was statistically significant.

All retrieved variables had Cronbach's Alpha values over 0.7, meeting the minimum threshold for reliable data *(Mugenda & Mugenda, 2008).* Reliability is the extent to which a research instrument consistently has the same results if used in the same situation repeatedly. After the pilot study, the researcher performed a reliability test on the questionnaires administered. Here the researcher administered the questionnaires at the beginning of the month when the sample for the pilot study shall be done at

Kakamega county hospital and then noted the respondents' responses and counterchecked against the responses yielded at the same questionnaires at the end of the pilot study.

First, an internal consistency method was taken, and then a pilot study was conducted to prove that the instrument was consistent in measuring its target variables. It can be trusted if a questionnaire has a Cronbach's Alpha of 0.70 or higher *(Bujang et al., 2018).* Using SPSS, a reliability test was conducted on the independent variables (factors related to patients, institutions, and providers) and the dependent variable (management outcomes for triaged patients). The findings are displayed in Table 2.

Table (1): Instrument reliability testing.

Variables	Cronbach alpha
Management outcome of triaged patients.	0.861
Patient-related factors	0.799

4.6. Data analysis

Three hundred seventy-two of the 385 questionnaires sent to the study's representative sample were filled out and returned. Accordingly, 372 were properly filled, and these individuals served as the participants for the analysis, yielding a response rate of 96.62 percent. Soft copies of acquired data were saved in a computer with password-protected folders, while hard copies were maintained in a locked cabinet.

Professionally trained research assistants who followed up with patients for 48 hours filled out the questionnaires. When all questionnaires were returned, the information was loaded into IBM SPSS version 25.0 and evaluated. Continuous data were used to build and illustrate normal distributions and interquartile ranges. The studied data was classified, and frequencies and percentages were computed and reported. To determine patient-related factors associated with the result, we used descriptive statistics, cross-tabulations, and chi-square tests of independence.

5. Results

This section analyzes information regarding the age, gender, marital status, and level of education of the respondents. The primary goal was to identify any response pattern that could be directly related to the study's independent variables. The results are summarized in Table 3. From the table, patients aged 36-60 years were 32% and male respondents represent 60.5% that recorded the highest frequency. Also, married were 56.5% and A-level education constitutes 45.7% of the respondents recorded the highest frequency.

Table 4 summarizes the frequency and percentage distribution of patient triage category, status on arrival, and triage early warning scores. The table reveals that 70% of the studied emergency patients had a score of three according to ATS, 77.2% were sick on arrival and did not require oxygen administration, and their triage early warning score (initial) was 4 in 66.1% of the admitted patients.

Figure 1 illustrates the percentage distribution of the cause of patient illness on admission. 35.75% were admitted for medical emergencies, and 31.99% were admitted for road traffic accidents. Also, 16.13% were admitted due to fall and 12.9% were admitted due to asualt.

Table 5 demonstrates the frequency and percentage distribution of patients' outcomes after 48 hours of intervention. The review after intervention or triage reveals that 40.6% needed fluid or blood resuscitation, 24.7 % required pain control, and 16.4 needed intubation and mechanical ventilation. After interventions, 69.9% required admission to a general ward, and 17.5% needed admission to the critical care unit. After 24 hours of care, the Triage Early Warning Scores score of 51.1% were 5-6 (very urgent) and 33.9% urgent (3-4). Also, most patients (80.6%) required admission to a general ward and 10.8% to a critical care unit after 48 hrs. of admission.

Table 6 shows that with a significance level of 0.05, the F-statistic = 0.044 has a p-value of 0.039. The ANOVA test's significant value = 0.039, which is less than the 0.05 level of significance, shows that the independent variable in this model, namely patient-related characteristics, is essential in predicting the result of the management of triaged patients. Based on these results, it can be concluded that the model is well-fitting; therefore, it is necessary to determine the coefficients and their importance, as shown in the table below.

Table 7 shows that the *p*-value of the coefficient to patient-associated factors is 0.039, less than the 0.05 significance level. Consistent with these results, the study shows that patient-related characteristics significantly impacted the management outcome of triaged patients. (t-statistic =0.210; p-value = 0.039). With a positive correlation of 0.143 for patient-related characteristics, the study finds that these variables benefit the outcome of patients' management after being triaged and coded in the emergency room at Kenyatta National Hospital. As a result, the management outcome of triaged and coded patients in the emergency room increased by 0.143 for every unit increase in patient-related parameters.

Table (3): Frequency and percentage distribution of patients' demographic characteristics.

Demographic characteristics	Frequency	Percentage
Age		
Below 18 years	59	15.9
19-35 years	112	30.1
36-60 years	119	32.0
Above 60 years	82	22.0
Gender		
Male	225	60.5
Female	147	39.5
Marital status		
Married	210	56.5
Single	112	30.1
Widowed	15	4.0
Divorced/separated	23	6.2
Cohabiting	12	3.2
Level of education		
University education	97	26.1
College Education	65	17.5
A-level	170	45.7
O-level	40	10.8

Table (4): Frequency and percentage distribution of patient triage category, status on arrival, and triage early warning scores.

Variables	Frequency	Percentage	Mean±SD
Triage category			
ATS two	39	10.5	2.55±1.148
ATS three	260	70.0	
ATS four and five	73	19.4	
Status of the patient on arrival			
Very sick on oxygen	85	22.8	1.77±0.420
Sick, not requiring oxygen supplementation	287	77.2	
Triage early warning scores (initial)			
3	47	12.6	2.09±0.576
4	246	66.1	
5	50	13.4	
6 or 7	29	7.9	

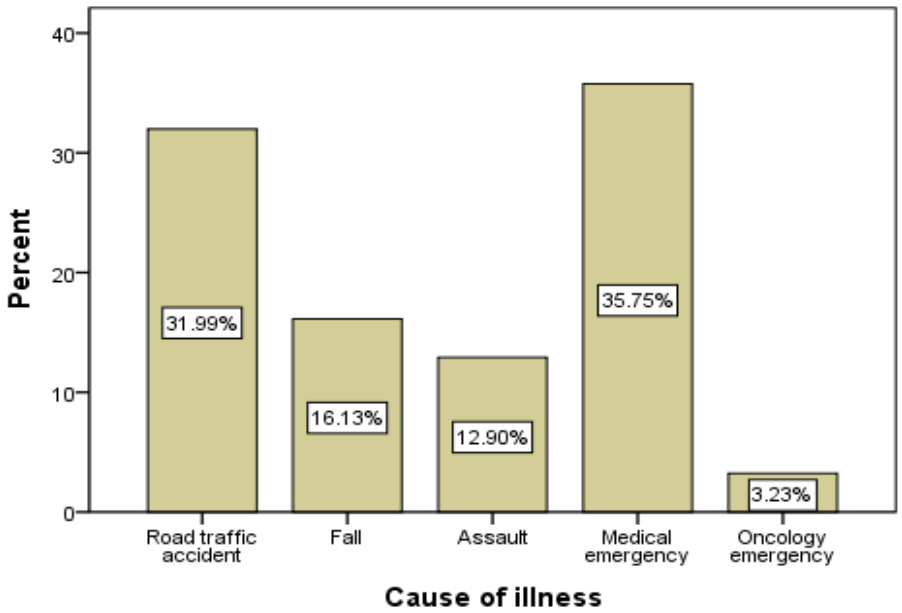

Table (5): Frequency and percentage distribution of patients' outcomes after 48 hours of intervention.

	Frequency	Percent	Mean±SD
Interventions after review or after triage			
Resuscitation	7	1.9	4.41±1.472
Intubation then ventilation	61	16.4	
Oxygen supplementation	40	10.8	
Emergency surgery	21	5.6	
Fluid or blood resuscitation	151	40.6	
Pain control	92	24.7	
Outcomes after intervention			
Admission to CCU	65	17.5	3.63±0.829
Admission to HDU	28	7.5	
Admission to the general ward	260	69.9	
Referral	19	5.1	
Patients' TEWS score after 24 hours of care			
Emergency (above 7)	40	10.8	2.39±0.785
Very urgent (5-6)	190	51.1	
Urgent (3-4)	126	33.9	
Routine	16	4.3	
Outcomes after 48 hours of interventions			
Discharge	12	3.2	3.63±0.801
Admission to CCU	40	10.8	
Admission to HDU	20	5.4	
Admission to the general ward	300	80.6	
Total	372	100.0	

Table (6): The ANOVA test between management outcome of triaged patients and patient-related factors.

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	29.766	1	4.961	0.044	0.039[b]
Residual	22.892	8	0.177		
Total	52.657	9			

a. Dependent Variable: Management outcome of triaged patients.
b. Predictors: (Constant), Patient-related factors

Table (7): Relationship between management outcome of triaged patients and patient-related factors.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.486	0.250		0.25	0.004
Patient-related factors	0.143	0.069	0.074	0.21	0.039

a. Dependent Variable: Management outcome of triaged patients.

6. Discussion

Resource-limited settings are increasingly experiencing a 'triple burden' of disease, comprising trauma, non-communicable diseases (NCDs), and known communicable disease patterns. However, the epidemiology of acute and emergency care needs to be better characterized, and this characterization limits efforts to further develop emergency care capacity *(Myers et al., 2017)*. So, this study aims to determine the relationship between triage patient-related factors and 48 hours outcomes at the Accident and Emergency Department, Kenyatta National Hospital.

This section analyzes information regarding the age, gender, marital status, and degree of education of the respondents. The primary goal was to identify any response pattern that could be directly related to the study's independent variables. From the demographic characteristics, it is evident that the highest percentage of the respondents were 36-60 years old. This finding shows that the most affected individuals in accidents and emergencies are those in the working group (36-60 years). Concerning gender, nearly two-thirds of the patients were males. On the other hand, more than half of the respondents were married, and nearly half of the respondents had attained A- level education.

A similar age was reported by *Myers et al. (2017)* in a study about patient characteristics of the accident and emergency department of Kenyatta National Hospital, Nairobi, Kenya: A cross-sectional, prospective analysis. The study reported an average age of 36, with males representing half of the studied patients.

On causes of illness, more than one-third of the patient's admission was due to a medical emergency, and road traffic accidents were presented in around one-third. Medical emergency cases and accident victims carry the biggest burden of the services needed in the department, this calls for a more collaborative approach to ensure effectively and quality care is given. This finding jibes with data from a Swedish study showing that most of the patients had a history of medical problems, the majority of

which were cardiovascular in nature, including hypertension, stroke, myocardial infarction, and heart failure (medical emergency). The second most prevalent set of prior diagnoses was psychiatric, including conditions like anxiety, depression, and substance abuse in less than one-quarter of the patients *(Magnusson et al., 2020).*

Patient-related factors associated with the management outcome of triaged patients within 48 hours of follow-up at the accident and emergency department, Kenyatta National Hospital reveals that most of the triaged patients had a score of 3 according to ATS, while level 4 and 5 scores were more than nineteen percentage and level two was constituting more than ten percent. Regarding the patients' status on arrival majority were not requiring oxygen supplementation. Those in need of oxygen supplementation were nearly a quarter of patients, meaning there must be a reduction in waiting time and reduced crowdedness of patients to ensure the sick patients get adequate care. These findings are consistent with *Myers et al. (2017),* who reported that seven percent of patients were triaged as 'emergent,' 14% as 'very urgent,' 35% as 'urgent,' 35% as 'routine,' and 9% as 'undesignated.'

On interventions, after review, more than two-fifths of the patients required blood or fluid resuscitation, around one-fourth needed pain control, and less than one-fifth needed intubation and ventilation. These findings might be because around one-third of the studied patients were admitted due to road traffic accidents, plus more than one-quarter of those patients were admitted due to falls and assaults. This finding was also explained by around one-fifth needed intubation, ventilation, and admission to the critical care unit, while more than two-thirds were discharged to the general ward emphasizing the importance of triaging. As more than half of the studied patients had a very urgent level, according to TEWS, more than one-third had an urgent level, and more than one-tenth needed emergent intervention. This finding means that most of the patients received at Kenyatta national hospital were sick and required adequate trauma care; this means that the resources available may not be adequate to meet the demands at all times.

This finding corresponded with a study by *Anderson and Wittwer (2004)* that demonstrated that patient-related factors represent a distinct class of influences on triage decisions. This study found that patients rated vital signs, type of injury, and pain as the most relevant elements in triage. In contrast, gender and history of disease were rated as the least important. In this regard, Anderson *and Wittwer (2004)* found in their study that the position of the patient, the patient's overall condition, the patient's potential risk, the patient's discomfort, laboratory findings, and physical examinations are among the most significant and useful elements in triage decision-making.

The study concludes that patient-related factors significantly affected the management outcome of triaged patients, with a positive correlation for patient-related characteristics. The study finds that these variables benefit patients' management outcomes after being triaged and coded in the emergency room at Kenyatta National Hospital. As a result, the management outcome of triaged and coded patients in the emergency room improved by 0.143 for every unit increase in patient-related parameters. The state of the patient's body and mind must be considered when making decisions in the emergency department.

This finding agreed with a study by *Burr (2006)*, who had also reported that patients' existent problems, mechanism of injury, and vital signs are the most important factors, and age and gender are the least important factors affecting triage decision-making. Also, in another study, factors such as vital signs, the main complaint, disease history, and clinical examinations were reported as the important factors affecting triage decision-making *(Patel et al., 2008)*. Also, according to the results of other studies, clinical factors related to the patients, especially the type of the disease or injury and the intensity of the disease signs, have been among the important factors affecting triage decision-making *(Dadashzadeh et al., 2013)*.

7. Conclusion

On patient-related factors associated with the outcome of triaged and coded patients in the accident and emergency department at Kenyatta National Hospital, the study concludes that patient-related factors significantly influenced the management outcome of triaged patients. This result means that patient-related factors like the cause of injury and the patient's status on arrival will influence the outcome positively; this means that triaging process should be seamless to adequately improve the patient outcome.

8. Recommendations

The recommendations that have been identified as key to improving patient management outcomes include:

Kenyatta national hospital management to review the triage process and policy to ensure that the patients can be followed up easily; using an online queue system will guide monitoring of the patient system and subsequent follow-up, thus reducing waiting time.

Kenyatta National Hospital and Ministry of Health to ensure that adequate equipment, e.g., oxygen points and monitors are available and stocking adequate drugs, which are important in resuscitation and other management. There is a need to increase infrastructure and space to reduce overcrowding, which may be a risk to the patients and staff.

To improve patients, more skilled personnel need to be employed by Kenyatta national hospital, including doctors, laboratory staff, and nurses; the staff will also require more training in triaging and trauma management skills.

Further research can be done to determine the patient satisfaction levels and the staff training needs assessment.

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