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ASSESSMENT OF THE TRIAGE SYSTEM AT THE EMERGENCY DEPARTMENT OF THE GREATER ACCRA REGIONAL HOSPITAL

BY

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DECLARATION

I, Christiana Asante. declare that with the exception of quotations and references contained in published works which have all been identified and acknowledged, this thesis is entirely my own work, and it has not been submitted either in part or whole for another degree elsewhere.

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DATE: _____/ _____/ 2019

DEDICATION

To my loving husband, Mr. Ebenezer Asante and our children, Yaa Asantewaa, Kwadwo Ofosuhene and Kwadwo Addo.

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Writing a research paper is an enormous undertaking. While the final report reflects the work of an individual, it cannot be completed without the help, input, support and encouragement of others. This work is no exception. I am most grateful to God for the grace and favour I received from him to complete this programme successfully.

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ABSTRACT

Background: Triage ensures that patients are treated in order of their clinical urgency. However, developing and less developed countries, including Ghana, are not utilizing the full potential of the triage system. The purpose of this study was to assess triaging of patients at the Greater Accra Regional Hospital.

Methods: A quantitative cross-sectional study design was employed in this study. Triage records of 1,520 patients from July to September was assessed using a checklist. A self-administered structured questionnaire was administered to 26 ED staff. Descriptive analysis of demographic data was carried out showing frequencies, averages and standard deviations of the variables. The Chi-square statistic (χ^2) was used to assess the relationship between triage outcomes and process, and triage outcome by sex distribution.

Results: There was good emergency department utilization among patients (75%). There were 22.6% admissions, 22.6% discharges and 19.7% referrals after triaging. The triage process was mainly high acuity triaging (71.5%), with under triaging and over triaging accounting for 23.3% and 5.2% respectively. However, staff shortage (92%), inadequate materials and resources to work with (85%) and overcrowding (77%) were the challenges faced by the ED staff with the smooth implementation of the triage process.

Conclusions: General ED utilisation was good among the patients and the triage process was generally satisfactory although there were over and under triaging. However, implementation of the triage process was not without challenges. It is recommended that staff communications and interactions should be improved and undertake workload assessment.

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LIST OF ABRREVIATIONS

ACEM:	Australasian College for Emergency Medicine
ACSCOT:	American College of Surgeons Committee on Trauma
ATS:	Australian Triage Scale
CTAS:	Canadian Triage and Acuity Scale
ED:	Emergency Department
ESI:	Emergency Severity Index
METTS:	Medical Emergency Triage and Treatment System
MTS:	Manchester Triage Scale
QA:	Quality Assurance
RN:	Registered Nurse
SATS:	South African Triage Scale
SRTS:	Soterion Rapid Triage Scale
TTS:	Taiwan Triage System
WHO:	World Health Organization

CHAPTER ONE

INTRODUCTION

1.1 Background

Decision making in the health sector with regard to effective distribution of scarce resources is a key lifesaving phenomenon (Opiro, Wallis, & Ogwang, 2017). In terms of allocating healthcare resources, correct decisions must be made to ensure effective allocation of the resources especially when the demand for them significantly exceeds the available resources.

These decisions made at various levels of the health sector ensure that allocation of the health care resources is prioritized. Healthcare providers at the Emergency Departments (ED) are sometimes compelled to decide on the patients to receive immediate care and the patients who need to wait when there is high demand for health care services. This underscores the need for limited health care resources to be used in a way that provides the most effective and timely services for most people (Opiro et al., 2017).

The ED is a vital entry point for patients who demand immediate health care services (Kobusingye et al., 2005). A holdback in providing timely and appropriate care to such patients may result in death or permanent disability (World Health Organization [WHO], 2012). Although patients at the ED require immediate care, it is essential to note that not all of them have their health care needs satisfied instantly. In order to maximise the outcome of interventions given to patients at the ED, it is important to rationalise the care given to them using a proper guiding tool (Opiro et al., 2017).

The triage scale is one of the tools used to reduce tension on limited health care resources when providing emergency health care services to patients at the ED. The triage scale aspires to ensure that patients obtain the most immediate and effective care relative to their clinical condition and need, which finally results in the satisfactory use of the health care providers' time and resources (Richardson et al., 2009). The concept of the implementation of triage at the ED is to ensure that patients are treated based on the severity of their condition and that the intervention given is timely according to the clinical urgency of their condition.

The triage system used at the E.D today was introduced in the 1950s in the United States (Gilboy, Travers, & Wuerz, 1999). Triage is the ultimate task in an ED and is vital for rating the severity of patients' condition (Gerber Zimmerman & McNair, 2006). Rating is important to discover the order in which patients should be given care in an ED when there is high demand for emergency healthcare services. In the absence of queuing for care, triage is not needed.

The vital signs of the patient such as respiratory rate, oxygen saturation in the blood, the pulse, temperature and the patient's chief presenting complaints are considered for making triage decisions (Farrohknia et al., 2011). Triage is not only used at the E.D. It may also be used in other clinical areas to determine certain treatments (Jolliffe, Harris, Morris, Wallacet, & Whittaker, 2001; Alcazar et al., 2008). Triage scales aim to provide satisfactory waiting times to patients according to the severity of their clinical condition, in order to provide timely intervention and to avoid negative outcomes resulting from prolonged and undue delays at the health care facility before treatment.

The triage decision making process is affected by three factors. These factors comprise the clinical features of the patients, the healthcare provider who makes the triage decision and the setting where healthcare is being provided. The importance of triage includes optimal use of time and healthcare resources, enhancing the efficiency and productivity of the ED, promoting quality of care and boosting patient and family satisfaction with health care services provided (Whitby et al., as cited in Qureshi, 2010).

Quite a number of triage systems have been introduced to hospital ED worldwide to enhance effective clinical decision making and timely intervention (Richardson et al., 2009). Some countries initiated and developed triage for the ED in the early 1990s (Parenti, Ferrara, Bacchi, Sangiorgi, & Lenzi, 2009; Taboulet et al., 2009). Triage scales developed in the 1990s and 2000s were designed as a 5-level scale which resulted from the motivation of FitzGerald (FitzGerald, as cited in Farrohknia et al., 2011). Today, the Australian Triage Scale (ATS), Canadian Emergency Department Triage and Acuity Scale (CTAS), Manchester Triage Scale (MTS), and Emergency Severity Index (ESI) have greatly influenced modern ED triage (Manchester Triage Group, 2006).

Other scales that are not known globally include the Soterion Rapid Triage Scale (SRTS) from the United States, the 4-level Taiwan Triage System (TTS) (Gottschalk, Wood, DeVries, Wallis, & Bruijns, 2006; Chi, & Huang, 2006) and the South African Triage Scale (SATS), which was developed in South Africa (Rosedale, Smith, Davies & Wood, 2011). It has been made compulsory for some countries such as Australia, to use a national triage scale. This is the opposite to that of Europe where it is not

mandatory for most countries in Europe to use a national triage scale (Parenti et al., 2009; Taboulet et al., 2009).

In resource limited sub-Saharan African nations, including Ghana, the adoption and use of international triage systems may not be suitable. The South African Triage Scale (SATS), is a simple tool which has been found to be effective in resource limited countries (Rosedale et al., 2011). This was established for use by healthcare providers who are not specialists to recognise patients who are at higher risk for death and to also boost the efficiency and effectiveness of health care services provided at the ED. Reports concerning evaluation of the SATS in South Africa (Rosedale et al., 2011), and other countries where it is used, show that it has been associated with positive outcomes (Dalwai et al., 2013). These positive outcomes include reductions in patient waiting time, length of stay, and mortality (Molyneux, Ahmad & Robertson, 2006). At the same time, it contributes to improvement of the patient flow.

In a survey conducted to determine access to surgical and emergency care in sub-Saharan Africa, it was seen that not many (19-50%) hospitals were able to provide 24-hour emergency care services due to the lack of adequate infrastructure (Hsia, Mbembati, Macfarlane & Kruk, 2012). Even with the available infrastructure, emergency services must be enhanced in order to provide better health care outcomes. Anthony (2011) explained that one way is the use of simple tools such as triage. The Ridge Regional Hospital is one of the major health facilities in the country which is well furnished with modern equipment. The introduction of triage into the emergency care of patients at the hospital is known to have significantly reduced patient waiting time at the OPD of the hospital and also promoted how high risk patients were

identified and categorised (Owen et al., 2016). This study was therefore aimed at assessing triaging in general and its outcome at the Ridge Regional Hospital in Ghana.

1.2 Statement of the Problem

The burden of emergency conditions remains increasingly high in sub-Saharan Africa with many people dying from those conditions (Opiro et al., 2017). Specifically, many people died in resource limited settings where health care providers were overburdened with emergency care services before the introduction of the SATS tool in those settings (Sunyoto et al., 2014). Although most developed countries have identified the importance of triage in ED, Ghana and some developing and less developed countries have failed to fully utilize standardised tools for triage in the ED (Qureshi, 2010).

The triage system has also been incorporated into the emergency medical services in Ghana. Most regional, teaching and specialist hospitals in Ghana have EDs where triaging is incorporated into their emergency decision making practices. Triage should be completed by a specifically trained and experienced registered nurse (RN) (Fathoni, Sangchan & Songwathana, 2013). Therefore, triage nurses must exhibit effective critical thinking skills to provide healthy and timely health services where information available are scanty or ambiguous. The knowledge and experience of triage nurses is considered a factor that contributes to the triage decision making process (Considine, Botti & Thomas, 2007).

The recent “No bed syndrome” that has bedevilled many referral hospitals in Ghana may be linked to the triage practices being carried at the ED of these facilities (Badu, 2018). The Greater Accra Regional Hospital serves as a major referral health facility

for most health facilities within the Greater Accra Region. Staff at the recently built ultramodern ED of the Greater Accra Regional Hospital practice triaging.

Patients who are triaged at the ED are either treated and discharged, admitted to the hospital or referred to higher equipped facilities for care. Studies on the effectiveness and outcome of triage in the Ghanaian health sector is lacking (Afaya, Azongo & Yakong, 2017). The critical nature of the ED setting at the Greater Accra Regional Hospital and the key role that triage plays in the effective management of clients at the ED, underscores the need to assess triage practices at the ED. This will help determine the quality and effectiveness of the triage system being practices and its outcomes at the ED of the Greater Accra Regional Hospital.

1.3 Research Questions

1. What is the utilization of ED services at the Emergency department of the Greater Accra Regional Hospital?

2. What is the Triage process at the Emergency department of the Greater Accra Regional Hospital?

3. What is the outcome of patients triaged at the Emergency department?

4. What are the challenges staff at the ED face with implementation of triage system.

1.4 Study Objectives

1.4.1 General Objective

The general objective of the study was to assess triaging of patients at the Greater Accra Regional Hospital.

1.4.2 Specific Objective

The specific objectives of the study were to:

1. Determine the utilization of ED services at the emergency department of the Ridge Regional Hospital.
2. Assess the triage process at the emergency department of the Greater Accra Regional Hospital.
3. Determine outcomes of patients triaged at the emergency department
4. Determine the challenges that the staff at the ED face with the implementation of the triage system at work.

1.5 Justification

Assessment of triage outcomes will help provide objective measurement of the effectiveness of the triage process in Ghana. This will help identify any gaps for improvement in order to promote quality health care in health care settings during emergency situations. Due to dearth of literature on triage outcomes in Ghana, the study findings will provide information that will add up to the few existing information on the triage practices and its outcome in ED settings in Ghana. Secondly, findings from the study will provide evidence-based information that will inform decision making and policies on the needed interventions that will effectively improve upon triage practices in the Greater Accra Regional Hospital. The outcome of the study will also provide direction for future research on triage in Ghana.

1.6 Conceptual Framework of Triage

Emergency department utilization, or "ED Utilization," refers to how often a person, population or patient uses the emergency department for any reason. Patients who report to the ED within 24 hours of onset of their clinical signs and symptoms are

described as good ED users whilst those who report 24 hours after onset of their clinical signs and symptoms are described as poor ED users.

As shown in Figure 1.1, triaging process is done within the ED in order to ensure effective decision making at the ED. The triage process helps to determine which patient to be attended to first and what interventions are appropriate at that very moment in order to save life, prevent complication and reduce patient waiting time (Richardson et al., 2009). The triage process may end up however as high acuity proportion, under triaging and over triaging (Sasser et al., 2012). Associated with the triage process are challenges that staff at the ED face with the implementation of triage.

However, the outcome of patient's condition after triaging may either be a discharge, admission to the main ward or referral to a higher facility – as shown in Figure 1.1.

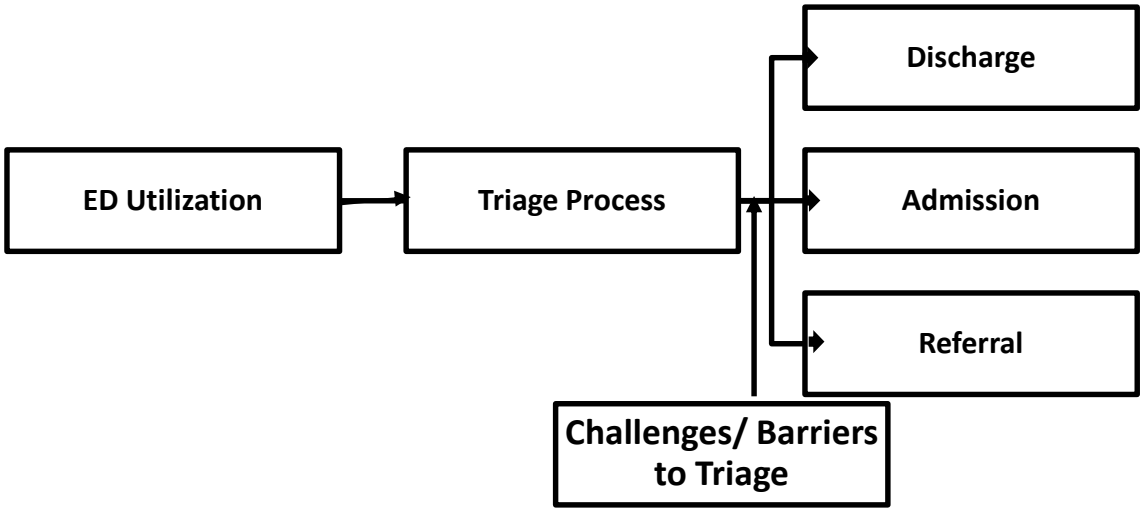

Figure 1.1: Conceptual framework on triage

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Literature review for the study is presented in this section. The literature review for this study was from articles published online. These were accessed from search engines online such as Google scholar, Hinari, PubMed, Pdfsearchengine, and CINAHL. This includes an overview of studies on triage process and ED service utilization among patients and studies on the implementation of the triage process at the ED. Moreover, the review of related literature gives factual review of the previous literature on the outcome of patients triaged at the ED and challenges faced with the implementation of the triage system.

2.1 Triage Process and ED Utilization

Sunyoto et al. (2014) in their cross-sectional study assessed the SATS system in a referral hospital in Somaliland. The emergency care services in the Burao district hospital in Somaliland was assessed using the American College of Surgeons Committee on Trauma (ACSCOT) indicators. They assessed and analysed triage data of all patients who sort emergency treatment services from the ED of Burao Hospital from January to December, 2012.

They found out that the ED of Burao General Hospital made a total of 7212 consultations in 2012. More than 40 cases per day were occasionally noticed on peak days with patients usually arriving at the ED in rush hours which peaked between 9 am and 11 am, and then reducing to a lesser extent between the periods of 4 pm and 6 pm. Reporting late to the ED after development of symptoms were noticed. Only 21%

of the total of 5017 patients who had emergent cases reported to the ED within 24 hours after developing the symptoms.

Picotti, Magnani, Tubino, Sartini and Di Pietro (2008) conducted a pilot study on the assessment of the triage system in the ED of Giannina Gaslini Children's Hospital in Genoa. The study found out that the hospital guidelines warranted 94% patients' vital signs to be checked, while 84% were assigned yellow code in the triage process. However, main symptoms were identified in 97% out of the 130 cases assessed. The percentage of underestimation was 3.2% and, this was found to be higher compared to the 2% which was reported in existing literature. They concluded that there was the need to improve compliance with the guidelines used for in triaging of patients at the ED.

Sunyoto et al. (2014) in their cross-sectional study in Somalia assessed the SATS system in a referral hospital in Somaliland. The ACSCOT indicators used for rating in the triage process are high acuity proportion, over triage and under triage with high priority emergency cases ("high acuity" proportion), over triage and under triage with limits of less than 25%, more than 50% and less than10%, respectively. Using the ACSCOT indicators as their SATS targets (ACSCOT, 1999), Sunyoto et al. (2014) found that among the patients presenting at the ED, red and orange cases constituted 6% and 17% of the total patients respectively, indicating 23% high priority emergency cases. Several delays in receiving care at the ED after they had reported to the health facility were also noticed. Majority of the cases (60%) were assigned with red codes. It was also observed that only half of the cases coded orange received treatment within the set time of 10 minutes. Patients who had their set time to receive treatment delayed, were at high risk of death compared with all patients treated within time. It was

concluded that particular attention is needed to enhance the relatively low rate of actual emergency cases, holdup in patient presentation and timely provision of care within the ED.

On the other hand, Opiro et al. (2017) using a descriptive cross-sectional design assessed 6 hospitals within the Acholi sub-region in Northern Uganda on hospital-based adult triage systems at emergency receiving areas. The aim of this study was conducted to assess the hospital triage systems, the caliber of triage staff and barriers that impede the development of the triage systems. Although their study design was the same, Opiro et al. (2017) did not assess the triage process using the ACSCOT indicators employed by Sunyoto et al. (2014). The participants were mainly nurses, doctors and physician assistants with majority of them having not having less than one-year experience in providing emergency care. It was noted from the study that out of the six hospitals, only one had a formal local triage guideline. The triage staff for the rest of the hospitals used their subjective eyes to decide the highest priority cases with no formal protocol. Only two hospitals out of the six hospitals had an ED department. Other hospitals had not specialized ED. Triage in such hospitals with no ED was reported to carried in the OPD and the wards. It was found that health care providers who carried out the triage in these hospitals were mainly registered and enrolled nurses

Furthermore, the findings of Opiro et al. (2017) reveal that three colour codes were used for triaging at the St. Mary's Hospital, Lacor were red, yellow and green. Protocols regarding how to triage patients were responded to be kept on the wall or in drawers for it to be accessible.

Lyons, Brown and Wears (2007) assessed the flow of patients through triage in a London hospital emergency department. This was a mixed method study in two phases. The first phase comprised 16 hours triage in the ED which was observed and interviews conducted with the triage staffs. Triaging of 247 patients was assessed for a period of two months. The average spent by a patient with the triage nurse in the reception booth was about 13 minutes. Also, the average time spent by the patient from entry to the triage and departure was about 4 minutes. None of the patients were triaged to be on a waiting list for resuscitation.

Further analysis showed significant differences in the times taken to triage a patient between the areas to which a patient was triaged as well as the persons responsible for their care. Within groups, the variance between patients triage by ED staff thus, both majors and minors was significant. However, no significant difference was found when the triaging of patients to other health care providers outside the hospital was compared with the triaging of a patient to a specialty area inside the hospital. A significant increase in the time for triaging was found for patients triaged to be cared for by specialties staff in the hospital as compared to those triaged to be cared for by the ED staff in triaging a patient (Lyons et al., 2007).

In addition, there was no significant difference in the time used for triage among patients triaged for other areas seen by a specialty staff. There was increased triage time for patients' specialty care but with no significant difference in their triaging time regarding whether or not patients were accepted or refused by the specialties. However, clients who were not triaged to receive treatment at different departments spent more time in the ED but no difference in triage time as to whether the specialties accepted or refused the patients. These imply that patient who receive active treatment

in triage spend more time They also found an overall increase in the time to triage patients who were deemed by triage as requiring specialty care, but no difference in triage time regarding whether the specialties accepted or refused the patients. Together, these statistics implied that any contact with a specialist, thus whether the patient is to be seen within the emergency department or within the specialty area within the hospital, causes an increase in triage time. Patients who received active treatment in triage for example wound dressing, arranging tests and occasional prescriptions, took significantly longer to triage than those patients who were triaged into the department (Lyons et al., 2007).

A quality improvement study was conducted to evaluate the implementation of nurse-led emergency triage in a large Ethiopian teaching hospital by Abdelwahab, Yang and Teka (2017). This was a retrospective review of patient records guided by the Donabedian model. A 45% random sample was selected from all adult emergency patients during the study period which was from May 10th to May 25th 2015. They assessed the presence and proper completion of the triage form. Triage level was then abstracted and compared with patient outcomes to quantify over- and under-triage triage. The most common chief complaints found were abdominal pain (17.8%), fever (11.1%), chest pain (8.9%), headache (8.9%), and diarrhoea/ vomiting (8.9%).

During the study period, Abdelwahab et al. (2017) found that 11.1% of the patients were triaged to Red, 15.6% were triaged to Orange, 33.3% to Yellow, and 33.3% to Green. None of the 45 triage forms were filled out completely. Patient medical record number and name were completed for all patients, and age and sex were completed over 95% of the time, but over 80% (82.2%) were missing the patient's address. Date (88.3%), time (91.1%), and mode (62.2%) of arrival were completed on the majority

of the triage forms. Information about pre-hospital first aid was only recorded in two cases, and referral source was only recorded for 33.3% of the cases. Triage nurses did not consistently record the examination room where the patient should be treated.

Furthermore, heart rate was the most consistently recorded vital sign with a 97.8% completion rate, followed by systolic blood pressure (93.3%), temperature (86.7%), exposure to trauma (84.4%), mobility (82.2%), respiratory rate (82.2%), and level of consciousness (82.2%). The final summed TEWS was not recorded in eleven cases. From these, five were assigned a triage level without any additional justification, three were assigned triage levels based on discriminating factors, and three had no final triage level recorded at all. Discriminating factors (injury mechanism, presentation, pain level) were recorded in 21 cases, and in six of those cases, the discriminators were used to assign a higher triage level than would have been indicated by TEWS alone (Abdelwahab et al., 2017).

Aloyce, Leshabari and Brysiewicz (2014) made observations involved the assessment of the airway, respiratory and circulatory status, pain assessment, short history taking, documentation of the assessment findings, and assigning category of care in four emergency departments in Dar es Salaam, Tanzania. This was a combined descriptive cross-sectional and observational study to assess knowledge and skills of triage amongst nurses working in the emergency centres. The assessment was done using a structured questionnaire, an observation checklist and a triage equipment audit record. They found that airway patency, auscultation of breath sounds and chest movement were not assessed by any of the nurses in the ED who were performing triage. Breathing patterns were not assessed by 32% of the nurses, respiratory rate was not assessed by 84% of the nurses, and cold or warm extremities assessments as a sign of

circulatory failure were not assessed by 32% of the nurses all in the ED who were performing triage.

However, the level of oxygen saturation in the arteries was assess by 84% of the ED nurses. Although the pulse status of the patients was normal the

Majority (90%) of the ED nurses who were performing triage checked the blood pressure and pulse status of the patients. However, the pulse status thus whether normal, thready or weak was not assessed recorded.

The ED nurses who were performing triage did not assess did not assess the pain of the patients neither did the take information concerning the medical history, medication history and the presenting problem as a short form of patient history. No further assessment was carried out on the patients who were triaged and waiting to enter the treatment room for care, to assess whether their condition has changed or not. Most of the triaging was done by the nurses at the ED who documented their findings from assessments done on patients. However, no record was kept on the triage category of care given to the patients after being triaged (Aloyce et al., 2014).

2.2 Outcomes of Patients Triaged at the ED

The end results for patients in connection with their SATS score revealed that the general ED default rate was 2.0% and with a death rate of 1.3% in Somaliland. There was a correlation between the hospital admission and death rate with the degree of urgency of patients' condition, as anticipated. They found out that patients who were defined with over triage (40%) and under triage (9%) indicators represented 50% and 10% respectively under the pre-set threshold. It was found out that the paramount causes of mortality rate at the ED were cardiovascular conditions (17%), lower respiratory tract infections (14%) and fatal injuries from accidents (12%).

In their mixed method study on triage in a London hospital emergency department, Lyons et al. (2007) found that a total of 34 patients out of the 247 patients assessed, were seen and treated and left the department directly after the triage process concluded. On the other hand, Abdelwahab et al. (2017) in their retrospective review of patient records in an Ethiopian teaching hospital, assessed the availability and correct completion of the triage form. The triage level was then withdrawn and compared with the end results of patients to measure conditions that are triaged as over triage or under triage. Most patients (71.1%) were alive during their time of discharge from the ED and few (28.9%) were given admission at the hospital after they had received emergency care at the ED. Out of the 13 patients that were given admission, four (two medical, two surgical) of them were assigned Green code representing 30.7% under- triage rate. Also, out of the 32 patients who were discharged alive from the ED, seven (medical) of them were assigned Red codes representing an over-triage rate of 21.9%.

To test the credibility of a contemporary protocol for Emergency Medicine, Widgren and Jourak (2011) assessed a large cohort of 8695 patients referred to in-hospital care from the ED of the Sahlgrenska University Hospital at Göteborg, Sweden. They employed a new five-level triage tool known as the Medical Emergency Triage and Treatment System (METTS), integrating it with the results of the patients' vital signs, and his or her clinical manifestations in making triage decisions. Half of the patients were admitted at the ED by ambulance and other half walked into the ED to be admitted. It was observed that those who were brought in by ambulance had a significantly long hospital stay compared with the patients who walked in for their admission. It was also noticed that occurrence of incidence of death among those admitted by ambulance was higher (8.1%) compared to the walk-in patients (2.4%).

Patients given higher triage priority are at the risk of death. These patients are classified as the highest priority groups. It was found in the study that 32-53%patients who belonged to this group. In the highest priority groups, 32–53% of the patients were run down to a lower priority level after receiving primary treatment. They found that the METTS protocol was a well-grounded triage method and a responsive tool for consequential re-evaluation of the patient in the ED.

2.3 Challenges that Staff at the ED Face with the Implementation of Triage System

Triage is complicated. It requires a conducive physical environment with adequate staff personnel. The triage nurse must have a distinctive training, competence and appreciable experience in order to make timely decisions about the patient's needs. To assess, preserve and enhance the quality of care given to patients in the ED, the efficient use of equipment, proper documentation and best practices must be monitored and encouraged (Research in Focus on Research, 2006). This was commissioned by the Triage Project in Canada to scrutinize both the triage environment and the procedures used by different hospitals. As part of the survey, administrators were asked to provide details of problems experienced in triage under six areas. These areas were crowding, documentation, physical layout, attitudes, staffing and training, and quality assurance. Respondents reported that poor physical layout contributed to the difficulty in monitoring and communicating with patients, led to crowding and difficulty in providing privacy for patients.

Overcrowding at EDs is also a major challenge for triage workers. The Australasian College for Emergency Medicine (ACEM) defines ED overcrowding as the situation where functions of the ED are obstructed fundamentally due to large number of

patients waiting to be catered for, those undergoing assessment and treatment, or waiting to be discharged which exceeds the staffing scope of the ED (Australasian College for Emergency Medicine, 2002). Emergency department overcrowding is a common scenario across the globe (Carrus, Corbett & Kandelwai, 2009; Moskop, Sklar, Geiderman, Schears, & Bookman, 2009) and means like staff, space and equipment are scarce. Most patients are sometimes compelled to spend more time to wait before they are seen by a doctor (Carrus et al., 2009). The result of this is not solely inconvenience but a destruction in the care experience. Patient's safety may be threatened, cost of care may increase and staff morale will be reduced.

In addition to that, in Canada, the Research in Focus on Research (2006) group in their Triage Project found that crowding occurs due to large number of patients that exceeds the environmental space of the EDs. This can impede triage activities, affect privacy, and make it difficult for staff to monitor patients effectively. Staff may control the crowding situation by assigning lower or higher Canadian Triage and Acuity Scale (CTAS) scores that are suitable to define the level of crowding. One of the best ways to control crowding is by increasing the number of staff on duty. Renovation of the ED department is also considered as one of the best options to control crowding. This involves the provision of spacious triage waiting areas and segregation of patients based on the priority of needs on admission. Alert systems can also be installed in the hospital facility to enhance immediate and timely response to emergency situations in the health facility. Crowding can also be reduced by providing and encouraging the use of walk-in clinics.

The Triage Project in Canada by Research in Focus on Research (2006) group noticed that with regard to documentation some vital information were reported missing from

triage records and this impaired reassessment. Inadequate space on the triage form for recording information and lack of time for documentation were given as the main reasons for such a misconduct. Reports on the use of pain scale was also not documented due to "on-going issues with accurate documentation of objective-subjective data." In some situations, the code documented by the ambulance paramedic is written as the triage code, or variations between the two codes leading to confusion.

Similarly, Abdelwahab et al. (2017) using sample of 251 patient logbook in a tertiary hospital in Ethiopia, observed that only 42.1% of the charts had a triage formed filled for analysis. Thus, an indication of poor documentation. Their work however, was guided by the Donabedian model compared to the Research in Focus on Research (2006) group that applied no model to guide their study.

Negative attitudes of both patients and staff also represent a challenge to effective triaging. In Canada it was found that negative attitude of patients such as patients becoming irritated and aggressive when care provided by facility to patients is given based on triage and not first-come, first served basis. The workload of staff due to triage and reassessment also increase their levels of stress and results in occasional conflict among themselves during periods of disagreement in the triage process. (Research in Focus on Research, 2006).

In Uganda, Opiro et al. (2017) in their hospital-based descriptive cross-sectional study found that inadequate training of triage staff was the chief barrier to effective triage. This was seconded by inconsistencies in the triage scales from one hospital to another and inadequate staff on duty to perform triage. Moreover, lack of nationally recognized triage protocols, the absence of triage guidelines displayed in emergency

receiving areas and shortage of staff on duty were cited as the main barriers to the development of a formal triage system. The participants however, suggested that the possible way forward was to give consistent training on triage, acquire a universal triage scale nationwide, produce triage tools, thus charts and scales, and place them in open place in emergency receiving areas and the provision of administrative support in terms of number of staff on duty to help in improving the triage system. Sunyoto et al. (2014) highlighted the necessity for the establishment of emergency care thresholds that are more conducive to resource-poor environments.

Similarly, the Research in Focus on Research (2006) group found that health administrators in Canada reported staffing problems as a result of inadequate funding support for committed triage staff, lack of competent and experienced workers, difficulty in employing and maintaining staff, difficulty in providing in-service training to personnel, and the need for additional staff to substitute for those undergoing training

In their combined descriptive and observational study Aloyce et al. (2014) discovered low level of knowledge on triage among nurses working in EDs in Dar es Salaam, Tanzania. Knowledge on the South African Triage Scale (SATS) was assessed using a structured questionnaire. Thirty-three percent of the nurses did not have enough knowledge about triage. Fifty-eight percent had no knowledge regarding the waiting time limits (based on the SATS) for the different triage categories assigned to patients on their priority based on the severity of their conditions. In addition, 52% of the nurses were not able to triage patients when asked to triage the scenario based-situations

With regard to issues of Quaality Assurance (QA), the Research in Focus on Research (2006) group in Canada found that 40% of the EDs they assessed had no mechanisms for quality assurance (QA) mechanism in their triage activities and only 50% of them had intentions to develop one. Time and inadequate human resources were barriers frequently identified to having QA program. A standard audit tool known as an automated process, education and resources were identified as the acceptable items needed for setting up a QA program. In addition, Aloyce et al. (2014) also found inadequate equipment or materials needed for effective triaging at the EDs of the four hospitals assessed in Dar es Salaam, Tanzania. In this study, an audit record equipment was used to determine the availability of basic triage equipment assessment forms. It was found that only assessment only of the four hospitals had an assessment form on pulse oximeters, thermometer and pain assessment scale in their EDs. A pain assessment scale was not present in any of the four EDs used for the study. Furthermore, only one out of the four hospital EDs had triage protocols on how to carry out triage activities.

2.4 Summary

The literature presented information on triaging at hospital EDs within and outside Africa. Emergency department utilization in general was poor. No known publications have reported on the ED utilization situation in Ghana. Although triage process has been proven to be a good way of improving emergency care and reducing ED patient waiting time, not all ED do triage. Secondly, various triage processes have been reported in literature which shows discrepancies in the triage process from facility to facility and between countries. Assessment of the SATS triage process which is mainly designed for resource limited countries like Ghana is also limited. Challenges in the implementation of the triage system including suitable structural layout,

overcrowding, poor documentation, negative attitudes, poor staffing and less effective training remain. These have been reported in Australia, Canada and other African countries including Ethiopia, Uganda and Tanzania. However, these may not necessarily represent the Ghanaian situation. This study is therefore an attempt to fill this gap.

CHAPTER THREE

METHODS

3.0 Introduction

This section provides a description of the setting for which the research was carried out and the methods to be employed in carrying out this study. This comprises a description of the research design, target population, sample and sampling technique, tool for data collection, data collection procedure and data analysis. Validity and reliability, limitations of the study and ethical issues have also been described in this section.

3.1 Study Design

The study was quantitative and it employed a cross sectional retrospective design approach. Cross sectional study measures outcome and exposures at the same time and participants are selected based on the inclusion and exclusion criteria. This design was employed in this study to assess triaging process and it outcomes at the same time. (Sardana et al, 2016). Retrospective studies involve the collection of data about past events (Jupp, 2006). The main goal of retrospective studies is to collect past data to serve as means of determining change in a phenomenon for descriptive or explanatory purposes. It helps one to the able to study and understand contributory factors to any observed change over a period of time. This allows the researcher to develop ideas about possible associations and to be able to investigate potential relationships.

The quantitative research approach is described as a way of testing objective theories by way of examining relationships among variables (Moxham, 2012). By so doing, information gathered in a quantitative approach is quantified or in a numeric form which is referred to by White and Millar (2014) as statistical evidence. This helped

the researcher to assess how triaging is performed and the outcome of patients triaged at the Greater Accra Regional Hospital.

3.2 Study Location

The study was carried out at the Emergency Department (ED) of the Greater Accra Regional Hospital. The Hospital is located within the Osu-Klottey Sub Metropolis of the Accra Metropolis. The hospital has a general OPD, emergency/ casualty unit, dental and ENT units, ECG clinic, eye clinic, diabetic clinic, family planning/ cervical care unit, medical laboratory, blood bank, pharmacy, radiology department, public health unit, anti-retroviral treatment (ART) clinic and physiotherapy unit. The wards are medical ward, children's ward, VIP ward, female ward, postnatal ward, labour ward, surgical ward, theatre and a neonatal intensive care unit (NICU).

The Emergency Department of the Ridge Regional Hospital is one of the busy units in the facility. The department has a staff strength of 35 comprising nurses and doctors. It has a bed capacity of 45. It divided into four (4) bays – Orange, Red, Yellow and the Resuscitation Bay. The orange bay has 7 beds and the red bay has 8 beds. The yellow bay, which is the largest has about 26 beds and the resuscitation bay has 4 beds.

The ED has an average daily attendance of 40 patients. Common cases reported to the unit on day to day basis include Road Traffic Accidents (RTA's), trauma and injury from falls, hypoglycemia and hyperglycinemia. Cases of sudden collapse, seizures and fits, hypertensive urgency, acute abdomen, gastrointestinal bleeding GI bleeding among other surgical emergencies are the common cases received at the ED. The ED of the Greater Accra Regional Hospital was selected for the study due to its large clientele and the fact that it serves as the Regional Hospital for the Greater Accra Region.

3.3 Study population

The health professionals at the ED and triage records from the emergency department of the Greater Accra Regional Hospital were accessed and used for the study.

3.3.1 Inclusion criteria

Health Professionals

(1) Only nurses and doctors working at the ED qualified for recruitment for the study.

(2) Nurses and doctors who have had at least 2 years working experience at the ED of the Greater Accra Regional Hospital were selected the study.

Health Records

(1) Records on triaging carried out at the ED were used for the study.

(2) Only records on triaging from July to September, 2018 were included into the study.

3.3.2 Exclusion criteria

Health Professionals

Nurses and doctors at the ED of the Greater Accra Regional Hospital who were not willing to take part in the study were excluded from the study.

Health Records

Incomplete triage records were excluded.

Study Variables

The variables for this study are both independent and dependent, where the independent variables include the ED utilization, triage process and the challenges associated with triage implementation, and the dependent variables are the triage outcomes, as shown in Table 3.1.

Table 3.1: Variables

Dependent Variable	Independent Variables
Triage outcomes (1) Discharge (2) Admission (3) Referrals	Emergency service utilization
	High acuity proportion
	Under triaging
	Over triaging
	Challenges with triaging

Indicators

The indicators for this study show the number or proportion of patients that were admitted, discharged or referred to another facility (numerator) out of the total number of patients triaged (denominator), as shown in table 3.2

Table 3.2

Indicators	Definition	Numerator	Denominator
Admission	All patients admitted through the emergency unit to the ward	Number of patients admitted after triaging	Total number of patients triaged
Discharge	All patients discharged at the emergency unit	Number of patients discharged at the emergency unit	Total number of patients triaged
Referral	All patients referred to other facilities from the emergency unit	Number of patients referred to other facilities after triaging	Total number of patients triaged

3.4 Sample Size Determination

Health Professionals

The sample size represents the number of units selected from a population from which data is gathered (Creswel, 2015). However, in this study complete enumeration

method of sampling was used to select the all the 35 ED staff at the Greater Accra Regional Hospital due to their small number. However, only 26 staff completed and returned the questionnaires.

Health Records

All triage records from July to September, 2018 at the ED of the Greater Accra Regional Hospital were used as the sample size for the study.

3.5 Sampling Procedure

Health Professionals

No sampling procedure was employed since all staff in the ED were used for the study.

Health Records

Only the triage records available from July to September, 2018 at the ED of the Greater Accra Regional Hospital were identified and accessed for the study.

3.6 Data Collection Tools

Health Professionals

A self-administered structured questionnaire was administered to the staff at the ED of the Greater Accra Regional Hospital. This was in two sections. Section "A" covered demographic characteristics of the respondents including their age, years of work experience, category of staff. The Section "B" was on challenges that ED staff face with the implementation of triage at work.

Health Records

A self-developed checklist was used as the data collection tool. Items on the checklist included the following:

1. Folder/ identification number,

2. Demographic data (sex, age, diagnosis/ major complaint)
3. Period between onset of problem and reporting to the ED
4. ED reporting time
5. Time attended to at the ED
6. Assessment done at the ED
    a. Vital signs (temperature, pulse, respiration, blood pressure)
    b. Mobility
    c. Triage score and category (Red, Orange, Yellow, Green, Blue)
    d. Triage assessment (high acuity proportion, under triaging and over triaging)
7. Triage outcome (Discharge, Admission, Referral)

3.7 Data Collection Method

Health Professionals

After ethical clearance was sought from the Ghana Health Service Ethical Review Committee (i.e.,GHS -ERC 063/05/19), an introductory letter from the School of Public Health, University of Ghana, Legon, was sent to the management of the Greater Accra Regional Hospital to seek permission to collect data.

A copy of the letter each was sent to the medical officer and the nurse in-charge of the ED and the records officer in-charge of the ED records. The nurse in charge of the ED served as a contact person to introduce the researcher to the staff at the ED. The staff who agreed were given the questionnaires to fill. This was given to them individually. Enough time was allowed until the staff complete the questionnaire and submit to the researcher on their own accord after completion. The ED staff who were unable to

complete the questionnaires were allowed to return it on their next shift. This was to allow then have enough time to complete the questionnaire fully.

Health Records

The record officer served as contact person to assist the researcher with the needed triage records and patient folders from July to September, 2018. Triage records, patient folders, admission and discharge records and available electronic records on triage at the ED were all assessed and recorded on the checklist.

3.8 Quality Control/Assurance

(1) Data collection and entry was solely done by the researcher without aid from any fieldworker.

(2) The self-administered structured questionnaire and the checklist was designed in consultation with the supervisor to ensure validity. The questionnaire was given to the supervisor to review and approve before it was pre-tested.

(3) The questionnaire was pre-tested among 10 ED staff at the ED of the 37 Military Hospital. After that, the questionnaire was reviewed to ensure there are no ambiguous questions so as to ensure reliability of data collected.

(4) The self-developed checklist was given to the supervisor for revision and approval before actual data was collected. The researcher with assistance from the records officer at the ED of the Greater Accra Regional Hospital, collected the data from health records on triaging for the study. Data collection lasted two weeks.

(5) Data collected each day was cross-checked with the records officer and sent to the supervisor to peruse before data collection was done on subsequent days to ensure quality data. This was also to ensure that ensure that all data was

complete in order to avoid any missing data. Data was then entered into the SPSS (V. 22.0) and cross-checked with the supervisor to ensure that errors were reduced to the barest minimum.

3.9 Data Processing and management

Data gathered from all the questionnaires and patient's records were stored in a personal computer. A password was placed on all data to prevent access by unauthorized persons. Printed versions of questionnaires that were used for the study were kept in a cabinet under lock and key. All data collected are being kept for a period of five years after the study, after which they will be destroyed. Access to all data was available to only the researcher and supervisors for the purposes of ensuring confidentiality.

3.10 Data analysis

Pre-coded data were entered and cleaned in Excel Spreadsheet and analyzed using STATA 15.0. Descriptive analysis of demographic data was carried out showing frequencies, averages and standard deviations of the variables.

ED Service Utilization

Emergency department utilization was analysed by estimating the sum of clients who report to the ED within 24 hours of onset of symptoms (good ED users) and those who report to the ED after 24 hours of onset of symptoms (poor UD users). This was reported descriptively, using frequencies and percentages.

Triage Process

Triaging (high acuity proportion, under triaging and over triaging) was estimated. A summary of all Red and Orange cases who were admitted to the hospital as well as all Green and Yellow cases who were discharged after detention were estimated to

represent high acuity proportion. A summary of all Red and Orange cases who were discharged after detention were estimated to represent over triaging. A summary of all Green and Yellow cases that were admitted was estimated to represent the under triaging. This was reported descriptively using frequencies and percentages.

Triage Outcomes

Triage outcomes (discharge, admission, referral) was also analysed descriptively by summarising frequencies of all patients discharged, all patients admitted and all patients referred from the ED after triaging. Percentages of frequencies were also estimated. However, relationship between triaging and triage outcomes was tested using the Chi-square statistic (χ^2). The relationship between triage outcomes and gender was also tested using the Chi-square statistic (χ^2).

Challenges with Triaging

Analysis of challenges of triaging was done by estimating the frequencies and percentages of individual challenges reported by the staff at the ED.

3.11 Ethical consideration

Ethical clearance: Ethical clearance was obtained from the Ghana Health Service Ethics Review Commitee to conduct the study (i.e.,GHS-ERC 063/05/19).

Study area approval: An introductory letter from the school of public health, Legon, was also sent to the management of the Greater Accra Regional Hospital and the records officer in-charge of the ED. This was to inform them about the study, seek approval for the study in the hospital and introduce the researcher to them.

Purpose of the study: To assess triage and its outcomes at the Greater Accra Regional Hospital.

Description of population: The study population included doctors and nurses at the ED of the Greater Accra Regional Hospital with at least 2 years' experience and health records of patients triaged at the ED.

Description of consenting process: The staff at the ED were informed about the study. Those who agreed to take part in the study were asked to sign a consent form as evidence of their willingness to take part in the study. Participation was entirely voluntary and no one was coerced to take part in the study.

Voluntary withdrawal: Respondents were informed that they were free to opt out of the study anytime they felt uncomfortable to continue, without any consequences to them.

Potential risks and benefits: There were minimal risk associated with this study. There were no direct benefits of participating in this study, indirectly, the outcome of the study will inform decision making and policies on interventions to effectively improve upon triage practices in the Greater Accra Regional Hospital.

Compensation: No payments was made to respondents for taking part in the study.

Privacy and confidentiality: Questionnaires were administered individually to ensure privacy. Patients' triage records were only be accessed by the researcher with assistance from the records officer in order to ensure privacy. Patients' names and other identifying data were not taken. No identifying information of the ED staff were collected to ensure anonymity. Secondly, codes were assigned to each entry instead of names in order to ensure anonymity.

Data storage, security and usage: All data collected were stored and saved on a password protected computer. Hard copies of questionnaires and checklists were sealed and safely kept in the custody of the researcher and placed under lock in order

to ensure confidentiality of all information collected. Data collected was accessible to the researcher and the supervisor.

Declaration of conflict of interest: There exist no conflict of interest in this work.

Protocol funding information: This research work was solely funded by the researcher. No others funds were secured as sponsorship for this research.

CHAPTER FOUR

RESULTS

4.0 Introduction

This chapter presents the results of the study and is divided into sections. The first section reports on the demographic characteristics of participants. The rest of the sections present the results on the utilization of ED services at the ED of the Greater Accra Regional Hospital, triage process at the ED, outcomes of patients triaged at the ED and challenges that ED staff face with the implementation of the triage system at work.

4.1 Demographic Data of Respondents

As shown in Table 4.1, 56.3% (856) of the respondents were males and 43.7% (664) were females. Secondly, 22.1% (336) of the patients were 20-29 years old and 21.6% (328) were 30-39 years old with an average age of 44 years (SD (19.3).

Out of the total record of 1,520 patients assessed, 608 (40%) had diagnosis of Respiratory Tract Infection (RTI), Chronic Pulmonary Obstructive Disease (COPD) or Asthma. Most, of them had acute abdomen 26.6% (404), 20.3% (308) had trauma and 6.1% (92) had diarrhoea. The rest had no diagnosis reported, 7.1% (108).

Table 4.1: Demographic Data of Patients

Variable		Number	Percentage (%)
Sex	Male	856	56.3
	Female	664	43.7
Age group (years)	<19	92	6.1
	20-29	**336**	**22.1**
	30-39	**328**	**21.6**
	40-49	172	11.3
	50-59	212	13.9
	60-69	188	12.4
	70-79	120	7.9
	80+	72	4.7
	Mean age (years)	44	
	SD	19.3	
Diagnosis	Trauma	308	20.3
	Diarrhoea	92	6.1
	RTI/Asthma/COPD	608	40.0
	Acute abdomen	404	26.6
	Not diagnosed	108	7.1
Total		1,520	100.0

4.2 Utilisation of emergency health services at the ED

As shown in Table 4.2, 37.1% (564) of the patients reported to the ED less than 12 hours after onset of symptoms and 38.2% (580) reported to the ED within 12 to 24 hours after onset of symptoms. On the other hand, 18.9% (288) of the patients reported to the ED after 24 hours to 7 days after onset of symptoms, 5.5% (84) of them reported within 8 days to 1 month after onset of symptoms and 0.3% (4) reported after month of onset of symptoms. The records show that good ED users were 75.3% (1,114) and poor ED users were 24.7% (376).

Table 4.2: Utilisation of ED services

Variable		Number	Percentage (%)
Reporting time after onset of illness	<12hours	564	37.1
	12-24 hours	580	38.2
	>24 hours-7 days	288	18.9
	8 days -1 month	84	5.5
	>1 month	4	.3
ED Utilization	Good ED Users	1,144	75.3
	Poor ED Users	376	24.7
Total		1,520	100.0

4.3 Outcome of patients triaged at the ED

Table 4.3 shows that most of the patients, 22.6% (344) were admitted for further treatment and observation, 22.6% (344) were discharged after detention and 19.7% (300) were referred to higher level facilities for treatment.

Table 4.3: Outcome of triage

Triage outcome	Number	Percentage (%)
Discharged	344	22.6
Admitted	840	55.3
Referred	300	19.7
Defaulted	4	.3
Died	32	2.1
Total	1,520	100.0

4.4 Triage process at the ED

Table 4.4 shows that 37% (536) of the patients were categorised as Orange and 36% (532) were categorised as Yellow. However, 17% (252) were categorised as Green, 9% (128) were categorised as Red and 0.5% (8) were categorised as Blue.

Table 4.4: Triage process

Triage process		**Number**	**Percentage (%)**
Triage process	Red	128	9
	Orange	536	37
	Yellow	532	36.5
	Green	252	17
	Blue	8	0.5
Total		1,456	100.0

Majority of the triaging, 71.5% (820) that was done was high acuity triage. However, 23.3% (268) of the triaging done was under triaging and 5.2% (60) of the triaging done was over triaging. Triage process was significantly associated with triage outcome ($\chi^{2=}$ 391.869, p= 0.000) as shown in Table 4.5.

Table 4.5: Triage process and outcome

		Outcome				χ^2 test	P-value
		Discharged	**Admitted**	**Referred**	**Total**		
Triage process	Red	16	100	8	124	391.869	.000
	Orange	44	448	40	532		
	Yellow	176	212	140	528		
	Green	96	56	100	252		
Total		332	816	288	1436		

Level	**Number (n)**	**Percentage (%)**
High acuity	820	71.5%
Over triaging	60	5.2%
Under triaging	268	23.3%

The Chi Square statistic was used to estimate relationship between triage outcome by sex distribution. Triage outcome was not significantly associated with sex ($\chi^{2=}$ 4.730, p= 0.112) as shown in Table 4.6.

Table 4.6: Triage outcome by sex distribution

		Outcome			χ^2 test	P-value
		Male	Female	Total		
Triage outcome	Discharged	200	144	124	4.730	0.112
	Admitted	485	347	532		
	Referred	159	149	528		

Demographic Data of ED Staff

Majority of the ED staff, 73.1% (19) were females. Half of the ED staff, 50% (13) were 24-29 years old and 42.3% (11) were 30-39 years old. Their average age was 29 years (SD=3 years). Majority of them, 21 (80.8%) were nurses and 5 (19.2%) of them were doctors. Majority of the ED staff, 69.2% (18) have had less than 5 years' work experience and 26.9% (8) have had more than 5-10 years' work experience in respective fields of expertise, with an average of 5 years (SD=3.71) working experience. Most of them, 57.7% (15) had diploma and 30.8% (8) had a bachelors' degree. Majority of them, 73.1% (19) were married as shown in Table 4.7.

Table 4.7: Demographic Data of ED Staff

Variable		Number	Percentage (%)
Sex	Male	7	26.9
	Female	19	73.1
Age group (years)	<24	2	7.7
	24-29	13	50.0
	30-39	11	42.3
	Mean Age (years)	29	
	SD	3	
Marital status	Single	19	73.1
	Married	7	26.9
Profession	Doctor	5	19.2
	Nurse	21	80.8
Years of work experience (years)	< 5	16	61.5
	5-10	7	26.9
	> 10	3	11.5
	Mean (years)	5	
	SD	3.71	
Educational level	Diploma	15	57.7
	Degree	8	30.8
	Masters	1	3.8
	Other	2	7.7
	Total	**26**	**100**

4.5 Challenges with the implementation of triage

Figure 4.1. shows that the main challenges with the implementation of triage faced by the ED staff were shortage of staff, 92% (24), lack of materials and resources to work with, 85% (22) and crowding at the ED, 77% (20).

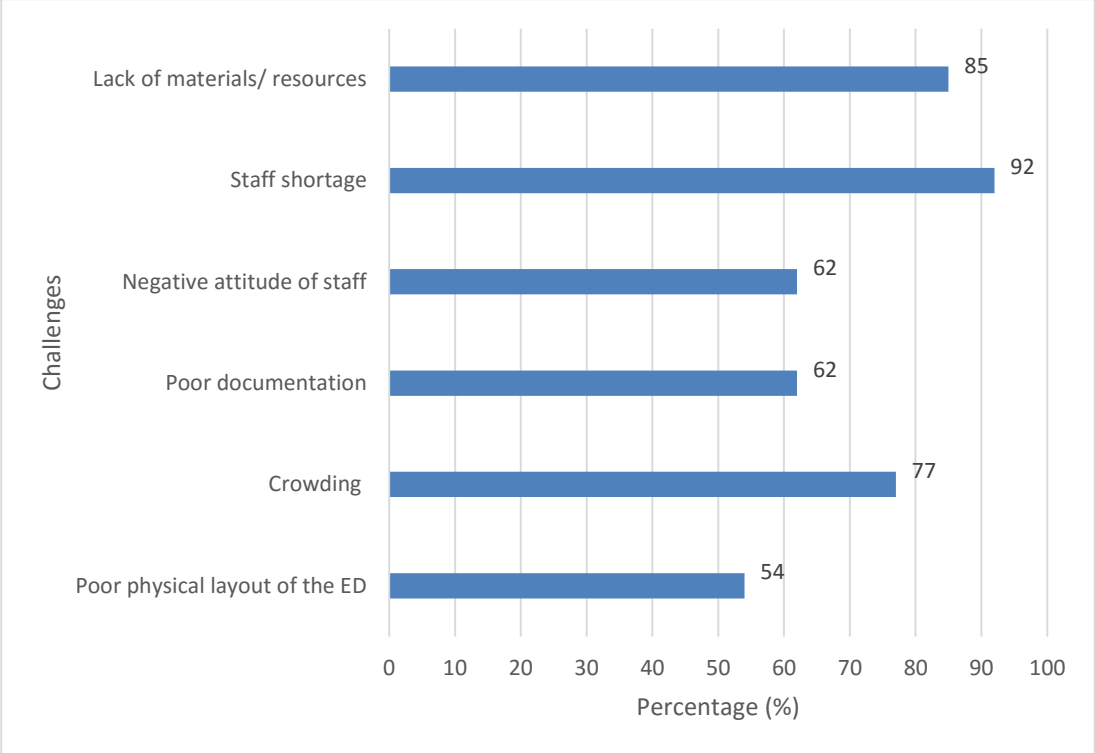

Figure 4.1: Challenges with triage implementation

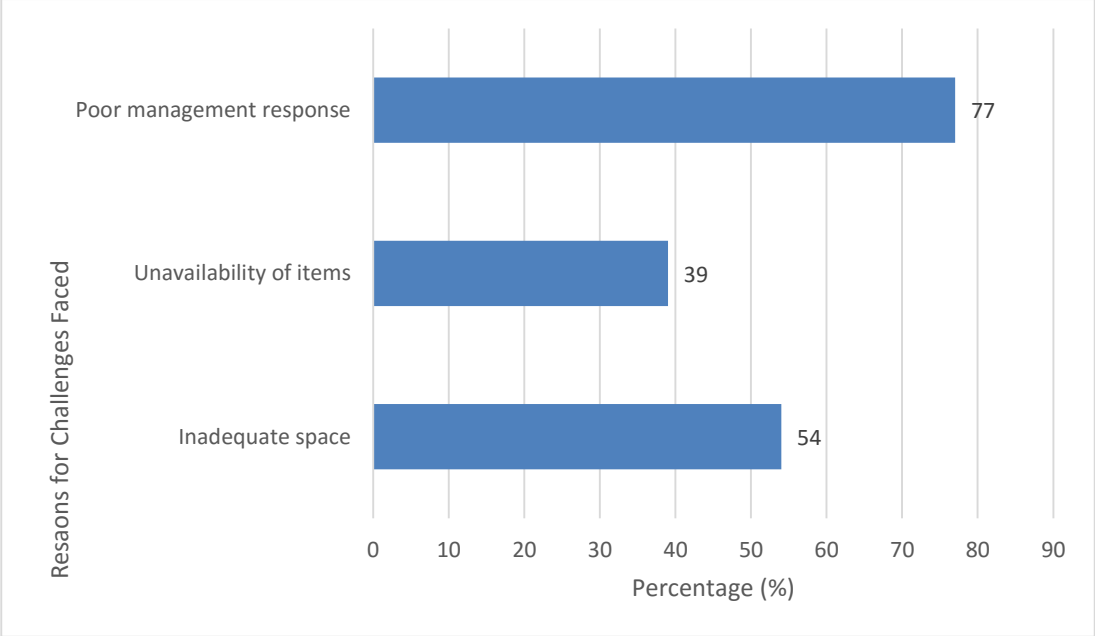

Figure 4.2: Reasons for challenges with triage implementation

Figure 4.2 shows that poor response from management (77% (20)) and inadequate space with which to operate (54% (14)), were the main reasons given for challenges faced with triage.

CHAPTER FIVE

DISCUSSION

5.0 Introduction

This chapter presents a discussion of the findings of the study. This comprised a comparison of the findings from the study to literature reviewed in the previous chapters in order to deduce meanings from the findings of the study. First in this chapter is a discussion of the demographic characteristics of the respondents in the study. Second is a discussion of findings on utilization of ED services, followed by a discussion of findings on triage process at the emergency department. A discussion of findings on outcomes of patients triaged at the emergency department and the challenges that the staff at the ED face with the implementation of the triage system at work are also presented in this chapter.

This study aimed at assessing triaging of patients at the Greater Accra Regional Hospital. Relatively equal numbers of males and females with a mean age of 44 years. Secondly, ED utilization was found to be good among the ED users (75.3%). General outcome of patients triaged at the ED showed 22.6% of admissions, 22.6% of discharges and 19.7% of referrals. The triage process carried out at the ED department was mainly high acuity triaging (71.5%), with under triaging and over triaging accounting for 23.3% and 5.2% respectively. This was also significantly associated with the triage outcomes. However, staff shortage (92%), inadequate materials and resources to work with (85%) and overcrowding (77%) were the challenges faced by the ED staff for the smooth implementation of the triage process.

Triage records accessed from July to September, 2018 shows almost equal numbers of males (56.3%) and females (43.7%) reporting to the ED for emergency health care services. Thus, an indication that both males and females almost equally access emergency health care services. The patients that usually report to the ED were mostly adults with an average age of 44 years. This is similar to the finding of Abdelwahab et al. (2017) in Ethiopia where the mean age of patients at eh ED was 38.16 years. However, about 64% of the patients in their study were male which is higher compared to the 56% of males reported in this study. This shows that the most ED users were middle aged persons. Usually, this stage is considered as a stage where people are still healthy and strong. However, the health status of adults in general has received little attention compared to adolescents (Park, Mulye, Adams, Brindis and Irwin, 2006). This therefore, is a strong indication for more attention to be given to the health status of the middle-aged Ghanaians.

5.1 Utilisation of emergency health services at the ED

One of the main objectives of this study was to assess the utilization of ED services. According to Kobusingye et al. (2005), the ED represents a crucial point of entry for health care services for clients that need immediate and urgent care. In this study about 75% of the patients reported to the ED within 24 hours of onset of their symptoms. Thus, an indication that majority of the patients were good ED users. This suggests that the patients reporting to the ED were mostly health conscious and concerned about their health.

On the other hand, about a quarter of the patients in this current study were found to have reported to the ED more than 24 hours after onset of their symptoms. Thus, an indication of poor ED utilization among a quarter of the patients. A few of them even reported more than a week (5.8%) after onset of symptoms. These delays

might be because symptoms may not be that severe to them or may not appear to them as life threatening. However, these delays in reporting to the ED may pose a great threat to ones' life. Similarly, Sunyoto et al. (2014) also observed delays in reporting to the ED among patients in their study in Somaliland. Although they reported on delay in patients reporting to the ED, the percentage of their late reporting cases was very high (79%) compared to that of this current study (25%).

5.2 Outcome of patients triaged at the ED

Patient outcomes after triaging and treatment at the ED was also assessed in this study. Findings from the study showed that about a quarter of the patients who reported to the ED in were admitted to the main wards of the facility for further treatment and observation. Usually, the severity of the nature of the condition reported at the ED may demand further treatment and observation. This usually results in the transfer of such patients from the ED to the main wards to continue with treatment. This allows space to the created at the ED for subsequent patients who report there for treatment. Similarly, Abdelwahab et al. (2017) found that in the ED of a teaching hospital in Ethiopia, about a quarter (29%) of the patients triaged and cared for were also admitted to the wards of the hospital for further treatment. Transfers to the wards for proper admission and further treatment usually is done after patient is given first aid and his or her condition is stabilized.

On the other hand, about a quarter of the patients in this study were discharged after detention and treatment at the ED. This usually occurs in situations where patient significantly recovers after treatment at the ED. This percentage of patients treated and discharged at the ED is higher compared to the finding of Lyons et al. (2007) in a hospital ED in London. They found that about 14% of patients who were detained at the hospital's ED left the ED directly after triaging and receiving

treatment. Contrary to this finding, Abdelwahab et al. (2017) found that majority of patients at (about 71%) the ED's in Ethiopia are actually treated and directly discharged from the ED. These differences in the percentages of patients discharged from the ED directly after receiving treatment is an indication of a variation in the nature and severity of conditions of patients that report to the ED of various countries.

Furthermore, about 20% of the patients who reported to the ED in this current study were rather referred to higher level facilities for treatment. This usually occurs when the condition is very severe, when the experts needed to provide the needed care for the patient are not available at that moment or when the materials and resources needed to provide the needed care are not available. Then patient may be referred to another facility, mostly a higher one where the patient will be able to access the needed care, treatment and observation. Contrary to this finding, Abdelwahab et al. (2017) found that majority (71%) of patients who were triaged at the ED of a teaching hospital in Ethiopia were actually treated and discharged home safely.

5.3 Triage process at the ED

One other objective of the study was to assess the triage process that is carried out at the ED of the Ridge Regional Hospital. Triage at the ED is aimed at ensuring that all patients receive treatment according to the clinical urgency of their condition to as to provide timely and appropriate treatment for patients (Opiro et al., 2017). Findings from the study on the triage process carried out at the ED shows that orange and red triaged cases comprised about 35 % and 8%, respectively. Thus, an indication that about 44% of the cases triaged were categorized as requiring urgent emergency care at the ED. This can be linked to the finding of Sunyoto et

al. (2014) where red triaged cases were found to be 6%, however, their orange triaged cases represented 17% which is about half that of this current study. Abdelwahab et al. (2017) also found in their study in Ethiopia that about 11% of the patients were triaged to Red and about 16% were triaged to Orange.

However, Yellow and Green cases were about 35% and 17% respectively. Indicating that about 52% of the patients triaged were categorized as persons requiring less urgent emergency care. This corroborates with some of the findings of Abdelwahab et al. (2017) where about 33% of the patients in their study were triaged to yellow as seen in this current study. However, 33% of the patients in their study were triaged to green, which is about twice that of this current study.

Triage is expected to be done carried out by specially trained nurses so as to prevent any negative outcomes and to ensure that patients get the needed attention for their health care (Fathoni et al., 2013). This therefore requires expert clinical assessment and decision-making ability of the nurse (Richardson et al., 2009). The triage process may be high acuity proportion, over triaging or under triaging (Sasser et al., 2012). In this current study, high acuity triage comprised about 72% of all the cases triaged. This suggests that majority of the triage cases were done correctly and accurately by the ED staff. As a result of this majority of the patients assessing health care services at the ED are likely to receive the needed timely and appropriate health care base on the clinical urgency of their condition (Opiro et al., 2017). High acuity triaging also ensures that the ultimate goal of the triage concept is met (Richardson et al., 2009).

In addition, about 23% of the patients in this current study were under triaged and 5% were over triaged. This is low compared to the findings of Sunyoto et al. (2014)

in their study in Somlaliland where over triage and under triage of all triage cases assessed were 40% and 9%, respectively. Both over and under triaging represent errors in the triage process. Thus, an indication of some gap in the triage process being carried out by the staff of the ED (Qureshi, 2010). Over triaging usually creates a situation whereby ED patients are given unnecessarily high-level attention than what the actual clinical urgency of their condition demands. Under triaging on the other hand places patients who actually need immediate attention due to the clinical urgency of their condition at the less urgent category due to error in clinical decision-making ability. This represents underestimation of the urgency of the patients' clinical condition. In the study carried out by Piccotti et al. (2008) in Italy, the percentage of underestimation was 3% which is low compared to that of this current study which stands at almost a quarter of the triaged cases assessed. This increases the health risk of such patients since the timely intervention required to save their lives may be ignored.

Consequently, patients who may require urgent attention might be delayed whilst that attention is given to others who may actually not need it. Such delays in providing the necessary emergency care might lead to avoidable death or permanent disability (WHO, 2012). This underscores the need for training of the ED staff to upgrade their assessment and clinical decision-making skills in order to improve upon the effectiveness and efficiency of the triage process.

5.4 Challenges with the implementation of triage

Challenges faced by the ED staff in the implementation of the triage was also assessed in this study. Staff shortage was reported as the main challenge (92%) faced with the implementation of triage. This explains why over-crowding (77%) was also mentioned as a challenge faced with the implementation of triage. This

confirms the findings of Carrus et al. (2009) and Moskop et al. (2009) where over-crowding is mentioned as a common problem in most ED's in the world. Over-crowding might occur as a sequel to staff shortage whereby patients continue to wait at the ED for care whilst more pile up in the ED because not enough staff are available to provide the needed care quickly. In general staff shortage at the ED might defeat the purpose of triage which is to provide quick and prompt care based on the urgency of ones' clinical condition since patients often have to wait for a long time before being seen by a doctor and even longer before being transferred to a hospital bed (Carrus et al., 2009).

Others also indicated a lack of materials and resources to work with as a challenge to the implementation of the triage system at the ED of the Greater Accra Regional Hospital. The problem of inadequate materials and equipment to work with at the ED was also found in Tanazia (Aloyce et al., 2014). The lack of resources to work with at eh ED represents a major setback to the whole ED and triaging concept and the underscores the need to proper management to ensure that these challenges are readily addressed.

Contrary the challenges of triage implementation at the ED reported in this current study, other challenges with triage implementation at the ED include poor documentation in Ethiopia (Abdelwahab et al., 2017), negative attitude of patients in Canada (Research in Focus on Research, 2006) and lack of proper training on triage in Uganda (Opiro et al., 2017) and Tanzania (Aloyce et al., 2014).

CHAPTER SIX

CONCLUSION AND RECOMMENDATION

6.1 Conclusion

This study shows that there is good ED utilisation among the patients that report to the ED for health care services. Despite a few errors of over triaging and under triaging, the triage process was generally satisfactory. However, this underscores training need for further training for improvement in triage skills among the ED staff. The outcome also was good as patients were mainly admitted for further treatment or discharged appropriately. However, staff shortage, inadequate materials and resources to work with and overcrowding continue to impede the smooth implementation of the triage process among the ED staff. This underscores the need for proactive management of resources in the hospital to support staff at the emergency department in the dispensation of their duties.

6.2 Recommendations

Based on the objectives of the study, it is recommended that;

1. Management of the various Units of the Hospital should intensify regular communication to ensure regular but appropriate patients' movement when spaces are available in order to reduce over triaging and under triaging.
2. There is the need for the Hospital Management to establish interdepartmental meetings to discuss movement and discharge of patients in the department.
3. Workload in the whole hospital need to be assessed to inform staff distribution and re-distribution especially in the Emergency Unit that seems to need additional staff.

4. There the need for management of the hospital in collaboration with the officer in charge of stores and supplies to supply of adequate materials and resources for ED staff. This will provide them will all the needed resources to work effectively and efficiently whilst conducting triage.

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APPENDICES

APPENDIX A: CHECKLIST

CHECKLIST ON TRIAGING OF PATIENTS AT THE GREATER ACCRA REGIONAL HOSPITAL

Name of facility: _____ Unit: _____

№	Sex		Age	Reporting Time after onset of symptoms (Hours)					Triage Process						Diagnosis	Outcome				
	M	F		<12H	12-24H	>24H - 7Days	8Days-1Month	>1 Month	Red	Orange	Yellow	Green	Blue	No Record		Discharged	Admitted	Referred	Defaulted	Died
01.																				
02.																				
03.																				
04.																				
05.																				
06.																				
07.																				
08.																				
09.																				
10.																				

Diagnosis: Trauma-**1**; Diarrhoea -**2**; RTI/Asthma/COPD-**3**; Acute Abdomen-**4**; Not diagnosed-**5**

APPENDIX B: QUESTIONNAIRE

Respondent ID ☐☐☐

SCHOOL OF PUBLIC HEALTH

UNIVERSITY OF GHANA, LEGON

MASTER OF SCIENCE IN MONITORING AND EVALUATION PROGRAMME

Title of Project: Assessment of the Triage System at the Emergency Department of the Greater Accra Regional Hospital

Date of Completion: __ __ / __ __ / 2019

Dear Sir/ Madam,

I am conducting a study to assess triaging of patients at the Greater Accra Regional Hospital. I will be grateful if you could spend a little of your time to complete this questionnaire. The purpose of this questionnaire is to assess the challenges that the staff at the Emergency Department face with the implementation of the triage system. There are no right or wrong answers. Any information provided is private and confidential. This study is only for academic purposes. Your participation in this study is entirely voluntary. Please feel free to answer the questions below.

INSTRUCTION: Please circle your choice of answer in the boxes below or write in the spaces provided.

No	**Question and filters**	**Coding/Response category**
Section 1	**Socio-Demographic Characteristics**	
1.	How old are you? *(Age as at last birth day)*	[ ]
2.	What is your gender? 1.Male 2.Female	[ ] [ ]
3.	What is your profession? 1. Doctor 2. Nurse	[ ] [ ]

No	Question and filters	Coding/Response category
4.	What is your highest level of education? 1. Diploma 2. Degree 3. Masters 4. PhD 5. Other (Specify)	[ ] [ ] [ ] [ ] [ ] [ ]
5.	What is your marital status Single 1. Married 2. Separated 3. Widowed 4. Divorced 5. Other (specify)	[ ] [ ] [ ] [ ] [ ]
6.	What is your number of years of experience?	_____years
Section 2	**Challenges with Triaging**	
7.	Which of these challenges do you face with triaging at the ED *(you may tick more than one option)* 1. Poor physical layout of the ED 2. Crowding	[ ] [ ] [ ] [ ] [ ] [ ] [ ]

No	Question and filters	Coding/Response category
	3. Poor documentation 4. Negative attitude of staff 5. Staff shortage 6. Lack of materials/ resources 7. Other (specify)	
8.	What is the reason for this challenge?(Explain)	……..
9.	Which of the challenges in question (Q7) one do you experience at Red?	[ ] [ ] [ ] [ ]
10.	Why this challenge?	…….
11.	Which of the challenges in Q7 do you experience at orange?	[ ] [ ] [ ] [ ]
12.	Why this challenge?	…….....
13.	Which of these challenges do you experience at Yellow?	[ ] [ ] [ ] [ ]
14.	Why this challenge?	…….

THANK YOU VERY MUCH!!!

APPENDIX C: PARTICIPANT INFORMATION SHEET

PARTICIPANT INFORMATION SHEET

Title: Assessment of the Triage System at the Emergency Department of the Greater Accra Regional Hospital.

Hello

I am Christiana Asante, a Master's student at the School of Public Health, University of Ghana, Legon. I would be grateful if you could contribute in my study on the challenges that the staff at the Emergency Department face with the implementation of the triage system at the Ridge Hospital. This leaflet provides information on the study to make you make informed decision to take part.

Background

Decision making in the health sector with regard to effective distribution of scares resources is a key lifesaving phenomenon. This underscores the need for limited health service resources to be used in a manner which provides the most effective and timely services for most people. One approach to reducing the strain on overburdened emergency services is the use of a proper emergency triage tool, also referred to as triage scale.

What is the purpose of this study?

The purpose of this study is to assess challenges that the staff at the emergency department face with the implementation of the triage system at work. This is to help me understand these challenges you face on a daily basis.

What do I have to do in this study?

If you agree to take part in the study, you will be asked to sign an informed consent form. This will serve as proof of your consent to take part in the nominal group session. After that, you will be given a questionnaire to fill.

What are the conditions that qualify me for the study?

You have to be staff nurse or doctor at the emergency depart of the Ridge Regional Hospital with at least two years working experience at the emergency department.

What are the risks of taking part in the study?

There are no direct risks associated with taking part in this study. However, you may feel exhausted or upset with some of the questions. If this happens, you will be reassured,

excused and referred to a clinical psychologist for counselling. However, you reserve the right to withdraw from the study anytime.

What are the benefits of participating in this study?

There are no direct benefits for participating in this study, however, the information you provide will help influence policy, planning and interventions to improve upon triaging.

What rights do you have as a participant in this study?

Participation in this study is entirely voluntary. You have the right to withdraw from the study at any time without any consequences to you. You also reserve the right to stop me from using the information provided by you in my final analysis.

Is there reimbursement for taking part in the study?

You will receive no payment to take part in this study.

How will confidentiality be maintained?

All information provided will kept as private and confidential. Codes will be used instead of your real names to ensure anonymity.

Who can I call for enquires?

A copy of the information sheet and the consent form will be made available to you after it has been signed. For further clarification about the study, you may contact me on telephone number +233 547 898 570 or Email: abenabaah.asante@gmail.com

With regard to concerns over the conduct of the study, please contact Hannah Frimpong, the administrator of the Ghana Health Service Research Ethics Committee, on telephone number 0507 041 223.

Thank you

APPENDIX D: PARTICIPANT CONSENT FORM

PARTICIPANT CONSENT FORM

I …….. Have been thoroughly briefed on the entire methodology and significant of the ongoing study which is being conducted by Christiana Asante. On my own free will, I hereby consent to be part of the study, based on my understanding of what the study entails.

I am doing this on condition that under no circumstances should my references be made to my actual identity to any other person(s) after providing all the information requested from me for this particular study as promised by the researcher.

…… ……..

Respondent signature/ Thumbprint **Date**

Investigator statement and Signature

I certify that the respondent has been fully briefed about the study. All questions and clarifications raised have been duly addressed.

…… ……..

Name & Signature of Researcher **Date**

APPENDIX E: ETHICAL APPROVAL LETTER

GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

In case of reply the number and date of this Letter should be quoted.

MyRef. GHS/RDD/ERC/Admin/App
Your Ref. No. 19/263

Research & Development Division
Ghana Health Service
P. O. Box MB 190
Accra
GPS Address: GA-050-3303
Tel: +233-302-681109
Fax + 233-302-685424
Email: ghserc@gmail.com
4th July, 2019

Christiana Asante
University of Ghana
School of Public Health
Legon

The Ghana Health Service Ethics Review Committee has reviewed and given approval for the implementation of your Study Protocol.

GHS-ERC Number	**GHS-ERC 063/05/19**
Project Title	Assessment of the Triage System at the Emergency Department of the Greater Accra Regional Hospital
Approval Date	4th July, 2019
Expiry Date	3rd July, 2020
GHS-ERC Decision	**Approved**

This approval requires the following from the Principal Investigator

- Submission of yearly progress report of the study to the Ethics Review Committee (ERC)
- Renewal of ethical approval if the study lasts for more than 12 months,
- Reporting of all serious adverse events related to this study to the ERC within three days verbally and seven days in writing.
- Submission of a final report after completion of the study
- Informing ERC if study cannot be implemented or is discontinued and reasons why
- Informing the ERC and your sponsor (where applicable) before any publication of the research findings.
- Please note that any modification of the study without ERC approval of the amendment is invalid.

The ERC may observe or cause to be observed procedures and records of the study during and after implementation.

Kindly quote the protocol identification number in all future correspondence in relation to this approved protocol

SIGNED.....
Dr. Cynthia Bannerman
(GHS-ERC CHAIRPERSON)

Cc: The Director, Research & Development Division, Ghana Health Service, Accra