



UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF ENGINEERING

DEPARTMENT OF BIOMEDICAL ENGINEERING

**Assessment of Emergency Centers and Proposed Design of an
Emergency Center**

Submitted to the Faculty of Postgraduate Studies in partial Fulfillment of the Requirement for the
Degree of Master of Science in Medical Engineering

Prepared by

Lina Gassim Omer Siraj

Supervisor

Dr .Elias Sidieg Mohammed Hassan

June 2015

Abstract

Emergency centers play a growing role in the health care system, accounting for a rising proportion of hospital admissions and serving increasingly as an advanced diagnostic center for primary care physicians.

To promote dialogue and engagement between Emergency Center staff and architects, designers, engineers and health planners such that they may apply their knowledge, experience and expertise to practical workings of the Emergency centers.

The data presented in this report were collected at 2015. Emergency departments are the main part of the ambulatory care component of the National Health Care Survey that measures health care utilization across various types of providers. A questionnaire is a probability sample of survey of visits to emergency departments, short-stay, and general hospitals in the Sudan. Sample data are weighted to produce daily estimates.

All questionnaire based studies of A&E departments were identified and reviewed by a single person to assess how departments were selected for inclusion; the number of departments studied; the study design and response rates. Data were entered and analyses on an Excel spreadsheet. Calculation of the Pearson correlation coefficient (r) using SPSS.

The sample sizes of the identified studies is 40 with (a mean) of 1.70 (standard deviation: .853) and (a median)of 1.00 and (mode) of 1 and (variance) of 728. Pearson's $r = -0.389$, $p < 0.05$).

The respondents feel moderately satisfaction of healthcare in their Emergency Departments. However, it should be noted that few of them feel that it is not good enough. However, they rate the probability as fairly likely.

الخلاصة

نظرا لاهمية مراكز الطوارئ ودورها الفعال في الرعاية الطبية من تسهيل الخدمات الاولية للمريض وتسهيل التعامل بين فريق العمل في المركز من اختصاصيين وتقنيين ومهندسين سواء كانوا طبييين او معماريين او متخصصي كهرباء وخلافه.

ولعدم توفر مراكز طوارئ متخصصة بالسودان جاءت فكرة اقتراح تصميم مركز من هذا النوع يلئم بيئة السودان لتقديم الخدمات المطلوبة .

اولا تم تجهيز 40 استبيان يتكون كل إستبيان من 21 سؤال تمت الاجابة عليه من قبل المدراء الطبيين لأقسام الطوارئ وعناصر التمريض والمهندسين الطبيين وذلك في 8 مستشفيات منها الحكومي ومنها القطاع الخاص .

تم تجميع البيانات ومعالجتها بواسطة برنامج احصائي و هذه النتائج تمت مراعاتها في التصميم المقترح الذي يتكون من رسم كروكي يوضح جميع الاجزاء الداخلية وتفصيلها ورسم هندسي بواسطة برنامج الاوتوكاد وتم الحاق خريطة مطبوعة وحساب التكلفة ايضا.

2.1 Introduction

The Emergency center plays a pivotal role in providing the public with access to acute health care, and the provision of support to primary health care and community services. An Emergency center is also an important interface to the many inpatient and outpatient services offered by its parent hospital and the health service of which it is a part. (EC) are intended to support clinicians in the design process, and inform government, health planners, architects and designers about what constitutes a contemporary Emergency centers. [2]

2.2 Emergency center purpose

The purpose of the Emergency center is to receive, triage, stabilize and provide acute health care to patients. This includes patients requiring resuscitation and those with emergent, urgent, semi-urgent and less-urgent conditions. An Emergency center also requires the capacity to deal with mass casualty and disaster situations. [3]

There are particular patient types seen in the Emergency center. These include:

- Major trauma patients
- Elderly patients
- Children and adolescents
- Patients with physical and mental disabilities
- Victims of child abuse
- domestic violence, or sexual assault
- Patients with mental health issues
- Patients with infectious diseases or who are immunocompromised.
- Custodial patients; and Patients affected by chemical, biological or radiological contaminants.

2.3 Internal functional relationships

Each area of an Emergency center plays an important part for the patient. The Emergency center consists of a number of functional areas including [3], but not limited to:

An entrance and waiting room and reception area , triage area, resuscitation area, A mental health assessment area, An acute treatment area , A consultation area or Fast Track area , Adjunctive areas (x-ray, Short Stay Unit (SSU), allied health, investigations room (point of care

testing), Staff/amenities areas, Administrative areas, Storage areas, Clean preparation and drug preparation room, Dirty utility and disposal areas, Patient amenities areas e.g. a food storage fridge that meets OH&S standards for patient sandwiches (for after hours) and Toilets (staff and patient including for disabled patients) and bathroom/shower facilities and Teaching and research areas.

