AN ANALYSIS OF ZAMBIA'S EMERGENCY MEDICINE REGISTRARS' EXPERIENCES IN SOUTH AFRICA: LESSONS FOR THE DEVELOPMENT OF EMERGENCY CARE IN ZAMBIA

by

Kephas E Mwanza

This research assignment is presented in partial fulfilment of the requirements for the degree Masters of Medicine Emergency Medicine in the Faculty of Medicine and Health Sciences at Stellenbosch University.

Supervisor: Prof Lee A Wallis

DECLARATION

By submitting this dissertation electronically, I, Kephas Elimon Mwanza declare that the entirety of the work contained herein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

Signature: …… Date: December 2019

TABLE OF CONTENTS

DECLARATION 2
ACKNOWLEDGEMENTS 4
DEDICATION 5
ABBREVIATIONS 6
PART A: LITERATURE REVIEW 8
INTRODUCTION 8
SEARCH STRATEGY 9
State of emergency care in Zambia 9
Postgraduate medical trainees' experiences 12
Supernumerary registrar program in South Africa 12
Summary or interpretation of literature 13
Identification of gaps or needs for further research 14
References 15
PART B: ARTICLE MANUSCRIPT 18
ABSTRACT 19
INTRODUCTION 20
METHODS 21
Trustworthiness 24
RESULTS AND DISCUSSION 25
1. Inadequate State of emergency care in Zambia 25
2. Priority aspects of emergency care development in Zambia 27
Study Limitations and Strengths 29
Conclusion 29
References 31
PART C: ADDENDUM 33
1. RESEARCH PROPOSAL 33
2. PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM 43
What is this research study all about? 43
Why have you been invited to participate? 44
Will you benefit from taking part in this research? 44
Are there risks involved in your taking part in this research? 44
Who will have access to the information you will provide? 44
Declaration by participant 45
Declaration by investigator 46
3. INTERVIEW SCHEDULE 47
4. APPROVAL LETTERS 49

ACKNOWLEDGEMENTS

My sincere thanks to my supervisor, Prof Lee A Wallis, who found the time to guide the project to the end. Much appreciation to my colleagues who participated in the study for finding time in their ever-busy schedules to offer valuable insight.

DEDICATION

To my inspirational wife, Elezia, and my 2 lovely children, Chimwemwe and Lindiwe, much love for you.

ABBREVIATIONS

ECAT	Emergency Care Assessment Tool
EC	Emergency Centre
ED	Emergency Department
EM	Emergency Medicine
EMS	Emergency Medical Services
GRZ	Government of the Republic of Zambia
IFEM	International Federation for Emergency Medicine
MeSH	Medical Subject Heading
ML	Medical Licentiate
MoH	Ministry of Health
OHEC	Out of Hospital Emergency Care
WHO	World Health Organization

PART A: LITERATURE REVIEW

INTRODUCTION

In recent years, there has been an increasing call from multinational organisations such as the World Health Organization (WHO) for states to develop robust emergency care systems(1). The state of emergency care in Africa is faced with numerous challenges, among which include inadequate human resources for health(2). Most low- and middle-income countries (LMIC) have inadequate emergency care systems in place and therefore suffer the highest mortality and morbidity from acute diseases(3). The consensus on emergency care in Africa in recent years has been that the large burden of acute disease in Africa can be substantially addressed by effective, integrated emergency care systems(4,5). The term emergency care system includes supportive and delivery structures required for effective, efficient provision of curative service(6). Emergency care forms only part of the emergency care system and refers to delivery of curative interventions with a specific focus on severe clinical cases(6). Emergency medicine (EM) refers to a field of practice based on the knowledge and skills required for the prevention, diagnosis, and management of acute and urgent aspects of illness and injury affecting patients of all age groups with a full spectrum of episodic undifferentiated physical and behavioural disorders. EM encompasses an understanding of both pre-hospital and in-hospital emergency medical systems(7).

The African Federation for Emergency Medicine (AFEM) has, among other strategies, prioritised curriculum development for nursing to meet Africa's distinctive health challenges, aimed at improving both the quantity and quality of emergency care through a skilled health workforce(8). Furthermore, specialist EM training programs have commenced as an initiative to improve emergency care in parts of Africa(9,10). However, in other African countries, owing to lack of consensus on the key components of emergency care, implementation has remained slow(11).

The Republic of Zambia had no EM specialist post in their treasury-approved establishment until late 2017(12). The Government of Zambia (GRZ), through its Ministry of Health (MoH), with support from the Swedish International Development Agency and Clinton Health Access Initiative, have embarked on developing emergency care in Zambia through infrastructure development and training(13). To date, five Zambian doctors have been sent to South Africa to complete specialist training in EM(13). It is expected that they will return to Zambia upon completion of their studies to provide specialised emergency care to the Zambian population.

At present, there are no studies to explore the experiences of trainees in EM which can further future emergency care practice in Zambia. As they will be leaders in the field on their return, their opinions are critical. Therefore, this study aimed to describe lessons from the Zambia's EM registrars training experiences at various stages of their training in South Africa and how these lessons will impact the development of emergency care in Zambia.

The literature review for this study focused on the following;

- The state of emergency care in Zambia
- The general postgraduate medical trainees' experiences
- The supernumerary registrar program in South Africa
- Summary of interpretation of literature
- Identification of gaps and needs for future research

Emergency obstetrics and neonatal care is beyond the scope of this review.

SEARCH STRATEGY

The PubMed database, Sabinet, and Google Scholar were searched for the following keywords and phrases: "emergency care", "emergency medicine", "postgraduate experiences," and "supernumerary registrar". Only English and human-related articles were included. No limitation on date of publication was set. Official reports and statistics were obtained directly from respective websites including those from WHO, Central Statistics Office of Zambia, and MoH Zambia. Additional references from within articles and reports were also sourced.

State of emergency care in Zambia

Emergency medicine in Zambia, like most African countries, is nascent(14–16). This explains why there is a scarcity of emergency care studies in the country to objectively inform the actual state of emergency care. In Chavula's 2017 thesis, he explored the capacity of public health facilities in Zambia to provide emergency care services by using the AFEM Emergency Care Assessment Tool (ECAT)(17).The main aim of the ECAT was to ascertain facilities' strengths and weaknesses in the delivery of emergency care services for five sentinel conditions and maternal health. The five sentinel conditions were: respiratory failure, shock, altered mental status, dangerous fever, and severe pain or trauma. The

sample size included seven district hospitals, 12 general hospitals and four central hospitals. Lack of training was the most frequent reason for providers not to perform emergency procedures at district and general hospital levels of care. In this thesis, we learn of how training influences capacity of health care providers in providing necessary emergency interventions. However, this paper did not address other key general health system strengthening aspects as guided by WHO's six health system building blocks such as leadership, information and technology, and health financing in Zambia(18). Furthermore, this study did not assess triage. Triage refers to the methods used to assess patients' severity of injury or illness within a short period of time after their arrival, assign priorities, and transfer each patient to the appropriate place for treatment(19). Lack of formalised triage systems can result in overcrowding in the emergency department (ED) with subsequent quality of care reduction and capacity overload(19–21). Overcrowding exists when there is no space left to meet the timely needs of the next patient requiring emergency care(21). Therefore, triage has a direct effect on an institution's capacity to provide safe and timely emergency care(21).

Developed countries have a specific model of Emergency Medical Services (EMS) delivery that has been adopted and implemented for their population in their unique context(22). The delivery of EMS can broadly be classified into Anglo-American and Franco-German models. An Anglo-American EMS model, as seen in United States of America or Canada, aims at rapidly taking patients to the hospital. The Franco-German EMS model, on the other hand, takes the hospital services to the patient at the scene of incident, as practiced in Germany(22). There has also recently been a new model called Emergency Care Practitioner Scheme introduced in the United Kingdom (UK); its objective is to increase the percentage of patients treated in the community setting or at the scene of an incident(23). While high income countries can associate with one model or another, less than 9% of Africans benefit from a formalised emergency medical service(24). Zambia is not spared from inadequate EMS. Broccoli et al (2016) demonstrated this gap through a qualitative study in the Zambian setting where community members as well as healthcare providers identified both inadequate pre-hospital care and absence of a toll-free emergency number as barriers for accessing emergency care. Furthermore, Broccoli demonstrated how transportation to health facilities was highlighted as a deterrent to emergency care(14). Out of 3,425 enrolled in the trauma patients registry study conducted in Zambia, 51.8% used private vehicles and 37.1% used public transport(25). Despite the mode of transport, trauma patients arrived in the ED within six hours after injury, which served as an advantage for early intervention(25). Since most community members in Zambia used their own or private

transport to reach emergency departments, community involvement in establishing and strengthening a pre-hospital system in Zambia will be a necessary component(25).

Broccoli et al (2016), after 21 focus group interviews with 183 participants, found that 85% of overall community participants would help someone suffering an emergency(14). The healthcare providers (HCP) who were included in this study did not consist of a professional emergency health worker such as trauma nurse or EM physician because there were none in the country. This study does not only support health professional training, but also community training in emergency care. Therefore, Out of Hospital Emergency Care (OHEC) appears to be an appropriate term for use in Zambia. The term OHEC refers to care provided by lay people and also professionals outside of the hospital setting(26). Task shifting is where a HCP assumes new roles and responsibilities that are not traditionally within their scope of practice(27). There is data to support the benefit of task shifting in increasing essential surgical care for the population in sub-Saharan Africa(28). A systematic literature review in 2012 by Benjamin et al found that task shifting could potentially improve access to emergency care, as well as quality of care, and therefore advocated for task shifting as an alternative to increasing access to acute emergency care in low resource settings(2). In fact, Benjamin et al reported quality compliance by referring to a differentiated aspect of emergency paediatric care called Integrated Management of Childhood Illnesses in South East Asia, South America and sub-Saharan Africa(2). However, little is known regarding whether this approach can be used to enhance emergency medical care for acutely undifferentiated patients(2). Zambia has had a Medical Licentiate(ML) program where clinic officers (diploma non-physicians), a midlevel HCP, are given extra training with the aim of managing general and surgical emergency cases at district level (rural)(28). Zambia's population is projected to be 17.9million by 2020, with more than half (57%) of the people living in the rural areas(29). The health workers' distribution pattern observed in Zambia is such that most health workers are in urbanised areas(30); this justifies the need for a HCP that can be trained and retained for these hard-to-reach rural areas to provide essential emergency care for these vulnerable populations. By the year 2011,it was reported that Lusaka Province (urban) compared to Northern Province(rural) had a doctor to population ratio of 1:6,247 and 1:65,763, respectively(30). While the ML program has been successful for essential surgical care, recognition, lack of a clear career pathway and employment options have been identified as threats for sustainability and subsequent retention(28).

The Emergency First Aid Responder (EFAR) training for the community in Zambia has a role in OHEC advancement. The EFAR programme for lay people was developed based on the needs assessment of a high violence and injury rate in Manenberg township of Cape Town

to meet the emergency care needs of low resource areas in South Africa(31). It was further tested in Zambia's Kasama and Nyimba villages, and has since undergone transformation to meet their unique healthcare challenges through involvement of an expert panel with clinical experience in the Zambian healthcare context(32). While the EFAR programme promises an improvement to accessing emergency care, lack of a formalised pre-hospital system is likely to obscure the benefits.

Postgraduate medical trainees' experiences

There have not been many studies conducted on specialist medical trainees that focused on eliciting trainees' experiences, especially in sub-Saharan Africa. However, in developed countries such as Australia, 99 general practitioner registrars were interviewed through a questionnaire in order to investigate their intention for future practice(33). The results of the study were viewed as considerations when developing strategies to recruit general practitioners or registrars in rural Australia. Furthermore, in 2010 the Medical Workforce Unit of the Royal College of physicians conducted a survey among their 2,146 Medical Registrars. Among other objectives was to cover medical registrars' future intentions and provide insight into their concerns for their education and training(34). It is clear from this that such a survey would provide valuable information for improving a healthcare system. South Africa has documented supernumerary registrar experience that has given insight into foreign doctors' in-training experience in South Africa(35).

Supernumerary registrar program in South Africa

Supernumerary registrars (SRs) are registrars from foreign countries with challenging training situations who have been endorsed to pursue specialist training in South Africa by their home Ministry of Health(35). SRs are expected to return to their home country to enhance the level of health care there as well as to transfer skills and the competency acquired in South Africa. Around 87% of supernumerary registrars including EM SRs who participated in the study at the University of Cape Town intended to return to their home country(35). This is a remarkable intention rate which is in agreement with the enshrined values of the SR program.

An ethical case commentary by Abraah Karan et al states that many factors contribute to workforce migration globally, including failed global health policies, destination country incentives, and the limited ability of source countries to retain physician talent(36). This failure to repatriate results in a significant loss on investment: over $517,000 (USD) for each

non-returning doctor(37). There are not many studies in Zambia to address the issue of retention of health workers following training abroad. Although there is documentation of all medical specialty SR experience of working without payment in the hospitals of South Africa as part of their training(35), there is no data on supernumerary EM registrar training experience and lessons learnt tailored to improve their home countries' needs.

Summary or interpretation of literature

- In a study done by Broccoli et al in Zambia, emergency care systems are just beginning to develop. There is a need for both health care workers and community workers to be trained in emergency care. Transportation to health facilities is a barrier to accessing emergency care and the establishment of formalised pre-hospital care has the potential to abate this problem.
- In Chavula's 2017 thesis, which focused on assessing the capacity of Zambian public health facilities to provide emergency care using the emergency care assessment tool, it demonstrated that emergency care training was required in order for health care workers to perform emergency procedures.
- In the literature entitled "Epidemiology of injuries, outcomes, and hospital resource utilisation at a tertiary teaching hospital in Lusaka, Zambia", participants arrived within six hours post-injury despite neither EMS nor health facility support for transport due to community participation in caring for the injured.
- There are different types of EMS delivery models and each depend on the population served and the context.
- Task shifting has been shown to be beneficial for improving acute emergency care in low resource settings. In Zambia, where doctors are mainly in urbanised areas, medical licentiates have proven to be fundamental for improved essential surgical and obstetric care. However, quality concerns on undifferentiated patients remain unanswered and sustainability is unsettled.
- The success of the EFAR programme in South Africa provided evidence for the development of a Zambian-tailored curriculum to train community members/lay people in emergency care.
- There is a dearth of data on supernumerary EM registrars experiences in South Africa that highlights lessons learnt to improve home country's healthcare.

Identification of gaps or needs for further research

- Has the modified Emergency First Aid Responder programme implementation in Zambia improved emergency care?
- Can the Emergency First Aid Responder programme integration into Community Health Assistants' health promotion activities in Zambia be the answer for sustainability?
- Is there an inventory of public health facilities in Zambia with formalised triage systems in their emergency centres?
- What model of Emergency Medical Service delivery suits Zambia's unique population, geography and fiscal challenges?
- Can Medical Licentiates (advanced diploma non-physicians) provide quality emergency care for undifferentiated acute emergency patients as alternatives to emergency physicians in rural Zambia?
- What are the future developmental intentions/expectations of supernumerary registrars upon completion of their studies?
- What lessons can be learnt from a descriptive study of Zambian specialist doctors who did not repatriate in the past 10years?
- What lessons can be drawn from the Zambia's EM registrars training experiences at various stages in their training in South Africa for the development of emergency care in Zambia?

References

1. Anderson P, Suter R, Mulligan T *et al*. World Health Assembly Resolution 60.22 and Its Importance as a Health Care Policy Tool for Improving Emergency Care Access and Availability Globally. Vol. 60 Issue 1, *Annals of Emergency Medicine*. 2012 Feb.
2. Terry B, Bisanzo M, Mcnamara M,*et al*. Task shifting: Meeting the human resources needs for acute and emergency care in Africa. *African J Emerg Med*.2012;2(4):182–7.
3. Reynolds TA, Calvello EJB, Broccoli MC, *et al*. AFEM consensus conference 2013 summary: Emergency care in Africa - Where are we now? *African J Emerg Med*. 2014;4(3):158–63.
4. Calvello E, Reynolds T, Hirshon J, *et al*. Emergency care in sub-Saharan Africa: Results of a consensus conference. *African J Emerg Med*. 2013;3(1):42–8.
5. Obermeyer Z, Abujaber S, Makar M, Stoll S, *et al*. Emergency care in 59 low- and middle-income countries: a systematic review. *Bull World Health Organ*. 2015;
6. Calvello E, Broccoli M, Risko N, *et al*. Emergency Care and Health Systems :consensus -based recommendations and Future Research. *Acad Emerg Med*. 2013;20(12):1278–88.
7. Australasian College for Emergency Medicine. *Policy on standard terminology 2014*. Available from: https://acem.org.au/getmedia/e5cf7ac4-dae5-4193-be9a-6746b0d85009/P02_Standard_Terminology_Dec-14.aspx:(Accessed 2 Jan,2019).
8. Scott T, Hons BA, Ed C, *et al*. African emergency nursing curriculum : Development of a curriculum model. *Int Emerg Nurs* . 2016;27:60–3.
9. Reynolds TA, Mfinanga JA, Sawe HR. Emergency care capacity in Africa : A clinical and educational initiative in Tanzania.*Journal of Public Health Policy*.2012;33(S1):S126–37.
10. Wen LS, Geduld H, Nagurney JT, et al. Africa ' s First Emergency Medicine Training Program at the University of Cape. *Acad Emerg Med*. 2011;18(8):868–71.
11. Calvello EJB, Tenner AG, Broccoli MC et al. Operationalising emergency care delivery in sub-Saharan Africa: consensus-based recommendations for healthcare facilities. *Emerg Med J*. 2016;33:573–80.
12. Ministry of Health Government of the Republic of Zambia. *Restructuring Report. Lusaka*; 2017.p71
13. Chiyinga R. Personal correspondence. 20th April. 2017

14. Broccoli, M C.Cunningham C TM *et al*. Community-based perceptions of emergency care in Zambian communities lacking formalised emergency medicine systems. *Emerg Med J*. 2016;33:870–5.

15. Binam F. Emergency medical training:the future of emergency care in Africa? *Med Trop*. 2002;62(3):275–7.

16. Bruijns SR, Wallis LA. Emergency medicine, an opportunity to re-imagine a speciality in Africa. *African J Emerg Med* . 2011;1(2):49–50.

17. Chavula, C,Wallis LA. *facility -based capacity assessment of emergency care services in public hospitals in Zambia*. A thesis submitted for the Masters of Science Emergency Medicine,University of Cape Town; 2017. South Africa

18. WHO. Everybody's business: strengthening health systems to improve health outcomes :WHO's framework action . 2007. Available from: https://www.who.int/healthsystems/strategy/everybodys_business.pdf (accessed on3rd Jan,2019)

19. Christ M, Grossmann F, Winter D, *et al*. Modern Triage in the Emergency Department. *Dtsch Aerzteblatt int*.2010;107(50):892-8

20. Jayaprakash N, . Crowding and Delivery of Healthcare in Emergency Departments : *The European Perspective*. 2009;X(November):233–9.

21. Salway R, Valenzuela R, Shoenberger J, *et al*. Emergency Department (Ed) Overcrowding: Evidence-Based Answers To Frequently Asked Questions. *Rev Médica Clínica Las Condes*. 2017;28(2):213–9.

22. Al-shaqsi S. Clinical Notes Models of International Emergency Medical Service (EMS) Systems. *Oman Med J*. 2010;25(4):320–3.

23. Black JJ ,Davis GD . International EMS Systems: United Kingdom. *Resuscitation*. 2005;64(1):21–9.

24. Mould-millman N, Dixon JM, Sefa N, *et al*. The State of Emergency Medical Services (EMS) Systems in Africa The State of Emergency Medical Services (EMS) Systems in Africa. *Prehosp Disaster Med*. 2018;32(3):1–11.

25. Seidenberg P, Cerwensky K, Oranmore R. Epidemiology of injuries , outcomes , and hospital resource utilisation at a tertiary teaching hospital in Lusaka , Zambia. African *J Emerg Med* . 2014;4(3):115–22.

26. Mould-Millman N,Naido R,De Vries S et al. AFEM Consensus Conference , 2013 . AFEM Out-of-Hospital Emergency Care Workgroup Consensus Paper : Advancing

Out-of-Hospital Emergency Care in Africa : Advocacy and Development African Federation for Emergency Medicine African. *African J Emerg Med*. 2014;4(2):90–5.

27. WHO. *Task Shifting*:Global Recommendations and Guidelines.2008. Available from: https://www.who.int/healthsystems/TTR-TaskShifting.(accessed4th Feb, 2019)

28. Gajewski J, Mweemba C, Cheelo M, *et al*. Non-physician clinicians in rural Africa : lessons from the Medical Licentiate programme in Zambia.*Hum Resour Health* 2017;15;53.Doi:10.1186/S12960-017-0233-0

29. Central Statistical Office Government of the Republic of Zambia. *2010 Census of Population and Housing: Population and Demographic Projections2011-2035*. Available from: https://www.zamstats.gov.zm/phocadownload/Zambia Census Projection 2011 - 2035.(accessed 10th Dec, 2018)

30. Ferrinho P, Siziya S, Goma F, *et al*. The human resource for health situation in Zambia : deficit and maldistribution. *Hum Resour Health*. 2011;9:1–11.

31. Sun JH, Wallis LA. The emergency frst aid responder system model:Using community members to assist life threatening emergencies in violent developing areas of need. *Emerg Med J*. 2012;29:673–8.

32. Pigoga JL, Cunningham C, Kafwamfwa M, *et al*. Adapting the emergency first aid responder course for Zambia through curriculum mapping and blueprinting. *BMJopen*. 2017;7:1–7.

33. Harding C , Seal A,McGirr J *et al.* General practice registrars' intentions for future practice: implications for rural medical workforce planning. *Aust J Prim Health*. 2015;22(5):440–4.

34. Goddard AF, Evans T, Phillips C. Medical registrars in 2010 : experience and expectations of the future consultant physicians of the UK.*Clinical Medicine* 2011;11(6):532–5.

35. Peer S, Burrows SA, Mankahla N, et al. Supernumerary registrar experience at the University of Cape Town , South Africa. *SAMJ*.2017;107(1):76–9.

36. Karan A, Deugarte D, Barry M. ETHICS CASE Medical " Brain Drain " and Health Care Worker Shortages: How Should International Training Programs Respond? Commentary. *AMA J Ethics J Ethics*. 2016;18(7):665–75.

37. Mcgrail MR, Humphreys JS. BMC Health Services Research. *BMC Health Serv Res*. 2009;12:1–12.

PART B: ARTICLE MANUSCRIPT

An analysis of Zambia's emergency medicine registrars' experiences in South Africa: lessons for the development of emergency care in Zambia

Kephas E Mwanza[1], Willem Stassen[2], Lee A Wallis[1,2]

1. Division of Emergency Medicine, Stellenbosch University, Cape Town, South Africa

2. Division of Emergency Medicine, University of Cape Town, Cape Town, South Africa

Correspondence to:

Kephas E Mwanza

Private bag X24,Bellville

7535 South Africa

mwanzakephas.e@gmail.com

mwanzacephas@yahoo.com

Mobile: +27635929488

ABSTRACT

Background: There is little data regarding experiences of emergency medicine registrars for the development of emergency care in Zambia. This study describes lessons from the Zambia's emergency medicine registrars' training experiences at various stages of their training in South Africa and how these lessons will impact emergency care in Zambia.

Methods: In this qualitative, descriptive study, semi-structured, telephonic interviews were conducted with current Zambian emergency medicine trainees. Recorded interviews were transcribed verbatim and subjected to inductive content analysis. A total of five interviews were completed and represent the entire population of interest.

Results: Participants perceived the current state of both in-hospital and pre-hospital emergency care as just beginning to develop. Human resource constraints and health professionals working in silos were perceived as hallmarks of the Zambian health care system. Local training was viewed as a strategy for dissemination of emergency medicine knowledge. In addition, basic equipment for emergency centres were listed and standardisation was highlighted as being critical for their practice in Zambia. Trainees also identified that both advocacy and a team approach to practice were imperative for rapid improvement in emergency care.

Conclusion: There is an urgent need for the establishment of a structured advocacy program for emergency care, promotion of inter-professional collaborative practice for patient safety, and support for local emergency medicine training which have potential for overall emergency care development in Zambia. In addition, the advancement of pre-hospital care strategies should incorporate community participation.

Keywords: Inter-professional collaborative practice, experiences, emergency care, advocacy

INTRODUCTION

Improved emergency care systems can assist in managing the burden of disease globally, particularly in low-and middle-income countries (LMICs)(1). The state of emergency care across sub-Saharan Africa is characterised by huge patient volumes attended to mainly by trainees or physicians without specialty training; and subsequently attributable to higher mortality rates when compared to higher income countries(2). A significant portion of young and productive people seek emergency care in LMICs(2). Therefore, interventions to improve emergency care can increase life years saved and productivity. The Disease Control Priorities Project estimates that over half of the deaths in LMICs could be impacted by better emergency care systems(3); as such, there is an urgent need to develop more robust systems for emergency care in these settings(4).

Due to a shortage of trained emergency medicine physicians, facility-based emergency care in most LMICs is provided by non-specialists, especially in sub-Saharan Africa(2). This exacerbates an already existing critical shortage of human resources for health(5). Therefore, priority development areas for emergency care include human resources(6).

Zambia's Ministry of Health, in agreement with the South African government, supports EM Specialist training through a supernumerary registrar program. Supernumerary registrars are foreign registrars in South Africa who have been endorsed to pursue specialist training abroad by their home Ministry of Health and are expected to return to their home country to enhance the level of health care there as well as to transfer skills acquired in South Africa(7).

At present, there are no studies available that explore the experiences of trainees in EM for the development of emergency care in Zambia. Therefore, this study aimed to describe lessons from the Zambia's emergency medicine registrars' training experiences at various stages of their training in South Africa and how these lessons will impact emergency care in Zambia.

METHODS

A descriptive, qualitative study design was employed. Individual semi-structured interviews were conducted on a purposefully selected sample of all Zambian registrars in EM specialist programmes in South Africa. Ethical approval was obtained from the Human Research Ethics Committee (HREC) of Stellenbosch University (Ref: S18/02/028), while institutional permission from the University of Stellenbosch and the University of the Witwatersrand was obtained prior to recruiting participants and obtaining their written consent. The study is reported in accordance with the Consolidated criteria for Reporting Qualitative research guidelines (COREQ)(8).

Reflexivity

All interviews were conducted and led by an independent researcher in the presence of the investigator. The independent researcher had no prior relationship with participants. The investigator is a male emergency medicine registrar in South Africa who has worked in both the urban and rural healthcare settings of Zambia. The interest of the investigator in this particular research topic began when he learnt of government commitment to improve emergency care in Zambia by sending doctors abroad for training. The Zambian government has always sent doctors abroad to learn rare skills, however, the major challenge has been failure to incorporate them back into the healthcare system upon graduation.

Theoretical framework

This descriptive study design is underpinned on a constructivist methodological orientation through use of individual interviews. The basis of constructivism theory is that human beings construct knowledge and meanings from their experiences and hence knowledge exists in their mind and cannot be matched with any real world reality(9). The phenomenology research was chosen in order to describe Zambia's EM registrars' expectations for emergency care in Zambia. Phenomenology was appropriate as it is concerned with the lived experiences of the people(10). Furthermore, phenomenological research compares and combines findings from the study with the literature to determine current knowledge on the topic(11).

Inductive-dominant content analysis was utilised as an analysis tool(12). The inductive approach was used as there was no former knowledge regarding the topic. A deductive approach was used to a minor extent to analyse subsequent transcripts following coding.

The study did not interpret the hidden meaning of meaning units (actual words spoken) and therefore focused on manifest rather than latent content(12).

Setting

This study was conducted through telephonic interviews. Participants were in a quiet and comfortable place of their own choosing at a time that was convenient for them. It is presumed that there were no non-participants at the time of the interview, although no such restrictions were made by the research team. The interviewer, in the presence of only the investigator, conducted the interview in a quiet room via the speaker phone function, to aid audio recording of interviews.

Participants comprised an equal number of females and males and all had both urban and rural work experience in Zambia before commencement of EM training in South Africa. Their ages ranged from 30 to 50 years. They were at different training levels in South Africa and worked in South African state hospitals at the time of data collection as supernumerary registrars. In order to ensure anonymity of the participants, a deeper description of their characteristics is intentionally undisclosed.

Data collection procedure

Semi-structured telephonic interviews on a purposeful sample (n=4) guided by an interview schedule were conducted from 10 July to 10August 2018, in English. Each interview lasted between 40 and 58 minutes. The response rate was 100%, having sampled every Zambian EM registrar at the time of data collection.

A total of five interviews were conducted. The fifth interview was a follow-up to allow for clarification. Interviews were audio recorded via the Voice Tracer Digital Recorder DVT1150 (Philips, Amsterdam, Netherlands) with participants' consent. Although the same comments were heard again and again during data collection to infer data saturation(13), we are unable to confidently ascertain this due to exhaustion of the sample(i.e., there were no other Zambian emergency medicine trainees at the time of data collection). Audio records were transcribed by an independent transcription service. Hereafter, transcriptions were sent to participants to correct any factual errors.

The interview schedule was not piloted. Its development was assisted by an experienced researcher with an interest in emergency care systems development in African LMICs. The interview schedule was divided into three main parts: the first aimed to ascertain the participants' demographics while the second focused on the perceived current state of

emergency care in Zambia. The third part's objective was to elucidate priority development areas for emergency care in Zambia, which participants felt they would focus on upon their return to Zambia after completion of their studies.

Data Analysis

De-identified transcripts were analysed using inductive dominant content analysis to the manifest level(12) using nVivo Pro version 12 (QSR International, Melbourne, Australia). Through a flexible reflective process of working and re-working on the data to reveal connections and relationships, many meaning units were condensed to form codes(14). The developed codes were then compared, appraised and arranged into categories. After analysis, participant member checks were completed via email to verify emerging meaning units and codes (see trustworthiness). The content analysis is exemplified in the table below.

Categorical development using qualitative content analysis

Meaning Unit	Code	Category
"*But perhaps most of them don't really look at it as important to have a dedicated emergency physician."*	Importance of emergency physicians	Inadequate state of emergency care
"In terms of the pre-hospital care, it is where I think most of the things are still lacking."	Lack of Pre-hospital	Inadequate state of emergency care
"In the ED, we talk a lot with other departments, whereas other departments don't talk to each other."	Working in silos	Inadequate state of emergency care
"*To teach others what I have learnt from the basic level to higher."*	Local training and knowledge	Priority aspect of emergency care development
"The first thing for us, when we go back home, is to demonstrate that emergency medicine is a good field and to make a difference."	Advocacy for emergency care	Priority aspect of emergency care development

Trustworthiness

In order to ensure rigour, the principles of trustworthiness were adhered to(15):

1. *Credibility* was ensured through purposive sampling of available participants knowledgeable on the topic, utilising known methods and providing reflective commentary. Credibility was further bolstered through member checking at two phases (transcription and analysis) and by interpreting results within the context of previous literature. Data collection using telephonic interviews allowed for respondents' comfort and ease of audio recording(16). Telephonic interviews have been shown to provide rich and high quality data as an alternative method to face-to-face interviews(16). Although this worked well for this study, concerns of absence of visual cues and compromised rapport cannot be overlooked(16). Additionally, telephonic interviews have the potential for respondents to be distracted in their environment(16). However, social cues were of less importance in this particular non-observational study in answering the research question. Rapport can in future be enhanced through newer internet data collection methods such as Skype. Skype video calling can minimise participant distraction from non-participants as it offers the interviewer an opportunity to request a more confidential session.

2. *Confirmability* was ensured by employing an objective interviewer with experience in qualitative data gathering, as well as by researcher triangulation of codes and categories. Methods are further described and results exemplified using the data oriented approach(15).

3. As this study is descriptive and qualitative, *transferability* is difficult to ascertain, however, by sampling every existing Zambian EM registrar (barring the principal author), the views are representative of the target population.

4. *Dependability* was addressed using an interview schedule to guide the data collection process. Method error was further limited by ensuring that all interviews were conducted by the same experienced interviewer. Repeatability was further facilitated through the use of transparent reporting of the methodology through the use of an accepted reporting checklist, i.e., COREQ(8).

RESULTS AND DISCUSSION

Participants perceived the current state of both in-hospital and pre-hospital emergency care as young and just beginning to develop. Human resource constraints and health professionals working in silos were perceived as hallmarks of the Zambian system. Local training was viewed as a strategy for dissemination of emergency medicine knowledge. In addition, basic equipment for emergency centres were listed as being critical for their practice in Zambia. Trainees also identified that both advocacy and a team approach to practice were imperative for rapid improvement in emergency care.

1. State of emergency care in Zambia

1.1. Nascent Emergency care

Participants perceived emergency care in Zambia as underdeveloped .

"So, because the care system is such that it's not that developed…" - P3

Emergency care in Africa, and Zambia in particular, is in its infancy(17). Therefore, graduate EM physicians have a champion role to perpetuate robust emergency care in their respective countries. This is in line with the endorsed role of emergency physicians in placing emergency care as a global priority(18).

Although Emergency Medicine specialist recognition is important for emergency care growth, participants reported that emergency medicine physicians were not recognised as important in Zambia.

"But perhaps most of them don't really look at it as important to have a dedicated emergency physician." - P1

"The first thing for us, when we go back home, is to demonstrate that emergency medicine is a good field and to make a difference. If we fail to do that, then there will be no support." - P3

Advocacy is an important facilitator for the growth of a new profession and its role in the development of emergency care in Africa cannot be overlooked. A survey of emergency medicine graduates from African Universities from 2012 to 2015 who were at that time practicing at a health facility in Africa, demonstrated the need for continued advocacy for emergency care growth(19). Therefore, deliberate advocacy programs which are focused on emergency care using existing health promotion strategies are fundamental tasks for

consideration by EM graduates for the advancement of emergency care in their respective countries, including Zambia.

1.2. Lack of formalised pre-hospital care

Similar to emergency care in its entirety, participants reported that pre-hospital care was inadequate and/or non-existent.

"…*nurses accompany patients between the hospital transfer systems, … that are not particularly trained in emergency care." -P1*

"…we don't have a dedicated phone line…that a person can call an ambulance to come and assist them." -P1

These findings are consistent with literature which has revealed that less than 9% of pan-Africans are served by formalised Emergency Medical Services (EMS)(20). According to the African Federation for Emergency Medicine (AFEM), EMS refers to formalised pre-hospital care provided by emergency care professionals who respond to medical emergencies within a well-defined jurisdiction, and provides out-of-hospital emergency care (OHEC)(21). Community-based OHEC systems have been introduced in underserved areas as an accessory to the expensive and non-ubiquitous professionalised EMS(22). The involvement of community was supported by findings in Broccoli et al in the Zambian study where 85% of community members were willing to help someone with an acute illness(23).

The importance of community involvement in pre-hospital care led to the development of the community first responder course, the Emergency First Aid Responder (EFAR) programme(24). EFAR was originally developed to meet the emergency care needs of low resource areas in South Africa(24). It was further tested in Zambia's Kasama and Nyimba villages, and the curriculum has since undergone transformation to meet the unique health care challenges of Zambia through involvement of an expert panel with clinical experience in the Zambian health care context(25). While the EFAR programme promises an improvement in accessing emergency care, the lack of a formalised pre-hospital system is likely to obscure the benefits. Pre-hospital care can reduce trauma-related mortality upto 25% in LMIC(26), and as such the call for its furtherance now in Zambia is timely.

2. Priority aspects of emergency care development in Zambia

2.1. Local Training

Participants expressed an obligation to return to Zambia and contribute to the local training of healthcare providers.

"*…being able to teach others what I have learnt from the very basic level to higher level…"- P1*

While training was acknowledged as a challenge due to inadequate equipment and the need for resources, local training was proposed as an option due to the perceived lower resource needs.

"Teaching others will require resources, but within your own hospital that might be easier because you won't need resources." - P1

The findings of this study highlight the role that local medical education can play to disseminate emergency medicine knowledge and skills in Zambia, for both in- and pre-hospital providers. In 2013, the WHO called for transformation and upscaling of the training and education of healthcare providers in order to alleviate the human resource crisis(27). In response, in 2017, the Zambian Ministry of Health made a directive for the development and implementation of a Specialist Training Program (STP)(28). The first ever outside of the University setting, the STP aims to produce health professional specialists and create strategically placed "training hubs" to enhance workforce distribution of competently prepared registrars.

In 2016, the Zambian Ministry of Health, in collaboration with the WHO, undertook a systems-level assessment of emergency care using the WHO Emergency Care System Assessment Tool (ECSA). The findings were discussed by a working group that subsequently outlined a number of action points: implementation of a robust pre-hospital system and development of Emergency Medicine specialist programme and emergency nursing training in Zambia(29). Therefore, STP is opportune to support this initiative.

2.2. Basic Emergency Centre equipment

Participants felt that standards should be implemented regarding basic minimum equipment in emergency centres.

"… our emergency room, I think that they are not well stocked in terms of equipment."-P1

Participants also mentioned that available medical equipment in other parts of the country were under-utilised, likely due to training and awareness challenges.

"…and if a hospital has a defibrillator that defibrillator is somewhere in the corner collecting dust." - P4

"…more of lack of awareness of the need for the equipment…" - P1

While no formalised data for the availability of emergency equipment in Zambia exists, an emergency care capacity assessment of Zambia in 2017 identified supplies as a frequent reason for health providers' inability to perform emergency procedures at central hospitals(30). In addition to the WHO essential emergency equipment list, blood gas machines, portable ultrasound and electrocardiogram machines should be made available in Zambian emergency centres(31). Furthermore, offering emergency medicine training or an equipment-based course may improve awareness, availability and utilisation.

2.3. Inter-professional Collaborative practice

Participants subscribed to the importance of teamwork among health professionals.

"You find that in the ED, we talk a lot with other departments, whereas other departments don't talk to each other as much as we talk to them." - P2

"So it's not just about us, but it is also about other members of the team for that patient." - P3

The results of this study point to the need for different health professionals to work together towards overall improved emergency care in Zambia. The WHO, in their key policy issue under education and training, emphasised that all health professionals need to be competent in capacity to collaborate across professional boundaries(27). A team intervention has better outcomes than a lone professional intervention. Inter-professional Collaborative Practice (ICP) is built on the principles of patient safety(32). Therefore, there is growing emphasis to incorporate the Inter-professional Education program into academic centres to change the future of health professions practice(27). In 2017,the 160th session of the executive committee of the Pan American Health Organisation and World Health Organisation emphasised the prioritisation of inter-professional teams as a strategy for expanding access to health and health coverage with equity and quality(33). It appears reasonable to infer that ICP can improve the future state of emergency care in Zambia.

Study Limitations and Strengths

The study scope did not include a nursing perspective. The topic did not focus on other already existing emergency care aspects in Zambia, such as Integrated Management of Childhood Illnesses and emergency obstetrics and neonatal care. Broadening the scope of participants and the topic may in future provide more insight of the actual unique state of emergency care in Zambia.

Dependability criterion was difficult to ascertain due to the qualitative nature of the study. However, adherence to validated methodological tools such as COREQ assisted with dependability. A small sample size couldn't be overcome due to sample exhaustion.

Inherent bias could not completely be eliminated particularly since the principal author was a Zambian EM registrar. Bias was addressed through engaging an independent experienced researcher to conduct interviews, and the transcription was done by an independent paid service.

Telephonic interviews did not provide the visual cues characteristic of the naturalistic nature of qualitative research. Future research may consider video interviews but should be offset by the cost and access to reliable internet connectivity within the African setting.

The study purposively selected participants who were knowledgeable regarding the subject matter and had worked in the Zambian health care setting in both rural and urban areas to provide a rich context. Furthermore, member checking, researcher triangulation and data triangulation make their contributions more credible.

Conclusion

It appears that while ensuring availability of basic emergency centre equipment may facilitate the incorporation of Emergency Medicine graduates into the Zambian health care system, urgent establishment of a structured advocacy program for emergency care, promotion of inter-professional collaborative practice for patient safety and advancing local emergency medicine training have the potential for overall emergency care development. In addition, the advancement of pre-hospital care strategies should incorporate community participation.

Competing interests

The authors declare that they have no competing interests.

Authors' Contributions

KEM conceived the presented idea. KEM and WS contributed to the data analysis and writing of the manuscript. LAW supervised the research project from design to writing. All authors discussed the results and contributed to the final manuscript.

Acknowledgements

Many thanks to Matthews A. Pravetz who found time to proofread the initial draft of the manuscript. My indebted gratitude to Michael Pravetz for conducting the interviews.

References

1. Anderson P, Suter R, Mulligan T *et al*. World Health Assembly Resolution 60.22 and Its Importance as a Health Care Policy Tool for Improving Emergency Care Access and Availability Globally. Vol. 60 Issue 1, *Annals of Emergency Medicine*. 2012 Feb.
2. Obermeyer Z, Abujaber S, Makar M, *et al*. Emergency care in 59 low-and middle-income countries: a systematic review. *Bull World Heal Organ*. 2015;93:577–86.
3. Thind A, Hsia R, Mabweijano J, *et al*. *Prehospital and Emergency Care 14*. 2013;245–62. Available from: http://dcp-3.org/sites/default/files/chapters/DCP3_Essential Surgery_Ch14.pdf(accessed 20th Jan,2018).
4. Calvello E, Broccoli M, Risko N, *et al*. Emergency Care and Health Systems :consensus -based recommendations and Future Research. *Acad Emerg Med*. 2013;20(12):1278–88.
5. Tjoa A, Kapihya M, Libetwa M, *et al*. Meeting human resources for health staffing goals by 2018: a quantitative analysis of policy options in Zambia. *Hum Resour Health*. 2010;8:15.
6. Smith J, Haile-Mariam T. Priorities in global emergency medicine development. Vol. 23, *E+*

mergency Medicine Clinics of North America. 2005. p. 11–29.

7. Peer S, Burrows SA, Mankahla N. Supernumerary registrar experience at the University of Cape Town , South Africa. *South African Med J*. 2017;107(1):76–9.
8. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Heal care*. 2007;19(6):349–57.
9. Olusegun S. Constructivism Learning Theory : A Paradigm for Teaching and Learning. *IOSR J Res method Educ*. 2015;5(6):66–70.
10. Groenewald T. A Phenomenological Research Design Illustrated. *Int J Qual methods*. 2004;3(1):42–55.
11. Klopper H. The qualitative research proposal. *Curationis.* 2008;31(4):62–72.
12. Satu Elo HK. The qualitative content analysis process. *J Adv Nurs*. 2007;62(1):107–15.
13. Fusch PI, Ness LR. Are we there yet? Data saturation in qualitative research. *Qual Rep*. 2015;20(9):1408–16.
14. Erlingsson C, Brysiewicz P. A hands-on guide to doing content analysis. *African J Emerg Med*. 2017;7(3):93–9.
15. Shenton AK. Strategies for ensuring trustworthiness in qualitative research projects. *Educ Inf IOS Press*. 2004;22:63–75.
16. Gina Novick. Is There a Bias Against Telephonic Interviews in Qualitative Research? *Res Nurs Heal*. 2008;31(4):391–8.
17. Nowacki AK, Landes M, Azazh A, *et al*. A review of published literature on emergency medicine training programs in low- and middle-income countries. *Int J Emerg Med*. 2013;6(1):26.
18. Hsia R, Razzak J, Tsai AC, *et al*. Placing Emergency Care on the Global Agenda. *Ann Emerg Med*. 2010 Aug;56(2):142–9.
19. Bae C, Geduld H, Wallis LA, *et al*. Professional needs of young Emergency Medicine specialists in Africa : Results. *African J Emerg Med*. 2016;6(2):94–9.
20. Mould-millman N, Dixon JM, Sefa N, et al. The State of Emergency Medical Services (EMS) Systems in Africa The State of Emergency Medical Services (EMS) Systems in Africa. Prehosp Disaster Med. 2018;32(3):1–11.
21. Mould-Millman N, Naido R, De Vries S, *et al*. AFEM Out-of-Hospital Emergency Care Workgroup Consensus Paper : Advancing Out-of-Hospital Emergency Care in Africa : Advocacy and Development African Federation for Emergency Medicine African Journal of Emergency Medicin. *African J Emerg Med*. 2014;4(2):90–5.
22. Stein C, Mould-millman N, Vries S De, *et al.* Access to out-of-hospital emergency care in Africa: Consensus conference recommendations. *African J Emerg Med*. 2016;6(3):158–61.

23. Broccoli, M C.Cunningham C TM *et al*. Community-based perceptions of emergency care in Zambian communities lacking formalised emergency medicine systems. *Emerg Med J*. 2016;33:870–5.
24. Sun, JH, Wallis LA. The emergency frst aid responder system model:Using community members to assist life threatening emergencies in violent developing areas of need. *Emerg Med J*. 2012;29:673–8.
25. Pigoga JL, Cunningham C, Kafwamfwa M, *et al*. Adapting the emergency first aid responder course for Zambia through curriculum mapping and blueprinting. *BMJopen*. 2017;7:1–7.
26. Henry ,JA, Reingold AL. prehospital trauma systems reduce mortality in developing countries:A systematic review and meta-analysis. *J Trauma Acute care surg*. 2012;73(1):261–8.
27. WHO. Transforming and scaling up health professionals' education and training: World Health Organization guidelines 2013. Guidelines; 2013 p. 124. Available from: http://apps.who.int/iris/handle/10665/93635(accessed 5th Jan,2019).
28. Ministryof Health, GRZ. *Health Professions' Specialty Training Guidelines for Zambia*;2017p.2.Availablefrom:http://www.moh.gov.zm/docs/Specialty_Training_Guidelines_2017.pdf(accessed 5th Jan,2019).
29. Ministry of health,Government of the Republic of Zambia *Emergency care Report 7* October 2016.
30. Chavula C, Wallis LA. *Facility -based capacity assessment of emergency care services in public hospitals in Zambia*.AThesis submitted for Masters of Science Emergency Medicine,. University of Cape Town; 2017.
31. World Health Organisation(WHO). Essential Emergency Equipment List; 2012 p. 1–2. Availablefrom:https://www.who.int/surgery/publications/EEEGenericlist_revAug2012.pdf (accessed 5th Jan,2019).
32. Kohn LT, Corrigan JM, Donaldson MS. *To Err Is Human,Building a safer Health System.* Committee on Quality of Care in America I of M, editor. Washington,D.C: National Academic Press; 2000. 17-18 p.
33. WHO. 160th Session of the executive committee strategy on human resources for universal. In: *Strategy on Human resources for universal access to health and Universal Health coverage*. 2017. p. 26–30.

PART C: ADDENDUM

1. RESEARCH PROPOSAL

A DISCUSSION OF ZAMBIA'S EMERGENCY MEDICINE REGISTRAR'S EXPECTATIONS FOR THE DEVELOPMENT OF EMERGENCY CARE IN ZAMBIA

Student: Dr Kephas E Mwanza, MBChB

Student number: 18485111

Supervisor: Prof Lee Wallis, MBChB, MD, FRCEM

Division of Emergency Medicine

This study is in partial fulfilment of the MMed Emergency Medicine degree.

Declaration

I Kephas Elimon Mwanza hereby declare that the work on which this proposal is based on is my original work (except where acknowledgment indicates otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other University.

I empower the University to reproduce either the whole or any portion of the contents in any manner whatsoever.

Signature _____

Date _____

Table of Contents

Abstract.....36

Introduction.....37

Methodology.....38

Ethical Considerations.....39

Dissemination of Findings Plan.....40

Project Time Line.....40

Resources Utilisation and Budget.....41

References.....42

Abstract

The Republic of Zambia had no Emergency Medicine specialist until late 2017. The Government of Zambia, through its Ministry of Health and with support from the Swedish International Development Agency and Clinton Health Access Initiative, have embarked on developing emergency care in Zambia through infrastructure development and training. To date, five Zambian doctors have been sent to South Africa to complete specialist training in Emergency Medicine. It is expected that they will return to Zambia upon completion of their studies to provide the much-needed service, although trainees sent abroad often do not return.

Currently, there is no data regarding the expectations of trainee Emergency Medicine doctors for the development of emergency care in Zambia. This study aims to describe the expectations of Zambia's Emergency Medicine trainees at various stages of training in South Africa regarding the development of emergency care in Zambia. It is hoped that this will help to develop interventions to facilitate both their incorporation into Zambia's healthcare system as well as to serve as preliminary data for further research in this regard.

Introduction

Improved emergency care systems can have an impact on the burden of disease globally, but particularly in low- and middle-income countries (LMICs)(1)(2)(3)(4). The Disease Control Priorities Project estimates that 54% of deaths in LMICs could be avoided by better emergency care systems(5).There is an urgent need for these countries to develop more robust emergency care systems for their respective populations(6)(7). Emergency care only forms part of the emergency care system and refers to delivery of curative interventions with specific focus on severe clinical cases(8). Priority development areas for emergency care include human resources(9).Facility-based emergency care in most LMICs, on the other hand, is provided by non-specialists, for there is a paucity of trained Emergency Medicine (EM) specialists, especially in Sub-Saharan Africa(7). This exacerbates an already existing critical shortage of human resources for health(10).

Zambia is one of many low-income countries in Southern Africa. It is typical of the region in its emergency care challenges, compounded by inadequately trained EM specialists(11). Until late 2017, with the repatriation of the first one, no Emergency Centre in Zambia had a specialist Emergency Physician(12).

There is currently the political will to invest in emergency care in Zambia, which is intended to address gaps in service delivery(13). Four doctors are currently in training in South Africa and it is envisioned that they will return as qualified EM specialists, providing the long-awaited service. Recently, the first South African-trained Emergency Physician returned to Zambia. It has been documented that doctors sent abroad for specialist training do not return following completion of their studies (14). This failure to repatriate results in a significant loss on investment: over $517,000 (US)for each non-returning doctor(15).

At present, there are no studies to explore the expectations of trainees in EM for the development of emergency care in Zambia. Therefore, this study will investigate the expectations of trainee EM Physicians at different stages in training regarding the development of emergency care in Zambia. It is hoped that in discussing these trainees' expectations, it will assist in facilitating their incorporation into the Zambian healthcare system upon completion of their studies, as well as to provide preliminary data for further research in this regard.

Research Question

This research asks the following question:

- What are the expectations of Zambian EM Physician Trainees at various stages in their training with regard to the development of emergency care in Zambia upon completion of their studies?

Aim and objectives

The aim of this study is to describe the expectations of Zambia's EM trainees at various stages of their training regarding the development of various aspects of emergency care in Zambia upon completion of their studies.

To facilitate this, the specific objectives of this study are twofold:

- To identify current Zambian Emergency Medicine trainees through Emergency Medicine Cape Town(EMCT)and Witwatersrand University Division of Emergency Medicine registrar database.
- To detail the expectations of Zambia's Emergency Medicine registrars for the development of specific aspects of emergency care in Zambia using semi-structured interviews.

Methodology

Study design

This is a qualitative case study design consisting of semi-structured interviews. The minimal sample size and the non-quantifiable phenomenon under investigation serve as rationale for choosing this design.

Study Setting

This study will be conducted with trainees in the Zambian emergency care system.

Population and Recruitment / Enrolment

The study sample will include a purposive sampling of the current Zambian EM trainees in South Africa, along with the recent Zambian Emergency Medicine graduate.

The inclusion criterion is to be enrolled as an Emergency Medicine registrar at Stellenbosch University and Witswatersrand University in South Africa. This is identified from the Emergency Medicine Cape Town(EMCT) and Division of Emergency Medicine at Witswaterand students' database. This group of registrars will include 2017 EM graduates from Witswatersrand identified from Division records. Exclusion criterion is non-Zambian Registrar status. The Principal Investigator is excluded from this study.

The expected sample size of trainees including recent graduates is four doctors.

Participants will be invited by email and telephone. Upon their acceptance, they will be asked to sign a form for informed consent (Appendix A).

Data Collection and Analysis

Participants will be interviewed telephonically in English, the official language of Zambia, using a semi-structured interview guided by an interview schedule (Appendix B). Interviews will be tape -recorded (audio only) and then transcribed.

Coding, categorisation and theme development will be done using content analysis methodology. A reflective process of working and re-working through the data to reveal connections and relationships will be undertaken. If coding becomes problematic on a particular issue, a follow-up interview will be conducted for clarification(15).

Bias will be minimised by openness, vigilant awareness of pre-understandings and researcher triangulation(15). Participants' responses will be reviewed to confirm answers. Principles of trustworthiness will be adhered to by emailing participants their transcript and giving them an opportunity to correct any factual errors by a particular date. A second researcher for pattern consistency and comparison purposes will also analyse data using both content analysis methodology and codes.

Data safety and monitoring

Interview audio recordings and data files will be secured on a password-protected computer and restricted to the study team. Audio recordings will be transcribed and then destroyed to eliminate the identification of participants. Raw data including transcribed versions of the audio recordings excluding personal identifiers will be kept by the principal investigator in electronic format on a password-protected computer for minimum of five years, then subsequently destroyed. Individuals will be assigned codes. The potential risk of identifying individuals due to small sample size is noted.

Ethical Considerations

Ethical approval will be obtained from the Human Research Ethics Committee of Stellenbosch University. Participants will be asked to provide informed consent (Appendix A).

There will be no remuneration for participation.

The study poses minimal risk to participants. The study cannot guarantee absolute confidentiality because of the small sample size. Participants will be advised of this risk during the consent process. However, this risk will be mitigated by ensuring that no names of participants will be mentioned in the study, and the presentation of content that may

compromise anonymity will be avoided. All data will be de-identified prior to the database entry. A code will be assigned to each participant. No physical harm is anticipated during the study as no biological specimens nor treatment interventions are involved. We do not envisage any psychological or economic harm. The Code of Practice for Social Researchers will be adhered to for investigator safety (17).

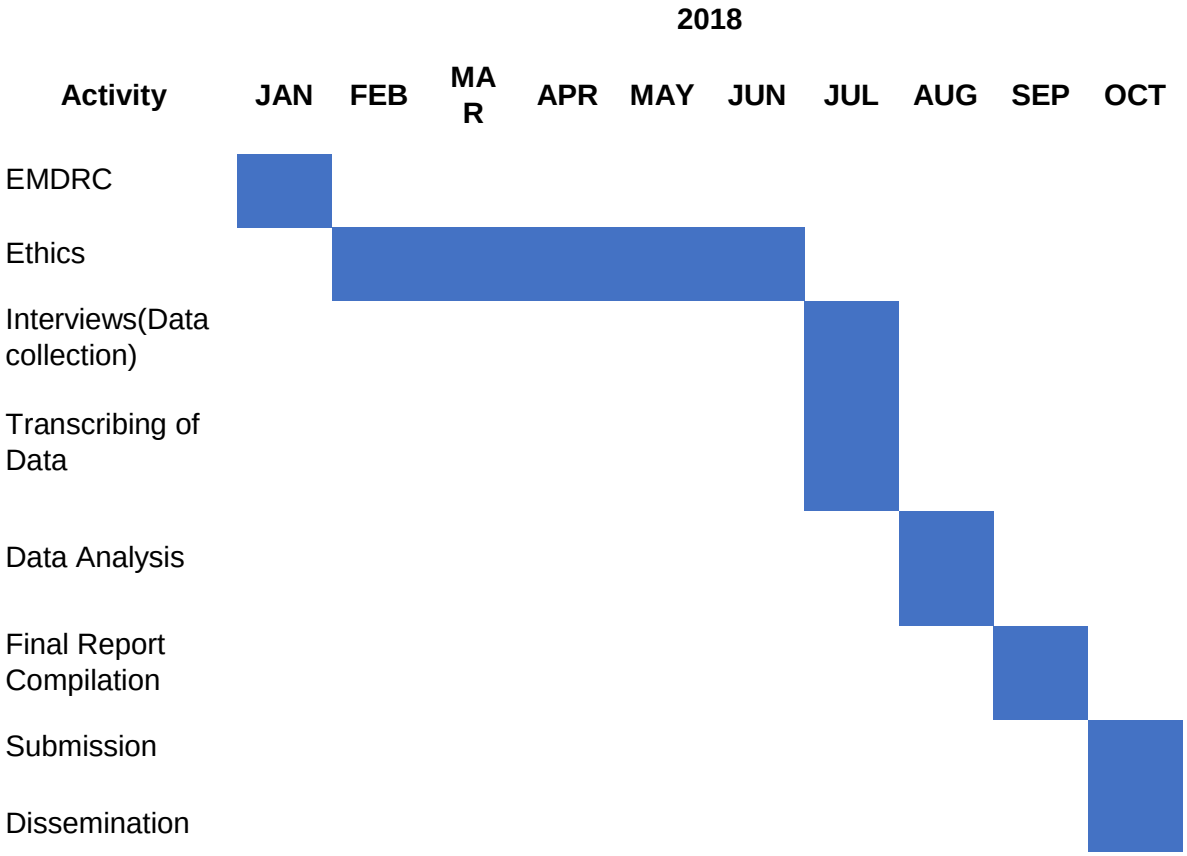
Understanding trainees' expectations will help to provide information for improved incorporation of graduates into the Zambian healthcare system.

Dissemination of Findings Plan

The study findings will be shared with the key institutions for health service delivery in Zambia (Ministry of Health, Health Professions Council, and The University of Zambia School of Medicine/Copperbelt University). An abstract will be prepared for presentation at the Annual Zambia Medical Association Conference. An article will be submitted for publication in a peer-reviewed journal.

Project Timeline

The projected timeline is from January to October 2018, as shown below.



Resource Utilisation and Budget

Projected cost is R2,706 as detailed in the budget estimate below. All resources will be borne by the principle researcher.

Item	Quantity	Unit cost(ZAR)	Comment	Total(ZAR)
Consumables				
• Note pads	2	50		100
• Stationery and supplies	1	100		100
• Printing of reports	3	100		300
Airtime cost	1	360		360
Cost of transcription	1	1600		1600
Minor Research Equipment(Recorder)	1	600		600
10% contingency				246
Total			**ZAR 2,706**	

References

1. Anderson P, Suter R, Mulligan T, *et al*. World Health Assembly Resolution 60.22 and Its Importance as a Health Care Policy Tool for Improving Emergency Care Access and Availability Globally , *Annals of Emergency Medicine* 2012 Feb;60(1):35-44.

2. Hsia R, Razzak J, Tsai AC *et al*. Placing Emergency Care on the Global Agenda. *Ann Emerg Med* 2010 Aug;56(2):142–9.

3. Reynolds TA, Calvello EJB, Broccoli MC, *et al*. AFEM consensus conference 2013 summary: Emergency care in Africa - Where are we now? *African J Emerg Med* 2014;4(3):158–63.

4. Calvello E, Reynolds T, Hirshon JM, *et al*. Emergency care in sub-Saharan Africa: Results of a consensus conference. *African J Emerg Med*. 2013;3(1):42–8.

5. Thind A, Hsia R, Mabweijano J, et al. *Prehospital and Emergency Care 14*. 2013;245–62. Available from: http://dcp-3.org/sites/default/files/chapters/DCP3_Essential Surgery_Ch14.pdf (accessed on20th Jan,2018).

6. Razzak JA, Kellermann AL. Emergency medical care in developing countries: Is it worthwhile? *Bull World Health Organ*. 2002;80(11):900–5.

7. Obermeyer Z, Abujaber S, Makar M, *et al*. Emergency care in 59 low-and middle-income countries: a systematic review. *Bull World Heal Organ*.2015;93:577–86.

8. Calvello EJB, Broccoli M, Risko N, *et al*. Emergency Care and Health Systems: Consensus-based Recommendations and Future Research Priorities. *Acad Emerg Med* . 2013;20(12):1278–88.

9. Smith J, Haile-Mariam T. Priorities in global emergency medicine development. Vol. 23, *Emergency Medicine Clinics of North America*. 2005. p. 11–29.

10. Tjoa A, Kapihya M, Libetwa M, *et al.* Meeting human resources for health staffing goals by 2018: a quantitative analysis of policy options in Zambia. *Hum Resour Health*. 2010;8:15.

11. Ministry of Health. *Zambia National Health Strategic Plan 2017 – 2021*. Lusaka; 2017.p51

12. Ministry of Health Government of the Republic of Zambia. *Restructuring Report*. Lusaka; 2017. p71

13. Ministry of Finance, Government of the Republic of Zambia. 2018 Budget Address. Zambia; 2018.p19-20. Available from: http://www.parliament.gov.zm/sites/default/files/images/publication_docs/2018 Budget.pdf (accessed 1st Jan,2018).

14. Karan A, Deugarte D, Barry M. ETHICS CASE Medical " Brain Drain " and Health Care Worker Shortages: How Should International Training Programs Respond? Commentary. *AMA J Ethics J Ethics*. 2016;18(7):665–75.

15. Mcgrail MR, Humphreys JS. BMC Health Services Research. *BMC Health Serv Res*. 2009;12:1–12.

16. Erlingsson C, Brysiewicz P. A hands-on guide to doing content analysis. *African J Emerg Med* . 2017;7(3):93–9.

17. Social Research Association.*A code of Practice for the Safety of Social Researchers*.Safety of Social Researchers 2001 p.1-8.Available from:http://the-sra.org.uk/sra_resources/safety-code/(accessed 20th Nov,2017)

2. PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM

TOPIC:**A DISCUSSION OF ZAMBIA'S EMERGENCY MEDICINE REGISTRAR'S EXPECTATIONS FOR THE DEVELOPMENT OF EMERGENCY CARE IN ZAMBIA**

Ethics Approval Number:

Principal Investigator: Dr Kephas E Mwanza:mwanzacephas@yahoo.com

Supervisor: Prof Lee Wallis: leew@sun.ac.za

You are being invited to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please ask the study staff or doctor any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research entails and how you could be involved. Your participation is **entirely voluntary** and you are free to decline to participate. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point.

This study has been approved by the **Health Research Ethics Committee at Stellenbosch University** and will be conducted according to the ethical guidelines and principles of the international Declaration of Helsinki, South African Guidelines for Good Clinical Practice and the Medical Research Council (MRC) Ethical Guidelines for Research.

What is this research study all about?

The aim of this study is to describe the expectations of Zambia's Emergency Medicine traineeswho are at different stages in training regarding development of various aspects of emergency care in Zambia upon completion of their studies.

The study will involve use of a telephonic interview(s) to collect data at a time and place of your convenience.

The interview will be audio recorded and will take a duration of no more than one hour at your chosen place and time.

Why have you been invited to participate?

You have been invited because you are directly or indirectly involved in the development of emergency care services in Zambia.

Will you benefit from taking part in this research?

The information you will provide will benefit science and can contribute to the improvement in health policy. Understanding trainees' expectations will help to improve their incorporation into the Zambian healthcare system.

Are there risks involved in your taking part in this research?

No physical harm is anticipated during the study as no biological specimens nor treatment interventions are involved. You will be assigned a code to prevent identification. Due to the minimal sample size, there is a potential risk of being identified.

Do I have to take part?

Participation is voluntary. You can ask questions at any point in time of the study and you may freely withdraw yourself/data from the study at any time.

Who will have access to the information you will provide?

The information you will provide will be treated as confidential and protected. The audio recording made of the interview will be used for analysis only and thereafter destroyed. You will not be personally identifiable from extracts of the interview. Direct quotations from interviews will be anonymised, too. Study results may be used in any conference presentation, report or journal article. No other use will be made of the recording without your written permission, and no one outside the research team will be allowed access to the original recording.

Will you be paid to take part in this study and are there any costs involved?

No, you will not be paid to take part in the study. There will be no costs involved for you, if you do take part.

Is there anything else that you should know or do?

You will be sent the transcript by email and given the opportunity to correct any factual errors by a particular date.

You can contact Dr Kephas E Mwanza. at telephone number+27635929488 or any email above if you have any further queries or encounter any problems.

You can contact the Health Research Ethics Committee in South Africa at 021-938 9207 if you have any concerns or complaints that have not been adequately addressed by your study doctor.

You will receive a copy of this information and consent form for your own records.

Declaration by participant

By signing below, I ……..……. agree to take part in a research study entitled; **A discussion of Zambia's emergency medicine registrar's expectations for the development of emergency care in Zambia**

I declare that:

- I have read or had read to me this information and consent form and it is written in a language with which I am fluent and comfortable.
- I have had a chance to ask questions and all my questions have been adequately answered.
- I understand that taking part in this study is **voluntary** and I have not been pressurised to take part.
- I may choose to leave the study at any time and will not be penalised or prejudiced in any way.
- I may be asked to leave the study before it has finished, if the study doctor or researcher feels it is in my best interests, or if I do not follow the study plan, as agreed to.

Signed at .....…..…….. on ……...……..... 2018.

.....

Signature of participant

Declaration by investigator

I Dr Kephas E Mwanza declare that:

- I explained the information in this document to ……..
- I encouraged him/her to ask questions and took adequate time to answer them.
- I am satisfied that he/she adequately understands all aspects of the research, as discussed above
- I did not use an interpreter.

Signed at .....…..…….. on ……...…….. .....2018.

.....

Signature of investigator

3. INTERVIEW SCHEDULE

Emergency Medicine Trainees Interview Schedule

I. Opening

A. My name is Kephas E Mwanza, a student in Emergency Medicine(EM) at Stellenbosch University in Cape Town. As per my earlier communication through email, I would like to conduct an interview on your expectations for the development of emergency care following completion of your specialist training. The information you will provide will benefit science and can contribute to the improvement in health policy. Information will strictly be used for research purposes and will not be linked to you.

The interview should take no more than 60minutes. I will audio record inorder to assist me during analysis of information. Do you have any questions regarding the participant information and consent sent to you earlier? (If any, will take time to clarify.)Are you available to respond to some questions at this time?

Let me begin by asking you some questions about yourself and your training.

II Body

A. General demographic information

1. Tell me about yourself, including where you worked prior to coming to South Africa? Family of origin (parents, occupations, religion, etc.)

Education (primary, secondary, tertiary)

Occupation history (other than medicine)

Medical experience

2. Discuss why you chose to study Emergency Medicine.

B. Current emergency care in Zambia

1. How would you briefly describe the current state of emergency care in Zambia

Probing: Your perceptions of emergency care in Zambia in relation to human resource, finances, information and research, clinical service delivery, medical supplies and equipment.

Probing:Is there an existence of robust emergency care system/pre-hospital care?

2. Do you think the doctors understand emergency care?

C. Expectations on current emergency care

1. Having learned the basics of Emergency care in your program in South Africa, what are at least 3 specific main aspects(practice, technique, equipment, etc.)of emergency care you would do differently for the development of Emergency Care in Zambia following completion of your studies?

Well, it has been a pleasure finding out more about you and your expectations for development of Emergency Care in Zambia. ***Let me briefly summarise the information that I have collected during our interview.***

III Closing

A. (Summarise) You are…….Your expectations include

_____.

B. I appreciate the time you took for this interview. Is there anything else you think would be helpful for me to know as regards Emergency Care in Zambia?

C. I should have all the information I need. Could I contact you if I have any more questions or clarifications? Thanks again.

4. APPROVAL LETTERS

Approved with Stipulations

New Application

05/06/2018

Project ID: 6228

HREC Reference #: S18/02/028

Title: IDENTIFYING THE EXPECTATIONS OF KEY STAKEHOLDERS FOR THE DEVELOPMENT OF EMERGENCY CARE IN ZAMBIA

Dear Dr Kephas Mwanza,

The **Response to Modifications** received on 30/05/2018 07:35 was reviewed by members of the **Health Research Ethics Committee 2 (HREC2)** via Minimal Risk Review procedures on 05/06/2018 and was approved with stipulations.

Please note the following information about your approved research protocol:

Protocol Approval Period: **05-Jun-2018 – 04-Jun-2019**.

The stipulations of your ethics approval are as follows:

1. The design is indicated as a case study design, but the rationale should be strengthened. The student is advised to provide a citation for th specific design and describe it in more detail, e.g. explain what the case is, the type of case study etc.

2. The population for this study is only four registrars. Not all the participants may be available or they may refuse to participate which poses a to the scientific value of the proposed study.

3. Data collection: Provide a rationale for conducting telephonic interviews. Since you do not appear to be experienced in conducting qualitat interviews, perhaps an experienced person should assist or guide you during the first interview. Due to the small sample size it is important to ensure that the data is rich. Conducting the interviews via Skype may be another way to make it more personal.

4. Trustworthiness: you are an Emergency medicine registrar. It is suggested that you add a statement on how you will bracket your knowledg and experiences.

5. Ethical considerations: Ensure that it is clearly stated that you will incur the costs of the telephonic interviews.

6. Data storage: Usually data is kept for a minimum of 5 years and not 1 year as indicated in the proposal.

Please remember to use your **Project ID [6228]** and ethics reference number on any documents or correspondence with the HREC/UREC concerning your research protocol.

Please note that this decision will be ratified at the next HREC full committee meeting. HREC reserves the right to suspend approval and to req changes or clarifications from applicants. The coordinator will notify the applicant (and if applicable, the supervisor) of the changes or suspensi within 1 day of receiving the notice of suspension from HREC. HREC has the prerogative and authority to ask further questions, seek additiona information, require further modifications, or monitor the conduct of your research and the consent process.

After Ethical Review:

Please note you can submit your progress report through the online ethics application process, available at: https://apply.ethics.sun.ac.za and th application should be submitted to the Committee before the year has expired. Please see Forms and Instructions on our HREC website for guidance on how to submit a progress report.

The Committee will then consider the continuation of the project for a further year (if necessary). Annually a number of projects may be selected randomly for an external audit.

Provincial and City of Cape Town Approval

Please note that for research at a primary or secondary healthcare facility, permission must still be obtained from the relevant authorities (West Cape Department of Health and/or City Health) to conduct the research as stated in the protocol. Please consult the Western Cape Governmer website for access to the online Health Research Approval Process, see: https://www.westerncape.gov.za/general-publication/health-research-approval-process. Research that will be conducted at any tertiary academic institution requires approval from the relevant hospital manager. Et approval is required BEFORE approval can be obtained from these health authorities.

We wish you the best as you conduct your research.

UNIVERSITEIT • STELLENBOSCH • UNIVERSITY
jou kennisvennoot • your knowledge partner

INSTITUTIONAL PERMISSION:

AGREEMENT ON USE OF PERSONAL INFORMATION IN RESEARCH

Name of Researcher: Dr Kephas Mwanza

Name of Research Project: Identifying expectations of key stakeholders for the development of emergency care in Zambia

Service Desk ID: IRPSD 801

Date of Issue: 1 March 2018

You have received institutional permission to proceed with this project as stipulated in the institutional permission application and within the conditions set out in this agreement.

1 WHAT THIS AGREEMENT IS ABOUT	
What is POPI?	1.1 POPI is the Protection of Personal Information Act 4 of 2013. 1.2 POPI regulates the entire information life cycle from collection, through use and storage and even the destruction of personal information.
Why is this important to us?	1.3 Even though POPI is important, it is not the primary motivation for this agreement. The privacy of our students and employees are important to us. We want to ensure that no research project poses any risks to their privacy. 1.4 However, you are required to familiarise yourself with, and comply with POPI in its entirety.
What is considered to be personal information?	1.5 'Personal information' means information relating to an identifiable, living, individual or company, including, but not limited to: 1.5.1 information relating to the race, gender, sex, pregnancy, marital status, national, ethnic or social origin, colour, sexual orientation, age, physical or mental health, well-being, disability, religion, conscience, belief, culture, language and birth of the person; 1.5.2 information relating to the education or the medical, financial, criminal or employment history of the person;

LETTER TO HOD'S OF DIVISION OF EMERGENCY MEDICINE AT THE WITWATERSRAND UNIVERSITY

Dear Professor / Doctor/ Sir/ Madam,

Re: **Permission to Conduct a Master of Medicine (MMed) Research at the Faculty of Health Sciences, University of the Witwatersrand**

Above subject matter refers.

My name is Dr Kephas E Mwanza ,I am a second year Emergency Medicine (EM) registrar at the University of Stellenbosch Division of Emergency Medicine in Cape Town. This research is a requirement for obtaining my Master of Medicine (MMed) degree.

My study looks at Zambia's Emergency Medicine registrar expectations for the development of emergency care in Zambia. The study has been approved by the Stellenbosch University Ethics Committee and reference number S10/02/028 .It will involve semi structured telephonic interviews administered to a purposive target population of two EM registrars in your department who are sponsored by the Zambian Government .

If granted permission, the interviews will be conducted during breaks or at the end of departmental / division's academic meetings at the convenience of participants time and place. There will be no risks to patients as they are not part of the participants and there will be no expense to the university or participants.

Once approved, data collection is expected to last one month. All expenses will be borne by me.

Yours Sincerely,

Dr Kephas E Mwanza (Researcher) — 07.06.2018 Date

I ..PROF F MOTALA.. (HOD Emergency Medicine) hereby grant / do not grant permission to Dr Kephas E Mwanza to carry out the research study as outlined above.

Remarks Supported
.....
.....
.....

HOD Emergency Medicine(signature) — 27/8/18 Date