THE IMPACT OF BASIC EMERGENCY MEDICINE TRAINING ON THE UNDERSTANDING, PERCEPTION AND CAREER DECISION-MAKING TOWARDS EMERGENCY MEDICINE AMONGST HEALTHCARE PROVIDERS IN TERTIARY REFERRAL HOSPITALS IN TANZANIA

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By

Peter Shadrack Mabula

A dissertation / Thesis Submitted in (Partial) Fulfillment of the Requirement for the Degree of Master of Medicine (Emergency Medicine) of the

Muhimbili University of Health and Allied Sciences
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CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled; ***"The Impact of Basic Emergency Medicine Training on the Understanding, Perception and Career Decision-Making Towards Emergency Medicine Amongst Healthcare Providers in Tertiary Referral Hospitals in Tanzania"*** in (partial) fulfillment of the requirements for the Degree of Master (Emergency Medicine) of Muhimbili University of Health and Allied Sciences.

_____

Dr. Hendry Sawe

Supervisor

_____

Date

_____

Dr. Brittany Murray

Co-Supervisor

_____

Date

DECLARATION AND COPYRIGHT

I, **Peter Shadrack Mabula**, declare that this **dissertation** is my own original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

Signature…….. **Date** ……..

ACKNOWLEDGEMENT

This work has been completed only through the power and grace of our Almighty God. I sincerely express my special appreciation to my employer, Arusha Lutheran Medical Center for the sponsorship and the permission they gave me to pursue my further studies.

I also sincerely acknowledge and express my appreciation to the endless support from my supervisors, Dr. Hendry Sawe and Dr. Brittany Murray for their supportive guidance, valuable comments, advice and encouragement during the entire period I was conducting this study. Initially they gave me guidance about how to write a scholarly acceptable research proposal and later they guided me in writing this dissertation in its present form.

I should also recognize the great contribution of Dr. Stephen Dunlop, Dr. Ellen Weber, Dr. Bridget Griffith and Dr. Teresa Bleakly for their support, encouragement and unceasing advice on how to present this study the way it is today.

It is my responsibility to bring all of these great supporters before God's hands.

God bless.

DEDICATION

This dissertation is dedicated to

My wife, **Grace Mabula,**

My sons, **Carson** and **Cathbert,**

And to my late parents **Mr. and Mrs. Mabula**

With much love!

ABSTRACT

Background:

Emergency Medicine (EM) is a new specialty in Tanzania. Little is known about how to introduce EM to healthcare providers (HCPs) in hospitals without EM.

Aim:

To determine the impact of a 2-day EM training on the understanding, perception and career decision-making towards EM amongst HCPs at four tertiary level hospitals in Tanzania that do not have EM.

Methodology:

This was an interventional study including HCPs from four tertiary hospitals in Tanzania that do not have EM. Understanding, perceptions, and decision making regarding EM as a career was assessed before and after a 2-day basic EM training using a paper questionnaire. Quantitative data was obtained using Likert scale (out of 5) and was analyzed by T-tests, Mann-Whitney test and Kruskal Wallis test. Qualitative data was analyzed for content and themes by an inductive, iterative approach.

Results:

96 HCPs participated in the study; the four hospitals were equally represented. Median pre-training scores for all Likert questions was 3.49 (IQR3.26-3.91); understanding 3.33 (IQR3.00-3.66), perception 3.40 (IQR3.14-3.71), and career decision making 3.66 (IQR3.33-4.00). Post-training scores showed improvement with median scores of 4.61 (IQR4.45-4.72) overall, 4.66 (IQR4.00-4.66) for understanding, 4.63 (IQR4.50-4.87) for perception and 4.66 (IQR4.33-4.83) for career decision making (all $p<0.01$). Themes addressed by participants included whether EM physicians were needed, whether they had sufficient career possibilities, and whether or not doctors should be encouraged to pursue EM as a career.

Conclusion & Recommendation

A 2-day EM training had a positive impact on understanding, perception and career decision-making towards EM amongst Tanzania HCPs that work in hospitals without EM. Long-term follow up to ascertain retention is recommended.

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LIST OF ABBREVIATIONS

AMO	Assistant Medical Officer
ALMC	Arusha Lutheran Medical Centre
ED	Emergency Department
EGD	Esophageal Gastroduodenoscopy
ENT	Ear Nose and Throat
EM	Emergency Medicine
EMAT	Emergency Medicine Association of Tanzania
EMD-MNH	Emergency Medicine Department-Muhimbili National Hospital
EMD	Emergency Medicine Department
EMS	Emergency Medical Services
HCP	Health Care Provider
HICs	High Income Countries
KCMC	Kilimanjaro Christian Medical Centre
LMICs	Low and Middle Income Countries
LICs	Low Income Countries
MD	Doctor of Medicine
MMED	Masters of Medicine
MUHAS	Muhimbili University of Health and Allied Sciences
MBA	Masters of Business Administration

NICU	Neonatal Intensive Care Unit
PECT	Pediatrics Emergency Care Training
OPD	Out Patient Department
UK	United Kingdom
USA	United States of America

DEFINITIONS OF KEY TERMS

Triage: Sorting of patients according to their acuity (1).

Emergency: Situation posing immediate risk to health, life, property or environment

Understanding: Comprehension (2).

Perception: An attitude or understanding based on what is observed or thought (3).

Career: An occupation or profession, especially one requiring special training followed as one's life work.

1.0 INTRODUCTION

1.1 Background

Emergency Medicine (EM) is a medical specialty that requires the knowledge and skills to provide immediate care to patients of all age groups with undifferentiated illnesses. It concentrates on the stabilization, resuscitation and appropriate disposition of patients for definitive care. According to Kobusingye et al, "Emergencies occur everywhere, and each day they consume resources regardless of whether there are systems capable of achieving good outcomes" (4) Due to the nature of emergencies, EM departments ought to be open throughout the day and night as these patients present with emergency conditions and have no appointments. A key distinction between an emergency department and a clinic is that patients undergo triage, which prioritizes the patients for care in terms of their acuity, as opposed to their time of arrival.

EM emerged as a specialty in the United States of America in the early 1960s, initially involving non-emergency physicians working in those departments (5). Some of these providers only worked occasional shifts, and some worked full time in emergency departments (EDs). It was determined that EM departments with physicians that concentrated only on EM had better patient outcomes and EM as a specialty was born. Specialty training in EM aimed at treating patients with emergent conditions in a professional and evidence-based manner. After the establishment of EM in hospitals in the US and around the world, many advanced healthcare systems have also incorporated formal pre-hospital/out-of-hospital emergency care into their EM systems. These pre-hospital systems bring patients to EDs quickly and under the care of a trained emergency team such as paramedics.

Despite the clear improvement of patient outcomes, the spread of EM has been variable across the world. The incorporation of EM as a specialty in many parts of the world has increased in recent years due to a focus on EM by major international organizations (6). The World Health Organization (WHO) established a division of Emergency Care in 2014 (7), and several agencies have noted the importance of timely emergency care as a way of reducing morbidity and mortality. However, in some

countries, the incorporation of EM has been difficult for a number of reasons, including poverty, poor infrastructure, the high cost of training, and poor understanding of the benefits of EM as a specialty amongst healthcare providers and policy makers (8). There have also been difficulties in integrating EM into other established specialties because of a lack of understanding, or a poor perception of EM as a specialty (9).

In Low and Middle Income Countries (LMICs) where EM has been successful, the specialty's spread and success has been primarily due to collaboration with Emergency physicians from High Income Countries (HICs) (7,10–13). Emergency physicians from HICs in collaboration with local physicians have helped to establish EDs in LMICs and the spread of EM has been coupled with training programs to train competent healthcare providers in EM, in order to provide quality, emergent care to patients (7,10–13). Emergency physicians from both HICs and LMICs conduct conferences to increase the network of emergency healthcare providers in many parts of the world.

Despite this, studies have shown that non-emergency physicians continue to lack an understanding of EM as a specialty, especially in countries where there is little EM presence (9). This poor understanding leads to difficulties in expanding the specialty of EM, as it is difficult to choose EM as a future career when it is not well understood. Reasons hindering healthcare providers choosing EM as a specialty include lack of prestige, low payment and long working hours (14,15). In this case, exposure to a basic EM training is important and highly needed to increase understanding of the specialty.

In Africa, EM as a specialty was officially recognized in South Africa in early 2000 (16). About that time, the first residency program in Africa officially started at the University of Cape Town/Stellenbosch University (16,17). Since then, EM has been spreading to other African countries with variable incorporation into healthcare systems (13).

The EM program at Muhimbili University of Health and Allied Sciences (MUHAS) in Dar es Salaam, Tanzania was established in 2010, and it is the first EM training

program on the African continent outside of South Africa (13). The reason for its establishment was to promote and spread sustainable emergency care across the country of Tanzania by training leaders (specialists) in the field (13). This will also make the MNH-EMD sustainable by continuing to train physicians to work at this hospital.

The Muhimbili program has been the model for Sub-Saharan Africa; programs in Rwanda, Ethiopia, Ghana, and Uganda modeled their curriculums on the MUHAS EM Residency experience. As these training programs develop, graduates have found that a poor understanding and perception towards EM as a specialty among non-emergency physicians has led to difficulties in integrating and functioning smoothly in the hospitals to which they are posted to work. In order to improve emergency care across the country and continent, these graduates require proven strategies to increase the understanding and perception of EM in their local practice environments.

In a special interview with the EM graduates from Muhimbili, all of them expressed the challenges they encountered in their new working places. Graduates reported that their fellow healthcare providers had a poor perception of EM as a specialty and a poor understanding of what EM is and what it does. This was compounded by the hospital administration, which did not provide the appropriate equipment and supplies for EM care delivery. One graduate, D. Yash, stated, "it has taken a long time to be recognized and be respected as EM specialists" (personal communication, July 3rd 2015 MUHAS) (18).

Furthermore, beyond Muhimbili, the district and regional hospitals of Tanzania have variable levels of emergency care capacity, and no formally trained EM specialists. Most of these hospitals have outpatient department casualties, which are places designed to channel patients to the respective inpatient wards regardless of the acuity of illness (19). Using Casualty as a model leads to a lack of understanding of EM, erroneous perspectives, and likely contributes to healthcare providers not choosing EM as a career.

The establishment of a full capacity EM department at MNH has provided a chance for improved patient care, HCPs training, and proper disposition of patients in Tanzania (13). Though it is still a very new specialty in Tanzania, it has gained much acceptance at MNH and in Dar Es Salaam. Reasons for this include that the ED at MNH has been shown to reduce morbidity and mortality and be financially sustainable (20).

In 2014, with the recognition of the importance of EM, MUHAS incorporated EM as a course in the undergraduate medical school curriculum. However, despite the recognition of the importance of EM, there is only one EM specialist across Tanzania working outside Dar es Salaam. This leaves a major void in the health system in Tanzania. This void can be filled by supporting EM graduates to create EDs in hospitals across the country.

A good understanding and perception of EM as a specialty amongst healthcare providers is crucial in establishing EDs. Career decision-making towards EM as a specialty also need clear understanding and a positive perception amongst medical students for them to choose EM, leading to a sustainable specialty in the country.

There is a lack of data in Tanzania describing the state of understanding, perception and career decision-making towards EM and how basic EM training impacts on these elements amongst healthcare providers. This study aimed to determine the impact of basic EM training on healthcare providers in referral hospitals in Tanzania. This information will ensure the medical profession is better equipped to establish and sustain the specialty of EM in the country and throughout the region.

1.2 Literature review

In HICs, EM was started by physicians who chose to perform all their clinical work in EDs. Physicians who started EM encountered multiple challenges that included poor or no infrastructure, difficulties in incorporating other physicians into EM roles, and the cost of training EM physicians. In addition, EM physicians had no professional associations or organizations where they could bring their needs and challenges to policy makers, hospital managers and other specialties for assistance. Unity, along with hard work were some of the key components for their success (8). EM physicians organized professional societies and training programs to sustain the specialty.

Now, EM in LMICs is spreading through collaboration with physicians from HICs (6,21). Emergency physicians from countries with established EM care go to countries without specialized EM care and teach and/or establish EM residency programs (6). The involvement of LMICs has been accelerated by improved communications, allowing on line teaching modules, remote lectures, and international collaboration on curriculum (5). One such program is the Rwanda Emergency Medicine Initiative, under the support of USAID and the Global Fund to fight AIDS, Malaria, and Tuberculosis designed to train advanced nursing and medical health providers (22).

In Myanmar, the Australasian College of Emergency Medicine has had active involvement for the past four years, and created a program to train non-emergency medical specialists and other healthcare providers with basic emergency courses (23). A similar program exists in Haiti, led by The Crudem Foundation (24). All of these programs have been crucial to the existence and development of EM as a specialty, hence providing an opportunity for cost-effective EM care that saves lives and reduces morbidity (25,26).

The growing interest in LMICs toward EM as a specialty has been due to economic development. A report published by the American College of Emergency Physicians in 1998 states that economic development and urbanization led to an increase in death secondary to injuries and non-communicable diseases. As reported by the Society of American Emergency Medicine, the spread of EM has been partly due to the success demonstrated by EM in countries with developed EM care (27). Viewing the cost-

effectiveness and success of emergency care initiatives in HICs (13) authorities in limited resource settings see emergency care programs as part of solution to the new challenges brought on by economic development. This makes emergency care more important than ever.

The understanding and perception of healthcare providers towards a specialty is an important component for the specialty's ability to grow. Perception of healthcare providers towards Emergency Medicine as a specialty varies among non-emergency specialists in many countries (9,28). In a study done in the UK to assess non-emergency consultants' and registrars' perception of EM, non-emergency physicians described the EM department in many different ways, one of which was "casualty", and there was significant variation in perception of the functions and activities of the EM department (9). Additionally, there have been stumbling blocks for the development of EM including training expenses, lack of required infrastructure and the overall costs (21). This has a big impact for EM physicians even immediately after graduation as they encounter different challenges in their new working places. In a study done in South Africa on the experience of new EM graduates, new graduates reported various difficulties, but 74% lacked clear career options post graduation. This is likely to be because the healthcare system, in general, was not prepared for EM (17). These obstacles can make graduates reluctant to encourage doctors in training to pursue EM as a good specialty.

Emergency medicine is an essential aspect of a health care system, and for it to become established in sub-Saharan Africa and other limited resource settings, healthcare providers need clear information about the specialty to make it their career choice (29). This has been shown in other specialties in other setting. A study in Ghana found that there was no formal exposure for medical students to Family Medicine as a specialty. Many of them thought they could not opt for Family Medicine, because they did not know what it was. But when they were given information, many of them felt that Family Medicine could be a good choice for them. This demonstrates that it is important that physicians advocate for their own specialty to other groups of people. Providing information about any specialty helps people to make decisions for their

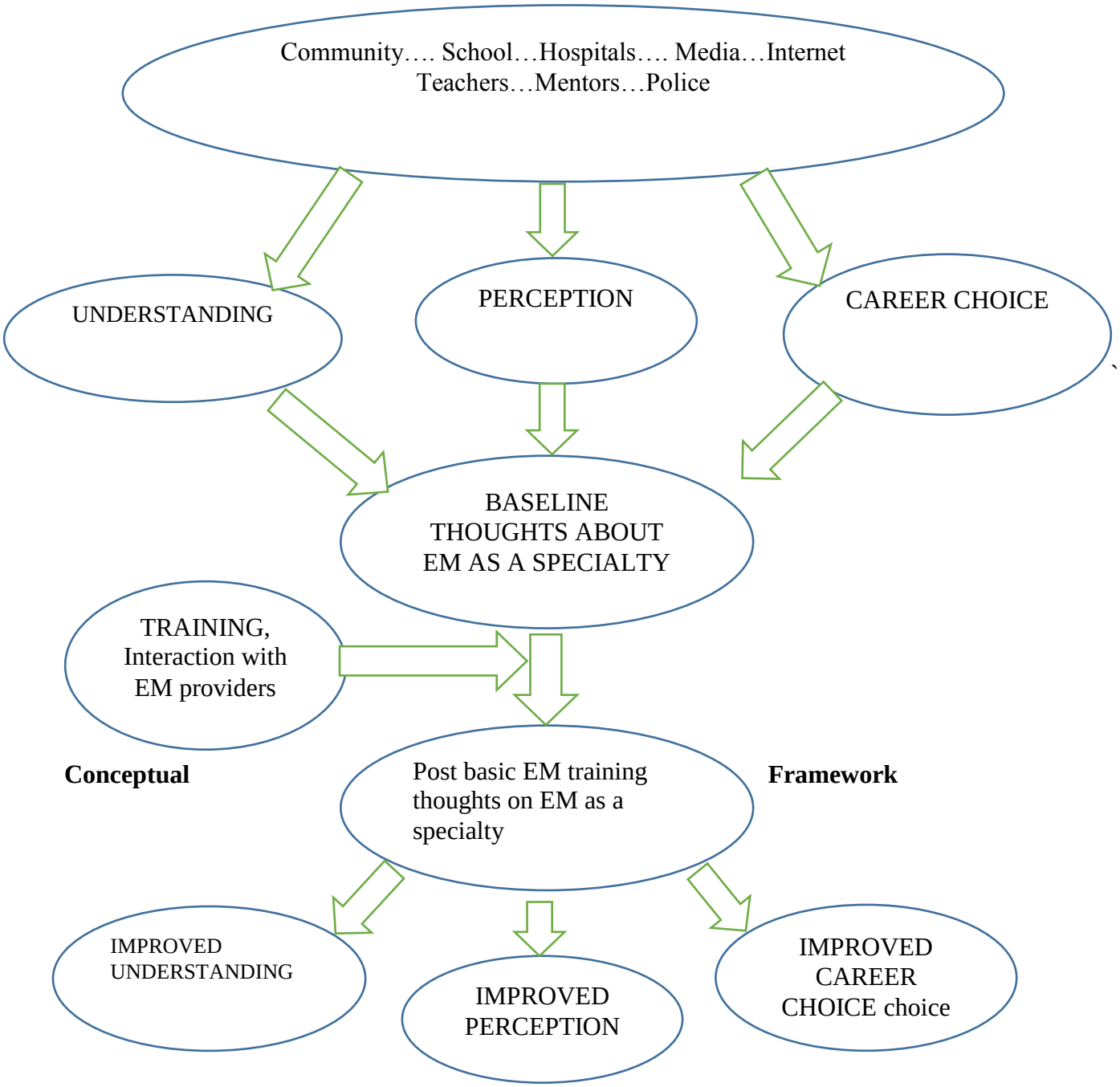
career ahead of time. In any existing specialty, clear information on a specialty is very important for healthcare providers to choose a career focus in that specialty (9,15,29,30).

Information is one factor contributing to career choices for physicians; another factor is exposure. Academic skills training has been shown to have an impact on career choice. For example, early exposure to research can play a fundamental role in a physician choosing a research career. Studies have shown that when students are exposed to training or skills, the chances of pursuing that specialty are high. Therefore, exposing healthcare providers to EM concepts, such as through trainings, can be a pathway to spread and sustain EM (15).

In Tanzania, EM is a very new specialty. A paper by Nicks et al on the state of EM in Tanzania describes the different levels of the healthcare system in the country and their capacity for emergency care. The district and regional hospitals have variable levels of emergency care capacity with no EM specialists or formal full-capacity EDs (19). In Tanzania, only MNH has a full capacity EM with specialized patient care and training. This highlights a clear gap in care in the country. Reynolds et al. further explained the educational EM initiatives in Tanzania, pointing to the EMD MNH and EM residency program as important advancements in improving EM care for the country by training local leaders in the specialty (31). The EM programs in Tanzania will ensure both better patient care outcomes, and serve to improve EM care delivery (13).

However, as this new and important field develops, it is important to determine the current level of understanding, perception and career decision-making towards EM, and how a basic EM training course can impact these elements amongst healthcare providers.

2.0 CONCEPTUAL FRAME WORK



Conceptual Framework

Understanding, perception and career decision-making towards EM are modified in many different ways including schools, hospitals, media, internet, mentors and police, just to name a few. With basic EM training there is an expectation it will have a positive impact on the understanding, perception and career decision-making towards EM.

3.0 STATEMENT OF THE PROBLEM

The EM specialty program at MUHAS has provided a unique opportunity for training and dissemination of high quality EM care to all Tanzanians. In 2017, MUHAS will graduate its fifth cohort of EM Physicians, all of whom will develop EM departments and care at tertiary hospitals across Tanzania outside of MNH. Despite this opportunity and excitement about growth, these EM physicians are expected to face several challenges, as most hospitals do not have fully functioning emergency care departments, instead relying on traditional outpatient departments, referred to as "casualties." Most of these units are scarcely equipped and are run by healthcare providers without emergency training. Similar to early years of other programs that are now well developed and established throughout the world (8,21), the understanding, perception and career choices among health care providers in the regions will pose a challenge to the short and long-term plans for developing and sustaining full capacity EM departments at these tertiary hospitals. Lack of understanding and poor perception of a specialty can frustrate newly graduated EM physicians while they attempt to establish a practice environment conducive to EM. Similarly, a lack of future healthcare providers enrolling in EM will stagnate the growth of the specialty in the country and cause burnout and fatigue of existing EM physicians over time. In order to advocate for change and create a smoother pathway for the existing residents and future trainees, it is important to understand how physicians not in EM understand what EM is, their perception of it as a specialty, and their willingness to consider EM as a career in Tanzania. Before this study, little was known about the understanding, perception and career decision-making towards EM amongst healthcare providers.

4.0 RATIONALE

The EM specialty training at MUHAS trains and equips all trainees with the most current EM knowledge tailored to both high resource and resource constrained settings. After graduation, these will need to learn how to integrate EM into their hospitals where this new specialty may not necessarily be well-understood or well-perceived. This study provides data on the level of understanding and perceptions of healthcare providers at referral hospitals in Tanzania where the graduates will establish EM departments, and it also provides an opportunity to study the impact of a potential intervention to change the understanding and perceptions of these providers. The data gathered from this study will be used to target programs to address the challenges of the current and subsequent groups of EM graduates, and inform institutions within and beyond Tanzania that may have EM programs at various stages of development. In addition, finding interventions that might impact career choices of the healthcare providers in favour of EM will be very useful for the long-term sustainability of this specialty within these tertiary hospitals and Tanzania at large.

5.0 RESEARCH QUESTIONS

What is the impact of basic EM training on healthcare providers in tertiary referral hospitals in Tanzania? This is answered through three specific questions:

5.1 What is the understanding, perception, and career decision-making towards EM amongst healthcare providers in tertiary hospitals in Tanzania before a basic EM course training?

5.2 What is the understanding, perception, and career decision-making towards EM amongst healthcare providers in tertiary hospitals in Tanzania after a basic EM course training?

5.3 Is a basic EM training course an acceptable and effective way to impact understanding, perception, and career decision-making towards EM amongst healthcare providers in tertiary hospitals in Tanzania?

6.0 STUDY OBJECTIVES

6.1 Broad objective

The objective of this study is to explore the impact of a basic EM training course on the understanding, perception, and career decision-making towards EM amongst healthcare providers in tertiary hospitals in Tanzania.

6.2 Specific objectives

6.2.1 To explore the understanding, perception, and career decision-making towards EM amongst healthcare providers in tertiary hospitals in Tanzania before basic EM course training.

6.2.2 To explore the understanding, perception, and career decision-making towards EM amongst healthcare providers in tertiary hospitals in Tanzania after basic EM course training.

6.2.3 To evaluate if a basic EM training course is an acceptable and effective way to impact understanding, perception, and career decision-making towards EM amongst healthcare providers in tertiary hospitals in Tanzania.

7.0 STUDY MATERIALS AND METHODOLOGY

7.1 Study design

This was an interventional study involving the evaluation of understanding, perception and career decision-making of healthcare providers regarding the specialty of EM before and after a two-day, basic EM training course. The study was conducted between June 2016 and March 2017. Pre and post-training paper questionnaires (Appendices A and C), with Likert-scale variables and qualitative questions were administered to assess understanding, perception, and career decision-making towards EM.

7.2 Study Setting

The study was conducted in four tertiary referral hospitals in Tanzania: Arusha Lutheran Medical Centre (ALMC), Kilimanjaro Christian Medical Centre (KCMC), Bugando Medical Centre (BMC) and Mbeya Zonal Referral Hospital (MZRH).

ALMC is a faith-based, private tertiary referral hospital located in the city of Arusha in northern Tanzania. ALMC is a multispecialty teaching hospital, which was opened in 2008, with a bed capacity of 125 and approximately 200 outpatient visits per day. Currently, ALMC has an Urgent Care Unit and OPD that operates 24 hours a day and provides triage, resuscitation, stabilization, and disposition of patients to definitive care wards. ALMC has a total of 329 health care providers, including 12 specialists, 11 registrars, 2 AMOs and 92 nurses.

KCMC is a semi-public/private teaching hospital located in Kilimanjaro, Tanzania. It was founded in 1971 and is run by the Good Samaritan Foundation. The hospital has a bed capacity of 630 and it is designated as the referral hospital for the northern zone of Tanzania with a catchment population of approximately 15 million. The hospital has 1300 health workers, 19 clinical departments and 9 schools. KCMC has a casualty/OPD run by 3 registrars, 2 assistant medical officers, 2 clinical officers and 21 nurses and 8 nursing attendants. Construction and staff training is currently underway in preparation for launch of a new full capacity EMD

BMC is a faith-based, not-for-profit teaching hospital located in Mwanza, Tanzania that opened in 1971 and is currently run by the Roman Catholic Church.

The hospital has a bed capacity of 900, with over 900 healthcare providers including over 12 specialists. Emergency care is still received at casualty; however, EM Department modernization and staff training is underway.

MZRH is a public, zonal referral hospital run by the Ministry of Health of Tanzania, and located in Mbeya city in the southern highlands of Tanzania. MZRH was inaugurated in 1985, currently has a bed capacity of 477, attends over 150 outpatients per day, with a catchment population estimated to be 6 million people. MZRH has approximately 600 healthcare providers, including over 25 specialists, 25 registrars, 5 AMOs, and 1 Clinical officer. The casualty/OPD is staffed by 6 registrars and a number of nurses.

7.3 Target population

The target population was all healthcare providers in tertiary referral hospitals in Tanzania.

7.4 Accessible population

The accessible population was all healthcare providers at ALMC, KCMC, BMC and MZRH.

7.5 Study population

The study population was randomly selected healthcare providers at ALMC, KCMC, BMC and MZRH who participated in a basic EM training course and consented to participate in pre- and post-surveys.

7.6 Study subjects

7.6.1 Inclusion criteria

Healthcare providers from ALMC, KCMC, BMC and MZRH who consented, took the survey and completed the training.

7.6.2 Exclusion criteria

- Foreign HCPs on temporary permit
- Other HCPs on temporary contracts
- Those who did not complete the full course

7.7 Variables

The variables of this study included:

7.7.1 Independent variables

- Demographic data
    - 7.7.1.1 Age
    - 7.7.1.2 Sex
    - 7.7.1.3 Address/City
- Level of education
- Experience in Medicine (years and roles)
- Current workplace

7.7.2 Pre and Post-test Variables (Dependent)

- Pre and post-training variables were tested through Likert scales of 1 to 5. A response of 3 was considered neutral while 1-2 are lower scores and 4-5 are higher scores.
- Understanding of Emergency Medicine
- Comprehension of EM as a specialty in Tanzania
- Comprehension of roles of EM as a specialty in the local healthcare system
- Comprehension of roles of EM physicians
- Comprehension of how patients are managed in EDs
- Perception of Emergency Medicine
- How EM as a specialty is regarded by healthcare providers
- How EM physicians are regarded by healthcare providers
- If healthcare providers believe that EM is necessary and/or valuable to the Tanzanian healthcare system
- Career choices (or advice to others regarding career choices) regarding EM as a specialty

7.7.2.1 How prestigious they consider EM as a specialty

7.7.2.2 If they would consider a career in EM, or advise another healthcare professional to consider a career in EM

7.7.2.3 How he/she perceives the future professional life of EM physicians

7.8 Intervention

MUHAS accredited Pediatric Emergency Care Training (PECT) short course was utilized as an intervention, to train participants. PECT is a 2-days Pediatric EM short course, which was developed by MUHAS-EMD in collaboration with MNH and the Emergency Medicine Association of Tanzania (EMAT). The main aim of this course is to train and equip HCPs who are primarily caring for acutely ill children in Emergency and paediatric units. PECT content includes assessment, problem identification and emergent management of a paediatric patient with medical and or trauma condition. PECT has a pre and post assessment exam, to help facilitators and trainees reflect on the level of understanding before and after training. A post training score of 75% and above is counted as successful and participants are awarded MUHAS certificates of successful completion something which was done in our case.

7.9 Sampling

Sampling of subjects was done by simple random technique by hospital cluster at ALMC, KCMC, BMC and MZRH. A total of 25 participants were required from each hospital to reach the sample size.

In order to best represent the true makeup of each staff group, the group that underwent training at each hospital was chosen to most adequately reflect the distribution of positions (cadres) that make up the hospital staff. To do this, in each of the four hospitals involved, participants were first clustered according to their cadres and then the total number of every cadre was divided by the total number of hospital staff to represent the percentage of staff represented by that cadre. The resulting percentage was multiplied by 25 to get the number of participants required for each cadre to undergo the training at that hospital. Once these numbers were specified, the hospital administration was requested to randomly sample the cadre to obtain the proper number for the training.

7.10 Sample size

7.10.1 The sample size required for this study had to meet two goals:

Be adequate to determine the baseline understanding, perception, and career decision-making towards EM amongst study participants.

7.10.2 Be adequate to detect an effect size of 10% of basic EM training on the above variables with a p-value of less than $\alpha = 0.05$ (32).

Therefore, sample size calculations for both aspects of the study were calculated and the larger one chosen to ensure there would be a large enough sample size for both aspects:

Sample size calculation for baseline survey interpretation was calculated by using the formula below: (32).

$$Sample\ Size = \frac{\frac{z^2 \times p(1-p)}{e^2}}{1+(\frac{z^2 \times p(1-p)}{e^2 N})}$$

Where:

N = Population size (100,000)

e = Margin of error (10%)

p = Proportion (0.43)

z = Z-score (1.96)

This gave a sample size of 95 participants.

Sample size calculation for sample adequate to detect an effect size of 0.5 standard deviation units (a moderate effect) in the categories of understanding, perception, and career decision was calculated by using the formula below:

$$n = (z_\alpha + z_\beta)^2 \, var / D^2$$

n=Sample size

D= Minimum detectable effect (10%)

z_α = standard normal deviate having probability α to the right, where α denotes the significance level of the one-sided test of hypothesis that D exceeds zero (1.96)

z_β = standard normal deviate having probability β to the right, where 1 – β denotes the power of the test (0.842)

Var = Variance (1.2)

This gave a sample size of 96 participants

Therefore, the sample size estimated for this study was 96 participants. The greater of the two calculated above was used to ensure an adequate sample for all objectives.

Because trainings are normally conducted in groups of 25, the sample size of 100 participants was made. This was designed to allow for a few participants who couldn't complete the course, while maintaining an adequate sample size.

7.11 Data collection

Participants in this study were consented and enrolled by the principal investigator and a research assistant. Each participant was assigned a study number so that questionnaire answers would be anonymous and pre and post-scores per individual could be compared. Participants responded to a pre-training paper questionnaire (Appendix A). Questions included Likert-scale variables and qualitative questions regarding their understanding, perception and career decision-making towards EM amongst healthcare providers. Participants then completed a two-day training course conducted by the principal investigator and other senior EM residents and EM Attending level physicians. The course content was from EMAT which is accredited by MUHAS. The Training outlines are shown in Appendix B. The trainers were also available during tea and lunch breaks during the training days to discuss EM with participants. After the completion of the training, a post-test (the same one done in pre-training assessment) via a paper-based questionnaire (Appendix C) was performed to evaluate the post-training understanding, perception, and career decision-making towards EM as a specialty amongst healthcare providers of the four tertiary, study hospitals. Pre and post-training paper questionnaires were kept in a locked filing cabinet and did not contain participants' names. Anonymized data from the questionnaires was entered into Microsoft Excel for Mac 2015 version 15.18 (Microsoft Corporation, Redmond, WA, USA) on a password-secured computer.

7.12 Data analysis

The study data was transferred from the paper questionnaires into Microsoft Excel spreadsheet for Mac 2015 version 15.18 (Microsoft Corporation, Redmond, WA,

USA) for analysis and the Likert scores were summed up, then the overall average was found and an average for each of the three categories (understanding, perception and career decision-making) was calculated and comparison of these means between sites was made.

Demographics were described and quantitative and qualitative pre and post-training results were analyzed. To find out whether the distribution was normal or skewed, the quantitative data was run into StatsDirect Version 3.0.171 and then was analyzed with simple descriptive statistics including median and interquartile range (IQR). Differences between pre and post-training responses were analyzed with paired T-tests, Mann-Whitney test and Kruskal Wallis test.

P-values are reported and a value of alpha<0.05 is considered statistically significant. Qualitative data was analyzed for content, and for themes by an inductive and iterative approach using Microsoft word for Mac 2015 version 15.18 (Microsoft Corporation, Redmond, WA, USA)

7.13 Ethical consideration

Ethical clearance to carry out this study was obtained from the Research and Publication Committee of MUHAS as well as from respective administrative authorities at ALMC, KCMC, BMC, and MZRH. All participants in the trainings that met inclusion criteria were offered a chance to participate in the study and those who agreed were consented with formal, written informed consent prior to participation in the study (See Appendix D). All data was treated with strict confidentiality and kept in locked filing cabinets and in a password-secured computer.

8.0 RESULTS

During the study period, 96 healthcare providers in the four tertiary hospitals were enrolled and completed two-day training as well as the pre and post-training surveys. The median age of participants was 34years (IQR 28-43); 35 (36.0%) were male. Most of the participants were diploma holders and 60% of all participants were nurses. 45% had worked for 5 years or less and all main departments were represented according to the size of each hospital.

Demographics of enrolled healthcare providers are summarized in table 1 (Table 1)

Table 1: Demographic Characteristics of Participants

		OVERALL	ALMC	KCMC	BMC	MZRH
Number of Participants	N(%)	96 (100.00)	25 (26.00)	21 (22.00)	25 (26.00)	25 (26.00)
Age: Median (IQR) years		34 (28.00-43.00)	37 (28.00-47.00)	31 (27.00-44.00)	34 (28.50-43.50)	35 (26.00-42.50)
Male	n (%)	35 (36.00)	7 (28.00)	4 (19.00)	12 (48.00)	12 (48.00)
Education Level						
Certificate	n (%)	23 (24.00)	4 (16.00)	2 (10.00)	5 (20.00)	12 (48.00)
Diploma	n (%)	43 (45.00)	12 (48.00)	9 (43.00)	13 (52.00)	9 (36.00)
Degree	n (%)	30 (31.00)	9 (36.00)	10 (47.00)	7 (28.00)	4 (16.00)
Cadres						
Doctors	n (%)	26 (27.00)	9 (36.00)	6 (29.00)	6 (24.00)	5 (20.00)
Nurses	n (%)	60 (63.00)	15 (60.00)	15 (71.00)	13 (52.00)	17 (68.00)
Administrators	n (%)	3 (3.00)	0 (0.00)	0 (0.00)	2 (8.00)	1 (4.00)
Others *	n (%)	7 (7.00)	1 (4.00)	0 (0.00)	4 (16.00)	2 (8.00)
Working Experience (Years)						
Less Than 5	n (%)	4 4(46.00)	9(36.00)	10(48.00)	14(56.00)	11(44.00)
Department						
Internal Medicine	n (%)	20 (21.00)	3 (12.00)	2 (10.00)	8 (32.00)	7 (28.00)
Obstetrics/Gynecology	n (%)	4 (4.00)	1 (4.00)	2 (10.00)	1 (4.00)	0 (0.00)
Pediatrics	n (%)	11 (11.00)	1 (4.00)	7 (33.00)	0 (0.00)	3 (12.00)
Surgery	n (%)	20 (21.00)	8 (32.00)	1 (4.00)	5 (20.00)	6 (24.00)
Anesthesia	n (%)	2 (2.00)	2 (8.00)	0 (0.00)	0 (0.00)	0 (0.00)
Casualty/OPD	n (%)	13 (14.00)	2 (8.00)	3 (14.00)	3 (12.00)	5 (20.00)
ICU	n (%)	7 (7.00)	2 (8.00)	2 (10.00)	2 (8.00)	1 (4.00)
Administration	n (%)	19 (20.00)	6 (24.00)	4 (19.00)	6 (24.00)	3 (12.00)
EM Awareness						
Presence of Formal EM Δ	n (%)	22 (23.00)	9 (36.00)	13 (62.00)	0 (0.00)	0 (0.00)
Worked in EM Department □	n (%)	14 (15.00)	7 (28.00)	7 (33.00)	0 (0.00)	0 (0.00)
Family Member Treated at ED	n (%)	40 (42.00)	9 (36.00)	11 (52.00)	12 (48.00)	8 (32.00)

** Radiology, Hospice, CTC* *Δ Full capacity ED* *□ 9% did not respond*

Overall Pre and Post- Training Scores on understanding, perception and career decision-Making

The overall results showed statistically significant differences between pre- and post-training scores (Table 2)

Table 2: Overall Pre and Post- Training Scores

Category	**Pre-Training** Overall Median(IQR) N=96	**Post-Training** Overall Median(IQR) N=96	***P-Value**
Understanding	3.33 (3.00-3.66)	4.66 (4.00-4.66)	<0.01
Perception	3.40 (3.14-3.71)	4.63 (4.50-4.87)	<0.01
Career Decisions	3.66 (3.33-4.00)	4.66 (4.33-4.83)	<0.01

* ***Mann -Whitney Test*** *was used to calculate the P-Value*

Understanding

We looked separately at the understanding of healthcare providers across all hospitals of study and found a statistically significant improvement in understanding after training in comparison to the baseline understanding levels. (Table 3)

Table 3: Pre and Post-Training differences on understanding by site

Hospital Name		**Understanding** **Pre-Training** Median (IQR)	**Post-Training** Median (IQR)	***p-value**
OVERALL	N=96	3.33 (3.00-3.66)	4.66 (4.33-4.83)	<0.01
ALMC	N=25	3.66 (3.00-4.33)	4.33 (4.00-4.50)	<0.04
KCMC	N=21	3.66 (3.00-4.33)	4.83 (4.58-4.83)	<0.01
BMC	N=25	3.33 (3.00-3.33)	4.66 (4.50-5.83)	<0.01
MZRH	N=25	3.00 (3.00-3.66)	4.83 (4.50-4.83)	<0.01

* ***Mann-Whitney Test*** *was used to calculate the P-Value*

Perception:

When assessing perception, there was a statistically significant improvement post-training in all sites except for ALMC which has a higher baseline score and after training there was a slight improvement, which was not statistically significant (p-value=0.95). (Table 4)

Table 4: Pre and Post-Training differences on perception by site

Hospital Name		**Perception**		
		Pre-Training Median (IQR)	**Post-training** Median (IQR)	***P-Value**
OVERALL	N=96	3.57 (3.14-4.28)	4.63 (4.50-4.87)	<0.01
ALMC	N=25	4.57 (4.14-4.85)	4.62 (4.37-5.00)	0.18
KCMC	N=21	3.64 (3.14-4.28)	4.93 (4.81-5.00)	<0.01
BMC	N=25	3.42 (3.14-3.57)	4.62 (4.50-5.75)	<0.01
MZRH	N=25	3.28 (3.00-3.87)	4.50 (4.50-4.75)	<0.01

** **Mann-Whitney Test** was used to calculate the P-Value*

Career decision-making

When assessing the outcome on career decision-making, results showed significant improvement after training at each hospital. (Table 5)

Table 5: Pre and Post-training differences on career decision-making by site

Hospital Name		**Career Decision-making**		
		Pre-Training Median (IQR)	**Post-Training** Median (IQR)	***P-Value**
OVERALL	N=96	3.66 (3.33-4.00)	4.66 (4.33-4.83)	<0.01
ALMC	N=25	4.00 (3.66-4.33)	4.33 (4.00-4.50)	<0.01
KCMC	N=21	3.50 (3.25-3.91)	4.83 (4.58-5.00)	<0.01
BMC	N=25	3.66 (3.50-3.83)	4.66 (4.50-4.83)	<0.01
MZRH	N=25	3.33 (3.16-3.83)	4.83 (4.50-4.83)	<0.01

***Mann-Whitney Test** was used to calculate the P-Value*

Pre- and Post-Training Test Score on Understanding, Perception and Career Decision-Making

Pre- and post-training scores highlighted significant differences between hospitals in EM understanding, perception and career decision making. (Tables 6a & b).

Table 6a: Pre-Training Test Score on Understanding, Perception and Career Decision-Making

Category	**ALMC** Median(IQR) N=25	**KCMC** Median(IQR) N=21	**BMC** Median(IQR) N=25	**MZRH** Median(IQR) N=25	***P-Value**
Understanding	3.66(3.00-4.30)	3.66 (3.00-4.30)	3.33 (3.00-3.33)	3.00 (3.00-3.66)	0.03
Perception	4.57 (4.14-4.85)	3.64 (3.14-4.28)	3.42 (3.14-3.57)	3.28 (3.00-3.57)	<0.01
Career Decision	4.00 (3.66-4.33)	3.50 (3.25-3.91)	3.66 (3.50-3.83)	3.33 (3.16-3.83)	<0.01

***Kruskal Wallis Test** was used to calculate the P-Value*

Table 6b: Post-Training Test Score on Understanding, Perception and Career Decision-Making

Category	**ALMC** Median (IQR) N=25	**KCMC** Median(IQR) N=21	**BMC** Median(IQR) N=25	**MZRH** Median (IQR) N=25	***P-Value**
Understanding	4.00 (3.66-4.66)	4.66 (4.33-5.00)	4.66 (4.33-4.66)	4.66 (4.66-4.66)	0.02
Perception	4.62 (4.37-5.00)	4.93 (4.81-5.00)	4.62 (4.50-4.75)	4.50 (4.50-4.75)	<0.01
Career Decision	4.33 (4.00-4.50)	4.83 (4.58-4.83)	4.66 (4.50-4.83)	4.83 (4.50-4.83)	<0.01

***Kruskal Wallis Test** was used to calculate the P-Value*

As part of this study, qualitative data was analyzed for content, and for themes by an inductive and iterative approach based on the study categories. There was a notable improvement and a positive change of the way participants thought of EM and EM physicians. (Tables7a &b)

Table 7a & b): Analytical Themes for Qualitative data

Table 7a*:* Pre-training

Categories	**Themes**	**Responses**
Understanding	Need for EM physicians.	"We don't need them" "Maybe we need them" "It doesn't matter if we have them or not"
Perception	EM physicians' initiatives How EM physicians treat Emergent patients	"Only treating patients" "They treat patients badly" "They treat patients like any other doctor"
Career decision	Need to advise a registrar to pursue EM as a specialty	"No, there are other specialties that are better" "Only if there is a full sponsorship"

Table 7b: Post-training

Categories	**Themes**	**Responses**
Understanding	Need for EM physicians.	"Absolutely EM physicians are needed for a better care of patients"
Perception	EM physicians' initiatives How EM physicians treat Emergent patients	"Apart from treating patients they also do research and teaching" "They treat patients with high acuity very well" "They reduce morbidity and mortality"
Career decision	Need to advice a registrar to pursue EM as a specialty	"Because of the high demand of EM physicians, we need to advice registrars to pursue EM as a specialty"

9.0 DISCUSSION

The distribution of the 96 participants from the four tertiary hospitals of study was represented by 25 participants from each hospital except for KCMC which had 21 participants. The median age of participants was 34 years, and participants were a mixture of cadres including administrators who are a key component in the establishment of EM (8,19). In this study, Casualty, which is a potential area where patients with high acuity are seen on regular basis, was represented by less than one-quarter of all participants.

Nearly half of participants had work experience of five years or less suggesting they had recently graduated from their respective schools. Over twenty percent of our study participants-all from ALMC and KCMC-reported that their hospitals had formal EM departments, furthermore, 15% reported to have worked in a formal ED prior to this study. This was an interesting observation highlighting a potential gap in understanding of EM and its specialty because none of these participants had worked at EMD-MNH-the only full capacity ED at the time of study- or outside Tanzania, in countries where full capacity EDs exist. The specialty of EM in Tanzania is very new and the first undergraduate training program within medical universities in Tanzania started in 2015 (31), hence none of these participants would have been exposed to the training or rotation. We believe exposure is necessary to impact healthcare providers awareness, as prior study has shown that formal exposure through a short training is necessary for providers to be aware of the specific specialty (29).

We found that the level of the baseline outcome in understanding, perception, and career decision-making was moderate across all hospitals something which was not very surprising given that EM is in its infancy as a specialty in Tanzania (13). Despite the overall moderate level in understanding, perception, and career decision-making, ALMC had a highest score in perception of EM as a specialty. This might be attribute to the fact that, this is a faith-based private non-for profit hospital that has had a long-time affiliation with United States of America (USA) ED, that sends EM Faculty yearly to mentor and support the clinical capacity within the ED (33). The rest of hospitals had no similar arrangement and, most of the ED based initiatives are locally

driven, and hence the lack of dedicated local champions and supportive administrative framework, might have impacted the level of exposure and hence reflected on the low perception level. This further highlights on the role of exposure towards impacting the perception of healthcare providers (28).

Our training was mainly focused on exposing healthcare providers to the role of EM in caring for acutely ill children presenting to ED. Similar to published literature on different settings, we observed a significant positive improvement- post exposure to a basic EM training-in understanding, perception and career decision-making from all participants at KCMC, BMC, and MZRH. However, ALMC observed non-significant change on similar variables, probably due to the fact that the baseline scores were already on the higher side.

Our analysis of the qualitative responses prior to EM training, revealed an overall low understanding, perception and in regards to advising registrars to joining EM as depicted in the following themes:

Need for EM physicians:

The participants believed that there is no need for EM physician, "*we don't need them"* and *"It doesn't matter if we have them or not"*. These responses are not surprising given that none of the participants had an exposure to EM and none had worked in an environment that EM is a core component of health care system. EM physicians might not be the only solution for a good emergent patient care, especially in LIC. However, their role in EM and its sustainability in-country is very vital. This low level of understanding changed substantially, post EM training as noted in the responses, "*Absolutely EM physicians are needed for a better care of patients*" highlighting the key role of exposure in understanding and hence providing an alternative means of creating an improved understanding within institutions in Tanzania and in other LIC.

EM physicians' initiatives and how they treat Emergent patients

Prior to EM short course training, participants believed that EM physicians have a limited role and this is only towards treating patients, "*EM physician initiatives is only treating patients*". The perception that is contrary to what the actual roles,

responsibilities and initiatives are for EM which extends beyond just treating patients (34–36). Similarly, participants had a negative perception on how EM physicians treat patients:

"*treat patients not adequately and or they treat patients like any other doctor".* Both of these perception changed very much when the participants responded to the same question post EM training: *"Apart from treating patients they also do research and teaching"* and "*They treat patients with high acuity very well"* further more "*They reduce morbidity and mortality"*

Need to advice a registrar to pursue EM as a specialty

Participants felt no need to advice the junior registrar to pursue EM as a carrier, "*no need to advise a registrar to pursue EM as a specialty"* citing that other specialties do better. Some suggested EM should only be pursued if there was full sponsorship. This is not a surprising perception, as EM is till new in Tanzania and providers are unaware of the role it plays in the health system (31). However, post exposure to EM training, this perception changed and participants believed that there is a need to increase the number and spread of EM physicians across the country: "*Because of the high demand of EM physicians, we need to advice registrars to pursue EM as a specialty".*

Overall, the short EM training course, positively changed participants' understanding and perception of EM as a specialty and this was shown by the survey results. It has been shown in other studies that a deep understanding of a specialty is essential for someone to choose a particular future career specialty (29). However, EM as a specialty needs a well-structured and equipped EM Department, with a well-triage and flow of patients which will reduce dissatisfaction to healthcare providers (28). This study highlighted that a short basic EM training is a good way to impact healthcare providers in their understanding, perception and career decision-making in areas where there is no established EM and that short emergency care courses are not only to impart skill, but also to introduce health professionals to the concept of emergency medicine in areas where it does not exist. More training and follow up sessions are needed to strengthen the momentum created by the initial training and further work should be directed at doing so.

10.0 STUDY LIMITATIONS AND MITIGATION

10.1 Limitations

The study was conducted in only 4 tertiary hospitals; hence, the results may not necessarily be generalizable to other health providers in regional and district hospitals across Tanzania.

The long-term impact of this training was not assessed by this study, which only evaluated the initial impact.

The participants were chosen by the hospital administration after clustering techniques were instructed to the hospital administration, which could have been a source of selection bias, since the selection at this stage was out of direct control.

10.2 Mitigations

10.2.1 By ensuring the sampling technique included participants of all cadres to represent the general healthcare providers in Tanzania, helped improve the generalizability amongst tertiary hospital care providers.

10.2.2 Since this is the first evaluation of training, we will design follow up trainings to maintain and re-assess the long-term impact of this training.

11.0 CONCLUSION

A short Basic Emergency Medicine Training has a positive impact on understanding, perception and career decision-making amongst healthcare providers of Tertiary level hospitals in Tanzania EM as a specialty. We found that this model of training is acceptable since it was successfully done in all four hospitals of study where all participants completed the training. This training model can be used in other hospitals to impact the views of healthcare providers towards EM in the future.

12.0 RECOMMENDATIONS

In countries where EM is still being introduced, we recommend the use of a short basic EM training to introduce healthcare providers at hospitals without EM to EM as a specialty. After initial trainings, follow up trainings and assessments should be done to determine long term impact and knowledge retention.

REFERENCES

1. Robertson-Steel I. Evolution of Triage Systems. Emerg Med J. 2006 Feb 1;23(2):154–5.

2. Understanding | Definition of Understanding by Merriam-Webster [Internet]. 2016 [cited 2016 Apr 13].

3. Perception | Definition of Perception by Merriam-Webster [Internet]. 2016 [cited 2016 Apr 13].

4. Kobusingye OC. Emergency medical systems in low- and middle-income countries: recommendations for action.

5. Suter RE. Emergency Medicine in the United States: A Systemic Review. World J Emerg Med. 2012;3(1):5.

6. Arnold JL. International Emergency Medicine and the Recent Development of Emergency Medicine Worldwide. Ann Emerg Med. 1999 Jan;33(1):97–103.

7. Obermeyer Z, Abujaber S, Makar M, Stoll S, Kayden SR, Wallis L, et al. Emergency Care in 59 Low-and Middle-Income Countries.

8. Philip Anderson. The Globalization of Emergency Medicine and its Importance for Public Health.

9. Reid S, Stephenson D, Bowden L. Perception of Emergency Medicine by Consultants and Specialist registrars from other Hospital Specialties. Emerg Med J. 2009 Oct 1;26(10):706–10.

10. GECC. Global Emergency Care Collaborative (GECC) [Internet]. [cited 2016 Apr 11].

11. Rwanda Emergecny Care Association. Rwanda Emergency Care Association (RECA) [Internet]. [cited 2016 Apr 11].

12. TAAAC-EM. Emergency medicine program targets “brain drain” in Ethiopia [Internet]. [cited 2016 Apr 11].

13. Reynolds TA, Mfinanga JA, Sawe HR, Runyon MS, Mwafongo V. Emergency Care Capacity in Africa: A Clinical and Educational Initiative in Tanzania. J Public Health Policy. 2012;33:S126–37.

14. Kazzi AA, Langdorf MI, Ghadishah D, Handly N. Motivations for a Career in Emergency medicine: a profile of the 1996 US applicant pool. CJEM. 2001 Apr;3(2):99–104.

15. Neacy K, Stern SA, Kim HM, Dronen SC. Resident Perception of Academic Skills Training and Impact on Academic Career choice. Acad Emerg Med Off J Soc Acad Emerg Med. 2000 Dec;7(12):1408–15.

16. Wallis LA, Garach SR, Kropman A. State of Emergency Medicine in South Africa. Int J Emerg Med. 2008 Jun;1(2):69–71.

17. Wen LS, Geduld HI, Tobias Nagurney J, Wallis LA. Perceptions of Graduates from Africa’s First Emergency Medicine Training Program at the University of Cape Town/Stellenbosch University. CJEM. 2012 Mar;14(2):97–105.

18. Dubal Y, Sangei I, Yusuf S. Personal Communication. 2015.

19. Nicks BA, Sawe HR, Juma AM, Reynolds TA. The state of emergency medicine in the United Republic of Tanzania. Afr J Emerg Med. 2012 Sep;2(3):97–102.

20. Sawe HR, Mfinanga JA, Mwafongo V, Reynolds TA, Runyon MS. Trends in mortality associated with opening of a full-capacity public emergency department at the main tertiary-level hospital in Tanzania. Int J Emerg Med [Internet]. 2015 Dec [cited 2016 Jun 13];8(1).

21. Kirsch TD. Emergency Medicine Around the World. Ann Emerg Med. 1998 Aug;32(2):237–8.

22. Kabeza AB, George N, Nyundo M, Levine AC. Development of Emergeny Medicine in Rwanda. afjem. 2013;3(3).

23. Istih. Emergency Medicine in Myanmar [Internet]. 2013 May. Available from: istih.org

24. Pearlmutter MD. Emergency Medicine in Haiti [Internet]. Available from: crudem.org

25. Davis DP, Graham PG, Husa RD, Lawrence B, Minokadeh A, Altieri K, et al. A performance Improvement-Based Resuscitation Programme Reduces Arrest Incidence and Increases Survival from in-Hospital Cardiac Arrest. Resuscitation. 2015 Jul;92:63–9.

26. Hall MK, Omer T, Moore CL, Taylor RA. Cost-Effectiveness of the Cardiac Component of the FAST Examination in Blunt Trauma. Pines JM, editor. Acad Emerg Med [Internet]. 2016 Feb [cited 2016 Mar 25];

27. Kirsch TD. The Development of International Emergency Medicine: Role for U>S Emergency Physicians and Organizations.

28. Rainer TH. Emergency Medicine-The Specialty. 2000;

29. Essuman A. Perceptions of Medical Students About Family Medicine in Ghana. 2013;

30. Yilmaz AA, Ilce A, Can Cicek S, Yuzden GE, Yigit U. The Effect of a Career Activity on the Students' Perception of the Nursing Profession and their Career Plan: A Single-Group Experimental study. Nurse Educ Today. 2016 Apr;39:176–80.

31. Reynolds TA. Emergency Care Capacity in Africa: A clinical and Educational initiative in Tanzania [Internet]. 2016 [cited 2016 Apr 11].

32. Caldewell J. Determination of Sample Size for Analytical Survey, Using a Pretest-Posttest-Comparison-Group Design [Internet]. 2016.

33. ALMC. Arusha Lutheran Medical Center [Internet]. 2008.

34. Wentlandt K, Degendorfer N, Clarke C, Panet H, Worthington J, McLean RF, et al. The Physician Quality Improvement Initiative: Engaging Physicians in Quality Improvement, Patient Safety, Accountability and their Provision of High-Quality Patient Care. Healthc Q Tor Ont. 2016;18(4):36–41.

35. Miró OS, Burillo-Putze G. Research in emergency medicine in Europe. Eur J Emerg Med Off J Eur Soc Emerg Med. 2012 Apr;19(2):63–8.

36. Hemphill RR, Santen SA, Rountree CB, Szmit AR. Patients' Understanding of the Roles of Interns, Residents, and Attending Physicians in the Emergency Department. Acad Emerg Med Off J Soc Acad Emerg Med. 1999 Apr;6(4):339–44.

APPENDICES

Appendix A: Pre-training questionnaires

Inclusion criteria

All healthcare providers randomly selected from ALMC, KCMC, MZRH and BMC.

Hospital Name_____

Demographics

1. Age: _____
2. Sex (circle): male female
3. Cadre: _____
4. Level of education:
   List highest certification (e.g. Certificate, Diploma, Degree): _____
5. Working experience(Years)_____
6. Work department (current): _____
7. Any administrative role?

Yes	No

If Yes, Specify _____

8. Does your hospital have a formal Emergency Medicine Department?

Yes	Unsure	No

9. Have you ever worked in an Emergency Medicine department?

Yes	No

10. Have you ever brought a family member to Emergency Medicine department?

Yes	No

11. Does your hospital have Emergency Medicine specialists?

Yes	No

12. When was the first time you heard about the specialty of Emergency Medicine in Tanzania? _____

13. From which source of information did you first hear about Emergency Medicine Tanzania? _____

14. At a city–wide or national level have you heard of any initiatives that Emergency Medicine specialists are usually involved in?

YES	NO

Explain_____

15. Do Emergency Medicine doctors help prevent illnesses or injuries?

1 Never	2 Rarely	3 Sometimes	4 Very Often	5 Always

16. Do Emergency physicians do research work to find out how to manage patients even better?

1 Never	2 Rarely	3 Sometimes	4 Very Often	5 Always

17. Do Emergency physicians work along Emergency trained nurses?

1 Never	2 Rarely	3 Sometimes	4 Very Often	5 Always

18. Do Emergency Medicine doctors prevent secondary injury to patients?

1 Never	2 Rarely	3 Sometimes	4 Very Often	5 Always

19. Do you think your hospital should have an Emergency Medicine specialist?

1 Strongly Disagree	2 Disagree	3 Unsure	4 Agree	5 Strongly Agree

Explain why _____

20. Do you think your hospital has been doing enough to manage emergent patients?

1 Strongly Disagree	2 Disagree	3 Unsure	4 Agree	5 Strongly Agree

21. Do you think you need Emergency Medicine at your hospital?

1 Very False	2 False	3 Unsure	4 True	5 Very True

24. Do you think the introduction of Emergency Medicine care in Tanzania will help save more lives than before?

1 Strongly Disagree	2 Disagree	3 Unsure	4 Agree	5 Strongly Agree

25. Would you advise a medical student to become Emergency Medicine Physicians?

1 Strongly Disagree	2 Disagree	3 Unsure	4 Agree	5 Strongly Agree

26. Emergency Medicine physicians are respected by other specialists.

1 Strongly Disagree	2 Disagree	3 Unsure	4 Agree	5 Strongly Agree

27. Do you think emergency medicine physicians and their practice in Tanzania will change the way patients with emergency conditions are been handled.?

1 Strongly Disagree	2 Disagree	3 Unsure	4 Agree	5 Strongly Agree

28. Establishing dedicated emergency care service reduces morbidity.

1 Strongly Disagree	2 Disagree	3 Unsure	4 Agree	5 Strongly Agree

29. Establishing a dedicated emergency care service reduces mortality.

1 Strongly Disagree	2 Disagree	3 Unsure	4 Agree	5 Strongly Agree

30. Do you think that all district and region referral hospitals should have Emergency Medicine specialists?

1 Strongly Disagree	2 Disagree	3 Unsure	4 Agree	5 Strongly Agree

31. Do you think Nursing and Medical students should have rotations in Emergency Medicine Departments?

1 Strongly Disagree	2 Disagree	3 Unsure	4 Agree	5 Strongly Agree

32. How is the pay in Emergency Medicine?

1 Much Less	2 Less	3 Unsure	4 The Same	5 Much More

33. How often do Emergency Medicine doctors get called from home?

1 Much Less	2 Less	3 Unsure	4 The Same	5 Much More

34. Would you advise someone to pursue Emergency Medicine as a specialty?

1 Strongly Disagree	2 Disagree	3 Unsure	4 Agree	5 Strongly Agree

35. Do you think Emergency Medicine specialists are generally satisfied with their career choice?

1 Strongly Disagree	2 Disagree	3 Unsure	4 Agree	5 Strongly Agree

36. Do you think professionals training in Emergency Medicine in Tanzania will have career opportunities?

1 Strongly Disagree	2 Disagree	3 Unsure	4 Agree	5 Strongly Agree

37. Do you think Emergency Medicine offers a good future financial reward?

1 Strongly Disagree	2 Disagree	3 Unsure	4 Agree	5 Strongly Agree

38. What advice would you give to a registrar considering a career in Emergency Medicine? _____

Appendix B: Training curricula and course outlines

Pediatric Emergency Care Training

DAY 1:

TIME	ACTIVITY
8:00-9:00	Registration & Introduction
9:00-9:15	Course overview
9:15-9:55	Pre-course assessment
9:55-10:35	Pediatric assessment
10:35-10:55	TEA BREAK
10:55-11:25	Pediatric Respiratory Emergencies
11:25-11:55	Pediatric shock
11:55-13:25	Demonstration & practical skills
13:25-14:25	LUNCH BREAK
14:25-14:55	Team work
14:55-15:25	Cardiac arrest
15:25-16:55	Practical skills stations
16:55-17:00	CLOSING OF DAY ONE

DAY 2:

TIME	ACTIVITY
7.30-8.00	Individual revision
8.00-8.30	Recap of day 1
8.30-9.15	Pediatric CNS Emergencies
9.15-10.00	Pediatric Trauma Assessment
10.00-10.30	TEA BREAK
10.30-11.15	Trauma- management specific conditions
11.15-13:30	Practical skills
13:30-14:30	LUNCH BREAK
14:30-15:30	Post-course assessment and feedback
15:30-15:45	Results of pre- and post-course assessment
15:45-16:30	Certificate presentation
16:30-17.00	Wrap-up

Appendix C: Post-training questionnaires

1. At a city–wide or national level have you heard of any initiatives that Emergency Medicine specialists are usually involved in?

YES	NO

If Yes, explain why_____

2. Do Emergency Medicine doctors help prevent illnesses or injuries?

1 Never	2 Rarely	3 Sometimes	4 Very Often	5 Always

3. Do Emergency physicians do research work to find out how to manage patients even better?

1 Never	2 Rarely	3 Sometimes	4 Very Often	5 Always

4. Do Emergency physicians work along Emergency trained nurses?

1 Never	2 Rarely	3 Sometimes	4 Very Often	5 Always

5. Do Emergency Medicine doctors prevent secondary injury to patients?

1 Never	2 Rarely	3 Sometimes	4 Very Often	5 Always

6. Do you think your hospital should have an Emergency Medicine specialist?

YES	NO

Explain why _____

7. Do you think your hospital has been doing enough to manage emergent patients?

YES	NO

8. Do you think you need Emergency Medicine at your hospital?

1	2	3	4	5
Very False	False	Unsure	True	Very True

9. Do you think the introduction of Emergency Medicine care in Tanzania will help save more lives than before?

1	2	3	4	5
Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree

10. Would you advise a medical student to become Emergency Medicine Physicians?

1	2	3	4	5
Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree

11. Emergency Medicine physicians are respected by other specialists.

1	2	3	4	5
Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree

12. Do you think Emergency Medicine physicians and their practice in Tanzania will change the way patients with emergency conditions are been handled.?

1	2	3	4	5
Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree

13. Establishing dedicated emergency care service reduces morbidity.

1	2	3	4	5
Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree

14. Establishing a dedicated emergency care service reduces mortality.

1	2	3	4	5
Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree

15. Do you think that all district and region referral hospitals should have Emergency Medicine specialists?

1 Strongly Disagree	2 Disagree	3 Unsure	4 Agree	5 Strongly Agree

16. Do you think Nursing and Medical students should have rotations in Emergency Medicine?

1 Strongly Disagree	2 Disagree	3 Unsure	4 Agree	5 Strongly Agree

17. How often do Emergency Medicine doctors get called from home?

1 Much Less	2 Less	3 Unsure	4 The Same	5 Much More

18. Would you advise someone to pursue Emergency Medicine as a specialty?

1 Strongly Disagree	2 Disagree	3 Unsure	4 Agree	5 Strongly Agree

19. Do you think Emergency Medicine specialists are generally satisfied with their career choice?

1 Strongly Disagree	2 Disagree	3 Unsure	4 Agree	5 Strongly Agree

20. Do you think professionals training in Emergency Medicine in Tanzania will have career opportunities?

1 Strongly Disagree	2 Disagree	3 Unsure	4 Agree	5 Strongly Agree

21. Do you think Emergency Medicine offers a good future financial reward?

1 Strongly Disagree	2 Disagree	3 Unsure	4 Agree	5 Strongly Agree

22. What advice would you give to a registrar considering a career in Emergency Medicine? _____

Appendix D: Consent form (English version)

THE IMPACT OF BASIC EMERGENCY MEDICINE TRAINING ON THE UNDERSTANDING, PERCEPTION AND CAREER DECISIONS TOWARDS EMERGENCY MEDICINE AMONGST HEALTHCARE PROVIDERS IN TERTIARY REFERRAL HOSPITALS IN TANZANIA

Dear Madam/Sir

I am Dr. Peter S. Mabula, an Emergency Medicine Resident at the Department of Emergency Medicine at Muhimbili University of Health and Allied Sciences (MUHAS). I am conducting a study on the impact of basic Emergency training on the understanding, perception and career decisions towards Emergency Medicine amongst healthcare providers in tertiary referral hospitals in Tanzania.

The aim if the study:

To determine the impact of basic Emergency training on the understanding, perception and career decisions towards Emergency Medicine amongst healthcare providers in tertiary referral hospitals in Tanzania

Participation in this study:

The study will include all healthcare providers in tertiary hospitals in Tanzania who consent to participate in the pre and post training test and a short basic EM training.

Risks: This study will have no any physical risks to participants.

Benefits: As you agree to participate in the study you will be a volunteer and you will not benefit directly by participating in the study, but the results of the study will help in the establishment of EM as a specialty in Tanzania

Confidentiality:

All information and data collected in questionnaires will not be disclosed to any one not related to this study. The data will be treated with strict confidentiality and stored in locked cabinets, encrypted computers.

Cost:

Participants will not be required to make any payment to participate in this study and there will be no financial compensation for participation.

Who to contact:

For further information, questions or queries, you can contact:

The Principal Investigator:

Dr. Peter S. Mabula
Muhimbili University of Health and Allied Sciences
Department of Emergency Medicine,
P. O. Box 65001,
Dar Es Salaam
Tel: +255 759 999 888, +255 789 229 888
Email: mabulajr@live.comDr. Hendry R. Sawe
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Tel: +255 754 885658 Email: hrsawe@gmail.com

Prof. Said Aboud,
Directors of Research and Publications,
MUHAS
P.O. Box 65001, Dar Es Salaam.
Tel no: 2150302-6, 2152489.

I, _____ have read and understood the contents of this form. My questions have been answered. I agree to participate in this study.

Signature of participant _____

Signature of researcher_____

Date consent signed_____

Appendix E: Consent form (Swahili version)

FOMU YA RIDHAA YA KUSHIRIKI KATIKA UTAFITI
THE IMPACT OF BASIC EMERGENCY MEDICINE TRAINING ON THE UNDERSTANDING, PERCEPTION AND CAREER DECISIONS TOWARDS EMERGENCY MEDICINE AMONGST HEALTHCARE PROVIDERS IN TERTIARY REFERRAL HOSPITALS IN TANZANIA

Habari Ndugu,
Mimi ni Dkt Peter S. Mabula, mwanafunzi wa udaktari bingwa wa magonjwa ya dharura katika Chuo Kikuu cha Afya na Sayansi Shirikishi Muhimbili (MUHAS). Ninafanya Utafiti huu kuhusu mtazamo, uelewa na uchaguzi wa kuwa daktari bingwa wa magonjwa ya dharura.

Madhumuni ya utafiti:
Utafiti huu una lenga katika kuangalia jinsi mafunzo ya muda mfupi yanavyoweza kusaidia katika mtazamo, uelewa na uchaguzi wa kuwa daktari bingwa wa magonjwa ya dharura.

Ushiriki katika utafiti:
Utafiti huu unawashirikisha watoa huduma wote katika hospitali za rufaa watakaokubali kushiriki.

Athari:
Hatutaraji kuwepo na athari/hatari yoyote itokanayo na ushiriki katika utafiti huu.

Faida:
Kwa kushiriki katika utafiti huu,utakuwa umejitolea na hakuna faida ya moja kwa moja atakayopata mshiriki, bali matokeo yatokanayo na utafiti huu yatasaidia kuboresha huduma za magonjwa ya dharura hapo baadaye.

Usiri:
Taarifa zote zitakazo kusanywa katika utafiti huu zitakuwa siri, hivyo ushiriki wako hautajulikana na mtu asiyehusika na utafiti huu. Taarifa hizi zitajulikana kwenye timu ya watafiti tu.

Malipo:

Kwa kushiriki kwenye utafiti huu, hautalipwa wala hautalipa chochote

Ukiwa na swali au tatizo lolote, unaweza kuwasilianana wafuatao:

Mtafiti mkuu,

Dr. Peter S. Mabula,
Chuo kikuu cha afya ya tiba na sayansi shirikishi, Muhumbili,
Kitengo cha Magonjwa ya Dharura,
S.L.P 65001,
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Msimamizi
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Prof. Said Aboud,
Mkurugenzi wa utafiti na uchapishaji
Chuo kikuu cha afya ya tiba na sayansi shirikishi, Muhimbili
P.O. Box 65001, Dar es Salaam.
Tel no: 2150302-6, 2152489.

Kuweka sahihi ya makubaliano:

Mimi, _____, nimesoma maelezo yote yaliyomo kwenye fomu hii na nimeelewa. Maswali yangu yamejibiwa na niko tayari kushiriki.

Sahihi ya mshiriki _____

Sahihi ya Mtafiti Msaidizi _____

Tarehe _____