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**The opinion of emergency medical service personnel
regarding safety in pre-hospital emergency care practice**

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The opinion of Emergency Medical Service personnel regarding safety in pre-hospital
emergency care practice.

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A research report submitted to the Faculty of Health Sciences, University of the
Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of
Master of Science in Medicine in Emergency Medicine

Supervisor: Prof Efraim Kramer

Johannesburg, 2015

DECLARATION

I, Robyn Holgate

Student number: 87-01462N

Hereby declare the following:

- I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong.
- I confirm that the work submitted is my own unaided work.
- I have followed the required conventions in referencing the thoughts and ideas of others.
- I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in my writing.

Signed:

A handwritten signature in cursive script, appearing to read 'R Holgate', written in dark ink.

Date: 15 May 2015

ABSTRACT

The pre-hospital setting poses a potential threat to safety as emergency care takes place in a dynamic, uncontrolled and ever-changing environment. In addition Emergency Medical Services (EMS) personnel are generally overworked. All these factors translate to possible errors which may well compromise the health conditions of the patients. This study reflects the opinions of pre-hospital personnel regarding safety and as such the perception of the current state of safety in South African EMS.

A prospective, descriptive and cross-sectional online survey was utilised to obtain opinions from respondents regarding pre-hospital safety in their work environment.

Results

A total of 610 electronic requests to partake in the survey were sent with a yield of 26.9% (n=164). A variety of questions relating to personal safety, patient safety and organisational safety culture were posed to the respondents. The typical respondent was a white (84%, n=134), male (69%, n=109), Advanced Life Support Paramedic (55%, n=86), between the age of 31 and 40 years (44%, n=69), who has between 11 and 15 years of EMS experience and works in the private sector (62.5%, n=65). Concerns included management support, fatigue, vehicle accidents and interpersonal violence. The majority have been exposed to vehicle accidents (54.2%, n=84) and it is believed that management could do more to ensure vehicle safety. Interpersonal violence should not be considered an anomaly in the EMS. The perceived incidence of violence towards the respondents is 56% (n=88), which is lower than that experienced by their international EMS colleagues. This workplace interpersonal violence was deemed the most important safety concern. Most

respondents did not seem to think that medical adverse events were particularly prevalent in their work environment, but appeared more comfortable admitting to having witnessed others making errors.

Limitations include a convenience sample which does not represent all EMS, and it is recommended that a representative study be completed.

Conclusion

Contributing factors towards safety concerns include lack of management support, poor communication from management, fatigue, interpersonal violence and inadequate staffing. There is evidence of a focus on a patient safety culture within the EMS.

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ABBREVIATIONS

AEA: Ambulance Emergency Assistant

ALS: Advanced Life Support

BAA: Basic Ambulance Assistant

BLS: Basic Life Support

CCA: Critical Care Assistant

ECG: Electrocardiogram

EMS: Emergency Medical Service

HPCSA: Health Professions Council of South Africa

ILS: Intermediate Life Support

IV: Intravenous

PBEC: Professional Board for Emergency Care

RRV: Rapid Response Vehicle

USA: United States of America

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Chapter 1: Background

“Dear colleagues and friends,”

“It is never easy to write a statement such as this, especially when it involves our own who dedicate their lives to saving others.

With great sadness we have to inform you that a tragic accident took place yesterday afternoon involving ER24 crews. BN and CN were on their way to assist with a life-threatening emergency when their medical rescue vehicle collided with another vehicle on the R555 near the N12 in Ogies, Mpumalanga.

BN was critically injured in the accident, and despite efforts to save his life by all medical personnel, he succumbed to his injuries in hospital. CN was seriously injured and he remains in a serious, but stable condition in a Witbank hospital.

BN started his career as a Basic Life Support Practitioner with ER24 in November 2009. BN is survived by his family including his fiancé and young child.

Investigations are still underway as to what caused the tragic collision.

Our deepest sympathies are with BN’s family and his colleagues who are dealing with the loss, and we wish for the speedy recovery of CN who remains in hospital.”

(Reprinted with permission from ER24) ¹

This is a letter that was sent to ER24’s personnel after a basic life support practitioner was killed responding to a medical emergency near Witbank. This letter is indicative of the risk involved when working as a medical professional within Emergency Medical Services (EMS) and consequently highlighted the need to research safety in EMS.

These pre-hospital safety concerns include violence, stress, fatigue and sleep disorders, road and vehicle safety, and patient safety. ²

The aim of this research is to assess the opinion of South African EMS personnel regarding their perception of personal and patient safety in the EMS environment. This will be achieved by describing the demographics of the respondents and reviewing their responses to a series of safety related questions regarding exposure to violence, vehicle accidents, patient safety related incidents and their opinion on management support. A validated Safety Assessment Questionnaire with additional safety related questions will be utilised.

Chapter 2: Literature review

2.1 Introduction

Safety is defined as being free from danger, risk or injury.³ The very nature of EMS places those in the profession at risk. The focus on safety in the EMS environment is essential and the safety of EMS personnel is as important as the patients' safety.² What are the safety concerns of the EMS personnel? This literature review will describe what constitutes safety and patient safety, and the factors affecting EMS safety in South Africa and internationally inter alia: stress, burnout, violence, fatigue, road and vehicle safety, and infection. Local literature and research regarding safety in South African EMS is limited and the establishment of a safety culture will ensure that key role players are informed of the issues related to safety that require improvement, be it organisational, physical or emotional safety.

2.2 Safety culture

The understanding of safety culture became prevalent in the late 1980's following the Chernobyl disaster when it became evident that a poor safety culture contributed to the catastrophe.⁴ This work place safety constitutes the preventative measures put in place to ensure the safety and health of the employees in that specific environment. It involves problem identification, the control of these problems, and the mitigation of their effects.⁵ The values of the organisation are referred to as "safety culture". This safety culture refers to the organisational custom of beliefs, practices, procedures and policies of safety within an organisation.⁶ Hence safety culture would be visible by the attitude of management and employees towards safety, their safety behaviour,

knowledge thereof and motivation to make a meaningful difference. The key requirements to implement a culture of safety within an organisation are senior management commitment and leadership, shared care and concern for hazards and their impact on people, reasonable norms and rules about hazards, and organisational learning.⁷ A reliable means of assessing safety culture is with the Safety Assessment Questionnaire (SAQ).⁸

2.3 Patient safety

Patient safety is the prevention of harm to patients, and freedom from accidental injury.^{2,9} Healthcare error leads to adverse events. An adverse event is defined as an injury related to medical management, not complications of disease. Medical management includes all aspects of care including, diagnosis and treatment, failure to diagnose or treat, and the systems and equipment used to deliver care. Adverse events may be preventable or non-preventable.^{2,9}

Patient safety is an attribute of health care that minimises the impact of adverse events.^{9,10} Adverse events that are due to preventable errors should be rare.⁸ In 1999 the Institute of Medicine in the USA published "To err is human: building a safer health system." ⁹ This publication emphasised the amount of preventable deaths in hospital due to medical error, highlighting the importance of addressing patient safety.⁹ 1 in 10 patients admitted to a hospital will experience an adverse event in hospital.¹⁰ This ratio is not currently well researched in the pre-hospital environment and is thought to be much higher than 1:10 in developing nations due to poor reporting tools and acknowledgement of these errors.^{9,11}

Both the lack of access to care, for example emergency care, and the safety and quality of care affect the healthcare delivery to patients worldwide.¹¹ This should

prompt industry leaders to develop systems to improve safety in healthcare. This includes safety for the healthcare provider and patient.

2.4 EMS safety

Patient and provider safety are vital in EMS.¹¹ EMS ensures that a patient is provided with medical care outside a hospital environment, and EMS personnel are fully accountable for their response times, quality of service, and medical care provided to their patient.¹² EMS had its beginnings in a war-related environment during the Napoleonic conflicts.¹³ It was this violence that has embedded the need for these practitioners in our societies hence the expectation that these practitioners will be exposed to such risks.

The work environment in EMS is unique in the health care sector.¹⁴ It is unknown, uncontrolled, and unpredictable and may be considered high risk.¹⁴ Many factors can dictate a safety risk for the personnel working in this environment for example limited human resources, the environment in which EMS work, shift work, driving and vehicle safety, and the nature of critical incidents to which they are exposed. Hence EMS personnel are placed at risk for not making the correct decision consistently, impacting in turn on patient safety.¹⁴ These factors are discussed in detail during the literature review.

2.5 EMS in South Africa

The pre-hospital profession in South Africa is divided into 3 levels of care: basic life support (BLS), intermediate life support (ILS) and advanced life support (ALS) which includes intensive medical care.¹⁵ Their scope of practice is regulated by the

Professional Board for Emergency Care (PBEC) of the Health Professions Council of South Africa (HPCSA).

The BLS practitioner is capable of simple airway management, splinting, extrication, as well as defibrillation using an automated external defibrillator in a supervised practice environment. Intermediate level staff can initiate intravenous (IV) therapy, defibrillate and administer a few drugs including glucose and aspirin. Advanced life support practitioners, known as paramedics, have a wealth of clinical experience, and are entitled to do much more than their international colleagues.¹⁶ The paramedic can provide advanced airway management (including intubation and cricothyroidotomy), needle decompression of the chest, and IV access. They can administer a variety of drugs, for example those necessary for pain management and sedation, and the treatment of emergencies. They are capable of interpreting an Electrocardiogram (ECG), and may administer drugs for cardiac dysrhythmias.¹² Recent changes to the EMS include the introduction of a two provider service, the Emergency Care Technician (ECT) which is a 2 year course, and the Emergency Care Practitioner (ECP) which is a 4 year degree course.¹⁶ This ECP qualification further entitles the paramedic to intubate using rapid sequence intubation and to administer thrombolytics.

The primary response duty of the South African EMS is to respond to an emergency call.¹⁵ Upon arrival the scene is assessed for safety of the personnel and patient. Thereafter assessment and treatment occur. The patient is stabilised on scene and subsequently transported to an appropriate hospital or clinic. The patient is then handed over to the hospital staff by the EMS personnel.

The profession provides EMS to the patient via a provincial or private service. The public EMS provides care to all areas within South Africa. They may be employed as

part of a municipal emergency medical service or part of another public safety agency for example, the fire department.¹⁷ This public service provides resources mostly at a basic life support level.¹⁵ The private EMS is mostly membership-based and this determines the geographical need for resources. These private EMS companies may have contractual commitments to local authorities, mines, or medical schemes, hence their geographical placement.¹⁷

Emergency services are resource-limited in South Africa as opposed to those of developed countries.¹⁵ This is particularly evident for ALS, as when compared to global ratios, the number of ALS paramedics is insufficient.¹⁸ Working conditions and physical security resulting in migration may be reasons for this scarcity of ALS.¹⁸ The highlighted concerns within a South African environment included their work environment, respect from their patients and the community, job availability, professional respect, crime, exposure to violence and risk, and exposure to infections.¹⁹

Resource depletion, for example a lack of training or vehicles, a resource-depleted rural area, or a converted vehicle as opposed to a customised vehicle may adversely affect safety.^{14,20} There are concerns that poorly maintained vehicles and equipment due to financial constraints may affect safety.¹⁵ No nation can afford to have ill-equipped and unhappy EMS personnel, especially against the backdrop of the long hours that EMS put in at work. When paramedics are unhappy, the poor, rural and under-served populations may well be the ones to suffer.²¹

2.6 Factors affecting EMS personnel safety

A range of factors which affect staff in the EMS may have an effect on their ability to perform their duties safely. Examples include shift duration, the environment, namely:

extremes of temperature, the vehicles personnel respond and work in, clients, sub-standard equipment or lack thereof, and potential exposure to infection.²²

It is no longer acceptable for EMS to simply transport patients. There is a definite need for a safe environment and improvement in current safety practices. The quality of service, medical care provided, cost to the patient and behaviour are all dependent on a safe environment.²³ The non-adherence to policies enforcing precautions such as those related to infection and violence, fatigue and poor sleep, stress and burnout, the non-application of procedures and lack of reporting of possible risks or safety incidents that occur in the workplace, are no longer acceptable in the profession.²²

While this is true for the international environment, these policies and safety practices need to be developed in the South African EMS.

Those safety concerns found to be of particular relevance to the South African EMS include stress, violence, fatigue, relationships at work, vehicle safety and poor quality of life. In addition to the factors being reported as safety concerns, the stressors have been identified as the reasons for EMS personnel leaving South Africa.¹⁷

2.6.1 Stress

Emergency work has been identified as stressful.²³ The Oxford English dictionary defines stress as “a state of emotional and psychological strain as a result of an adverse or demanding circumstance, the negative consequences of which include Post Traumatic Stress Disorder (PTSD) and burnout”.²⁶

The typical healthcare job in which one would find a person prone to stress is in a large medical corporation with a matrix-type management structure and an imbalance between the job demands and resources available. Those most prone are young, single staff with a high level of education, little experience and no opportunity

to make decisions. The person is typically an A-type personality who is controlling and competitive but who has a low self-esteem.²⁴ Although some personality traits may be similar, why are high levels of stress not restricted to those young, inexperienced EMS personnel? Maslach et al, in their publication on UK-based medical professionals, highlighted the EMS as being unique in that they have very little exposure to their patients. Other Healthcare Practitioners are rewarded by a reciprocal, potentially positive relationship with their patients, for example the patient being discharged from hospital. Another interesting finding is that professions who work in communities rather than being exposed to a hospital patient-centred care environment, such as the EMS, may experience higher levels of stress.²⁴ Stassen et al, in their study of ALS in Gauteng, found those most prone to stress were more experienced EMS personnel in positions of management, and those of female gender.²⁵ Reasons for the female gender distribution were ascribed to the higher incidence of depersonalisation in males as a result of a higher testosterone level.²⁴ Although the incidence of acute stress and subsequent burnout in the EMS is usually associated with a younger, more qualified individual in other publications,^{26,27,28,30,32} Stassen et al found no correlation between years of experience and stress, but a correlation between age and stress. The reason suggested for this was that the younger professional may leave the profession once exposed to stress, or having experienced burnout, which has resulted in the older, more resilient practitioner remaining in the EMS.²⁵ The reason for those in management being exposed to stress was due to the additional administrative load these personnel may have placed on themselves in addition to their operational responsibilities.²⁵

The negative consequence of stress in other healthcare fields tends to be much lower than EMS when compared in the literature.²⁶ For the most part, these stressful exposures are part of the EMS daily responsibilities, but exposure to both chronic and critical incident stressors increases the risk of EMS personnel developing a severe stress reaction, hence working together to identify stress is important as this may impact on the way patient care is delivered.^{25,27} The lifetime prevalence of severe stress-related illness such as PTSD and burnout for the general population is approximately 7.8% for high risk populations, but estimates in EMS personnel could be as high as 20%.²⁸ Stassen et al described an incidence of 23% in Gauteng ALS personnel.²⁵ Other psychiatric symptoms of stress such as depression, anxiety, sleep deprivation and worry are as high as 60% in the EMS.^{23,24,27,32}

A reason attributed to this high incidence of severe stress is because EMS personnel have an inordinate amount of work stress as a result of their responsibility for human life. Which experience or exposure to stress has the most effect on EMS personnel is difficult to predict. It may be a mass casualty incident, or the vicarious emotional response attributed to the tragic death of a lonely old man as a result of an affective connection with the patient. The literature has several references to understanding what factors may cause stress in the EMS, and these causes of stress, which can potentially compromise patient, public and personnel safety, are important in the context of this research.

Compared to elsewhere in the world, South African EMS is exposed to high numbers of traumatic incidents.²⁹ There is a direct relationship between exposure to traumatic scenes and post-traumatic stress and physical or psychological aggression.^{25,35} Whether or not alcohol or substance misuse is present does not appear to affect

stress levels.²⁹ The most distressing incidents for EMS personnel include child victims, where the patient is known to the EMS personnel, incidents involving critical injuries, delayed support from colleagues, incorrect demographic information provided for response, and the handling of dead bodies.³⁰

The organisational aspects of the work environment do affect stress in the longer term.^{23,27,33} Leiter and Maslach identified six work-related safety culture concerns that cause stress in an employee. These concerns are: workload and the amount of work expected, control and the lines of authority, what rewards employees receive as compensation for their work, the team one works with, equality of decisions by the management team and ethical values.³¹ Several of these factors, such as: too little pay, job stress, the impact on their family's lives, and long hours³² were cited by South African authors as stressful contributors to paramedics giving up their jobs.^{17,18,19}

Administrative stressors such as low salaries, lack of support from superiors and the way that ambulance personnel are treated at emergency departments may contribute more to stress than the actual stressor of treating critically ill or injured patients.²⁶ In their article on the occupational stress of emergency care workers in Gauteng, Naude and Rothman found the lack of staffing resources, job demands such as unnecessary call-outs and abuse by the public, inadequate remuneration and opportunity for promotion, lack of specialist personnel, and poorly motivated colleagues as the causes of stress in emergency workers in Gauteng. They found no variation of these factors amongst different positions in the organisations the respondents worked for or amongst various language groups.³³ Budget constraints and security risks were considered to cause moderate levels of intensity of stress.³³

Naude and Rothmann further established that job demands, including overtime, dealing with crisis situations, and responsibility contributed to emotional exhaustion and depersonalisation.³³

The negative effects of stress include: impaired performance, poor customer service, health problems and absenteeism, alcohol and drug use and destructive behaviour.²⁷ On the contrary, the positive effects of exposure to serious life-saving emergencies, for example an appreciation for a patient being alive and increased personal confidence, may alleviate some post-traumatic stress.³⁴ Thus psychological wellness and stress reduction in the EMS is important, as the personnel are required to continue to respond to emergency incidents. Stress debriefings need to be measured in terms of the quality of interventions and must be consistent, appropriately timed and combined with other stress management and support services in order to be effective. There is little evidence to suggest that compulsory debriefing has any value, as it can lead to resentment and passive participation.³⁵ However, stress as a result of one's work environment eventually influences an individual's personal life,³⁶ with no significantly different impact on stress according to gender, position held, employment sector, years employed, or qualification.²⁵

2.6.2 Violence

Workplace violence is defined as "incidents where staff are abused, threatened, or assaulted in circumstances related to their work.....involving an explicit or implicit challenge to their safety, well-being or health".³⁷ Encountering violence in the pre-hospital setting is not abnormal and may take the form of physical or emotional abuse from colleagues, patients and the public, for example bystanders and family

members.³⁸ This type of behaviour is so frequent that it is seen as an acceptable element of the job.³⁹

There is no national reporting system for EMS providers to record verbal harassment or violent acts in South Africa. Several studies from around the world indicate a risk to EMS personnel.^{40,41,42}

Violence occurs in 8.5% of EMS responses, and the violence is intentionally directed at EMS providers in over half the cases. Patients were responsible for the violence against EMS 89.7% of the time.⁴³ Internationally, a French report in 2003 revealed that 81% of their survey sample had been verbally or physically threatened, with 23% actually assaulted.⁴⁴ An Australian review found that 87.5% of EMS personnel were exposed to workplace violence, and that verbal abuse was the most prevalent (82%) followed by intimidation, physical abuse, sexual harassment and sexual assault.⁴⁵ American studies report that 61% of EMS personnel have been assaulted in the field, and 25% had sustained an injury from the violence.^{26,38} A Swedish study found 80.3% of EMS personnel had been threatened, 67% subjected to violence, and over one third had been subjected to violence either by a patient or relative every 3 months.⁴⁵

Gender was the most common predictor of intimidation, sexual harassment and sexual assault. Women were more prone to verbal abuse and sexual assault, whilst men experienced more blatant threat and physical assault.⁴⁶ EMS qualifications, how they responded to a call-out, and the number of hours per week in direct patient contact, were predictors for verbal abuse in an Australian study.⁴⁰ Student EMS personnel were more likely to encounter violence than their more experienced colleagues. This was attributed to their inexperience in scene management.⁴⁷

EMS personnel indicated safety concerns as well as physical and verbal abuse (racist comments) as major stressors in their jobs. This is further supported in other studies where physical violence is mentioned as the reason for EMS migration from South Africa to other countries.¹⁸ In 75% of the cases surveyed, weapons were used to threaten medical personnel.⁴⁸

This must be a safety concern for all pre-hospital emergency services. Is violence simply seen as part of the job and acceptable rather than a harmful activity requiring management?

The need for awareness, management commitment to provide the necessary tools, workplace assessment and development of hazard prevention controls to ensure stress reduction and personnel safety is concluded in most studies.^{45,47}

The need for workplace violence education is necessary for the management and avoidance of EMS workplace violence.⁴⁷

2.6.3 Fatigue and sleep disturbances

Alertness and vigilance are required in the EMS to prevent error and injury, yet fatigue and sleep disturbances are common symptoms.⁴⁹ Sufficient recovery time and rest are necessary due to the physical, psychological and emotional demands placed on the personnel. The incidence of reported lack of good sleep quality (as defined by less than 7 hours good quality sleep a night) varies between 29 – 35% in the general population, and may be as high as 59% in the EMS.⁵⁰ This poor sleep quality may jeopardise patient and personnel safety. The health complaints amongst the EMS mentioned above which could be attributed to lack of quality sleep included headache, sleeping problems and stomach symptoms.⁴⁹ Approximately 25% of female and 20% of male personnel reported 2 or more health complaints and

females had more headaches than males. Ultimately this poor quality sleep and subsequent health concerns could result in increased absenteeism, and ultimately employee unhappiness and poor productivity.^{51,52}

Shift work does affect sleep, psychological and physical well-being of EMS personnel. Adding sleep deprivation to this raises further concerns regarding patient safety.^{51,52} This lack of sleep quality was directly associated with the amount of shifts worked weekly and monthly, longer shifts (shifts exceeding 24 hours) and disruption in circadian rhythms.^{53,55}

Fatigue is a lack of energy usually not resolved by sleep.⁵³ By the very nature of the operational work, such as carrying stretchers and equipment, the EMS responsibilities are physically demanding and this leads to fatigued practitioners.¹⁷ Alertness, vigilance, concentration, judgement, mood and performance are all affected by fatigue.⁵³ Fatigued pre-hospital personnel make mistakes when treating their patients. These mistakes may cause injury, medical errors and compromise safety.

Patterson et al, in their publication on sleep quality and fatigue, found that poor sleep quality and fatigue jeopardised patient and personnel safety in the EMS setting.⁵⁴ The number of shifts worked monthly and extended duration shifts contributed to fatigue in the EMS. Long periods without rest compromised cognitive and motor performance and disrupted circadian rhythms. They further found that increased workloads during a shift compromised patient safety.⁵⁴ In an American survey to assess staff health, sleep and lifestyles, they reached a conclusion that lack of sleep was beginning to affect many employees' quality of life and that being awake for 18 consecutive hours produced impairment similar to a blood alcohol equivalent of

0.05%, and for 24 hours this equates to 0.096%. As a result of this, the hybrid schedule for shift work was developed and allows only 12 hours of work in a busy environment. This proposal included 2 day shifts in a busy unit followed by a 24 hour shift in a light unit and subsequently 4 days off.⁵⁵

Official policy on fatigue management in EMS is not frequently found in South Africa, but is widely available in other professions and countries such as the aviation industry and the doctor working conditions in the European Union. Working hours for doctors in the European Union were extending to beyond 48 hours prior to the working time directive and these hours had a significant impact on fatigue and stress levels for doctors.^{52,53} The researcher is confident that in the years to come, many studies will justify the implementation of such directive as a result of improved patient safety and doctor satisfaction. In terms of family relationships and shift work, it is important for families to find common ground regarding their shift work and most families appear capable of adapting to shift stressors, but this perhaps needs further investigation in the South African context.⁵⁶

2.6.4 Road and vehicle safety

A critical factor in the effectiveness of any EMS is the ability to get personnel and equipment to the scene of the emergency in a timely manner. Most EMS textbooks emphasises scene safety yet every year people die trying to save the lives of others.^{58,59} EMS personnel are expected to respond to any life-threatening emergency call within 5 to 15 minutes in an urban environment and 40 minutes in a rural environment.¹⁵ In attempting to accomplish this expedient response time the need for speed may cause harm to others, especially through motor vehicle crashes as a result of emergency responses in difficult terrain and weather conditions.⁵⁷

EMS has seen major advances in pre-hospital care since the 1970's,⁵⁸ but ambulances remain a vehicle with a patient compartment behind the operator. In the rear or patient compartment, cabinets have been added to store materials, but the main purpose of ambulances remains to transport a patient to a medical facility and the science of ambulance design and ergonomics of the rear compartment is not well supported.⁵⁸

EMS personnel are trained to understand the importance of early and appropriate medical care associated with survivable injuries.⁵⁹ These interventions include a faster EMS response time, improved medical care, and referral to a trauma centre in an appropriate EMS vehicle.^{60,61} However, this comes at significant cost for the EMS personnel. The commonest cause of traumatic death to EMS personnel is due to them having their own accidents en route to incidents.⁶³ The occasional responder is more at risk of accident damage than the regular EMS personnel, as excitement and anxiety tend to be greater.⁶¹ A lack of local knowledge regarding where you are responding to is also a valuable predictor of the increased potential for an accident.⁵⁹ Satellite navigation has not been shown to be a safety benefit unless the driver is unfamiliar with where they are going to.⁶¹ Fatigue and longer work hours have been identified as a cause of accidents in the EMS environment.⁶²

A review of EMS accident data revealed the following: According to a 2002 USA-based study,⁶³ fatalities were at least 12.7 per 100 000 EMS workers annually as compared to the national average for all professions which were 5 per 100 000, hence the additional risk of motor vehicle accidents for EMS.⁶⁶ Another study in the USA revealed that 77% of accidents occurred during clear weather and that season and day of the week did not change the accident frequency. Lights and sirens were on in 60% of EMS accidents, and 58% of fatalities.^{63,64} Ambulance collisions were

found to be fatal more often than fire and police vehicle accidents.⁶⁴ Ambulances are more likely to be involved in collisions at intersections with more than 1 vehicle in the urban environment, and at night on an unlit road in the rural environment.⁶⁵

Occupants of emergency vehicles, regardless of whether the vehicles are responding or merely transporting patients, are at risk for accidents.^{66, 67, 68}

To avoid accidents, ambulances must be visible to other drivers and pedestrians.^{69,70}

Lights and sirens are not the only essential features of emergency vehicles. In the United Kingdom emergency vehicles need to be recognisable at a distance of 200 – 500m and be readily identifiable as an emergency service vehicle.⁶⁹

Key findings in the literature shown to improve vehicle safety include retro-reflective material on vehicles,⁷⁰ visibility and recognition, fluorescent colours (especially yellow, green and orange)⁷¹ offer higher visibility during the day. There is limited evidence that other road drivers are “drawn into” highly visible emergency vehicles (the “moth effect”),⁷² but it is possible to overdo the use of retro-reflective materials.^{72,75} Literary evidence regarding vehicle safety in South Africa was not found.

Preventive intervention for EMS to implement to avoid emergency vehicle accidents includes: frequent advanced driver training, driving monitoring⁷³ and knowledge of traffic laws.⁷⁴

Using lights and sirens with a patient on board is a contentious issue. With a patient on board, little time is saved in transporting a patient to hospital with lights and sirens.^{75,76} The principle decision when EMS personnel decide to use lights and sirens is whether this will affect the quality of care rendered to the patient. When a

patient is on board, quality of patient care should take precedence over response times.⁵⁷

2.6.4.1 Ambulance design and ergonomics

Poor ambulance design and a lack of adequate restraints for EMS personnel patients in the rear compartment have been mentioned as contributing factors in injuries and fatalities during ambulance collisions.⁷⁷ However, even if the restraints were available for the EMS, the compliance is low due to the fact that they limit patient care, are inconvenient and restrict movement.⁷⁸ EMS personnel wear their seatbelts only when sitting in the front of their vehicles, and not when they are in the rear compartment.⁷⁸

The most frequently occurring clinical tasks in the patient compartment of an ambulance are checking of oxygen saturation, oxygen administration, monitoring the heart and checking the blood pressure.^{79,80} It is the EMS personnel's personal choice to sit alongside patients and not at the head of the bed. However, historically this monitoring equipment was designed to be accessed from the head of the stretcher and hence 40% of working postures require correction.⁷⁹ Paramedics reported that the most physically demanding activities were performing cardiopulmonary resuscitation in the patient compartment, accessing the patient and equipment, and loading the stretcher.⁸⁰ The standard practice appears to be to focus on equipment fixation and vehicle protection, with little emphasis placed on routine tasks.^{80,81}

The ideal interior design would be to allow most clinical work to be performed from a seated, seat belted position. Hence it has been recommended that a seat be positioned alongside the patient and a "captain's" seat at the patient's head. This chair is only suitable if there is sufficient foot space, otherwise the staff's posture and

working positions are suboptimal.⁷⁹ Whilst in theory this all seems straight forward, it does involve a change of culture for all EMS personnel including the use of safety belts when working in the rear patient compartment.^{79,81}

2.6.5 Infection risk

EMS personnel are exposed to blood and body fluids, and their safety in terms of potential infection is most important.^{82,83} Of the exposures, the majority are through non intact skin. Due to the unique environment EMS personnel work in, and a high incidence of patients whose infectious status is not known, there is concern for the transmission of HIV and Hepatitis through the cutaneous route.⁸⁴ This includes the muco-cutaneous pathway and needle-stick injuries.⁸⁵

It appears the use of safety needles in EMS is necessary. In a study designed to address the circumstances around occupational blood exposure it was found that 80% of needle or lancet injuries involved non-safety devices.⁸⁵ In a third of these cases, the patient was being uncooperative. A third of the injuries occurred when the paramedic was disposing of the device and a quarter occurred when the paramedic was using the device to administer treatment to the patient.⁸⁵ Injuries also occurred as a result of devices that had been improperly disposed of, such as stabbed into linen or stretcher mattresses.⁸⁵ Legislation regarding the use of safety devices for intravenous cannulas and needles has been implemented to prevent needle-stick injuries in the USA, but has not been implemented in the South African EMS.^{86,87} Further supporting the use of safety needles, EMS personnel have been reported to have increased rates of Hepatitis B virus markers consistent with occupational exposure to infected blood.⁸⁸ However, the availability of a safe and effective vaccine should lessen the occupational risk of contracting Hepatitis.⁸⁸ In the USA, the

effective use of Hepatitis B vaccines has resulted in a 95% reduction in the incidence of Hepatitis B infection.⁸⁹ Although some provincial and private services may offer the vaccine to the EMS personnel, or require proof of vaccination prior to employment, the researcher has observed that this practice is not standardised throughout the EMS.

Despite the high potential risk of infections in the EMS, moderate to low use of personal protective equipment is reported.⁹⁰ This may be attributed to low availability of personal protective equipment.⁹¹ However exposure may occur even with compliance to personal protective equipment (PPE), particularly where patients are uncooperative, vomiting, coughing or spitting blood.⁸⁵ Although 40% of all EMS occupational blood exposure occurs in uncooperative patients, the consensus appears to be that paramedics could reduce their risk of blood exposure through increased use of safety devices, techniques for avoiding blood exposure, and use of PPE.⁸⁵

Organisational structure factors such as training, workload, and perception of management's commitment to safety may too contribute to the risk of blood exposure and use of protective equipment.⁹² As a result of this more attention should be given to reducing muco-cutaneous exposures. Safety device legislation and effective interventions to prevent exposure may be an effective means of reducing exposure.^{82,83,85,86} Providing EMS personnel alone with PPE is an effective means of reducing exposure to pathogens.⁸⁸

2.7 Patient Safety

Pre-hospital care is an area of high risk for preventable error, mishaps and harm due to the dynamic work environment.⁷⁷ These EMS personnel work in the least ideal

physical and emotional circumstances creating the ideal situation for patient harm. There is a paucity of scientific research addressing patient safety in the EMS environment.

2.7.1 Equipment mishaps

The majority of patient transportation in the EMS involves the use of a stretcher to transport patients. The physical stressors include attendant/stretchers operations.⁹³ The incidence of stretcher mishaps is 0,018 per 1000 patients transported.⁹⁴ The most common of these mishaps include collapse or fall of the stretcher resulting in injury to the patient or EMS personnel.⁹³ The majority of stretcher events occur during unloading of patients, and the majority of the resultant injuries are sustained by EMS personnel, although patient injuries do occur. Only 1 in 5 incidents involved injury to the patient.⁹³ Injuries to EMS personnel include back injuries, sprains and strains and lacerations. Lack of knowledge may result in user error and safety for EMS personnel could be improved through teaching how to use the stretcher.⁹⁴

2.7.2 Errors and Adverse events

Patient safety may be defined as “the avoidance, prevention and protection of patients from injuries that may result from the processes of healthcare delivery”.⁹⁵ Within the pre-hospital environment, errors include medical errors, for example administering an incorrect medication, dropping a patient from a stretcher, and ambulance accidents. More people die in a given year from medical error than from car accidents in the USA allegedly however, the same cannot be contextualised to the South African environment.⁹⁶ It is difficult to measure the extent of EMS-related injuries, illness, fatalities and patient safety errors due to under-reporting, as a result

of fear and lack of standardised reports for capturing the adverse events occurring in the EMS.⁹⁷ Concerns over privacy, liability, trade secrets and potential public embarrassment prevent the sharing of information that could be used to identify opportunities for improvement.⁹⁷ The culture of blame is regarded as the reason for the lack of willingness to share information regarding adverse events and near misses.⁹⁸

Developing a just culture such as the systems approach used in aviation, as well as interrelationships with other healthcare providers experienced in patient safety would certainly enhance patient safety reporting in the EMS.⁹⁹

2.8 Conclusion

The literature highlights the unpredictability of the pre-hospital environment and presents it as a setting that places both the healthcare provider and patient at risk for injury or ill health. There is a paucity of information related to safety practices in South African EMS. These safety practices need to be measured.

Chapter 3: Methods

3.1 Aim

The aim of this study was to assess the opinion of South African EMS personnel regarding their perception of personal and patient safety in the EMS environment.

3.2 Objectives

- To describe the demography of respondents participating in the survey questionnaire.
- To determine the opinion of EMS personnel regarding their perception of personal safety in their EMS environment.

3.3 Study Design and Methods

A prospective quantitative, internet-based survey design was employed. The majority of the questions were closed and the open questions were structured to elicit basic factual data.

The invitation email was distributed to EMS personnel in South Africa with known valid electronic mail addresses. The researcher distributed a total of 380 requests electronically. This electronic mail contained an introductory letter and an electronic link to the survey.

The HPCSA was unable to facilitate the request to distribute the research to their known EMS database; hence the researcher relied on the following practitioners to assist with distribution of the modified Safety Assessment tool:

- A previously purchased list of EMS personnel available to the researcher
- CW, a paramedic in private practice

- PW, a paramedic in private practice, who has a collection of PBEC candidates that have considered undertaking training in the private sector
- MB, a paramedic in private practice
- CS, a paramedic in academia

There was no reason given for the HPCSA declining the request and this was not identified as a constraint during the protocol submission. With the assistance of the practitioners, and a populated list of EMS personnel, it was decided to continue with the survey.

The survey questionnaire was developed for this study. The survey consisted of a set of questions (see Appendix A) that aimed at obtaining data relating to the perceptions of pre-hospital personnel on personal and patient safety within their work environments. The survey comprised of an initial set of questions related to demographics, a series of statements linked to a Likert-scale response, and the researchers own questions related to EMS safety. The Likert-scale questions were modified from an organisational safety questionnaire utilised by Patterson et al.¹⁰⁰ These modifications were only logical semantics to ensure that the questions were applicable to the South African EMS. Consent to use the tool was obtained from Professor Patterson during the research protocol stage.

The survey was loaded onto a survey website (Survey Monkey[®]) where after a request was sent to potential participants via electronic mail inviting them to participate in the survey. This email (Appendix B) provided information on the study and contained a link to the website. Reminder invitations were sent two weeks and a month and half after the original request. The survey was also forwarded by key role-players within the pre-hospital profession. Data was collected from the 15th of June

2012 to the 20th of September 2012. The survey was closed as no new responses were obtained. Responses were then analysed descriptively.

The results were downloaded and placed onto a Microsoft Excel[®] spread sheet and basic demographic data and questions were analysed.

The questionnaire clarified the following:

- Urban as a city or town, and Rural as outside of a town. This is in keeping with the definition from the safety assessment questionnaire utilised by Patterson et al.¹⁰⁰
- Metropolitan EMS refers to those employees working for a local municipality, and Provincial EMS refers to those employees working for provincial government. Together both groups represent the Public sector of EMS employment.

3.4 Study population and sampling

A convenience sample of voluntary participants was selected. This sample included those EMS personnel who have access to electronic mail and the internet. This curbed the sample significantly and limited the generalisation of findings. A total of 380 electronic mail requests were sent by the researcher, a further 230 were distributed by other requested practitioners. There were no electronic mails returned unanswered. The survey was distributed as an open mail (no blind copy's) to avoid duplicate mails to the same practitioner.

Although the intention was to distribute the survey to all EMS registered with the PBEC this was not facilitated and neither was the request to purchase the database for reasons unknown by the researcher.

Inclusion criteria: Any person who has a pre-hospital qualification, as either a basic, intermediate, advanced life support practitioner, ECT or ECP and who has been operational in the EMS environment for at least a continuous period of 30 days and over the age of 18 years.

Exclusion criteria were those without a pre-hospital qualification, or qualified for less than 1 month.

3.5 Data management and analysis

The descriptive analyses of the Likert scores for the Safety Assessment Questionnaire were calculated according to the total number of respondents.

There were 3 questions in the survey which contained free text answers.

- What measures have been instituted in your workplace to make your environment safe?
- In your opinion what should be added to make your environment safer?
- A mandatory comment was requested for a positive response to the question: "Have you ever been assaulted at work?"

The responses for the free text questions were analysed and combined to make for a sufficiently descriptive review of the survey. Every word related to safety in the

response was captured in a table and like responses such as personal protective equipment and a list of such equipment were grouped together.

Data was extracted and populated into a spread sheet and analysed using Microsoft Office[®] Excel[®] 2010. Access to data on the website was password restricted, while extracted data was backed-up onto an external hard drive and secured.

During analysis, statements were grouped into four common themes: Stress and Burnout, Fatigue, Patient Safety, Road Safety. Data was descriptively analysed to describe demographics and responses to the closed ended questions. Open ended questions were coded and analysed for common themes. Statistical association and differences were evaluated using Pearson's Chi-squared test and p-values.

3.6 Costs

Costs for the electronic distribution as well as the follow up of data on Survey Monkey[®] were provided by the researcher.

3.7 Ethical Considerations

Ethical approval and clearance for research was obtained from the Human Research Ethics Committee (Medical) of the faculty of Health Sciences of the University of Witwatersrand (clearance certificate number M120230; Appendix C).

The introductory email included a letter of introduction which requested the recipient to participate voluntarily in the online survey (Appendix B). In this introduction confidentiality and informed consent were explained.

Survey Monkey[®] is a confidential online survey tool. The online data was downloaded from Survey Monkey[®] onto a secure computer. Only the supervisor and researcher as well as 1 statistician had access to the completed data.

Chapter 4: Results

Completed responses were reviewed by the researcher and a statistician, and demographic data were descriptively analysed.

4.1 Demographics of respondents

There were 158 responses deemed eligible for analysis from the initial data collection of 164. The reasons for this were:

- There were 3 respondents who submitted basic demographic data only and failed to submit any responses to safety related questions hence they were excluded from the study.
- A further three respondents were not registered with the PBEC and subsequently excluded from the survey (1 registered nurse and 2 medical practitioners).

Demographic data is presented in figures 4.1 to 4.8

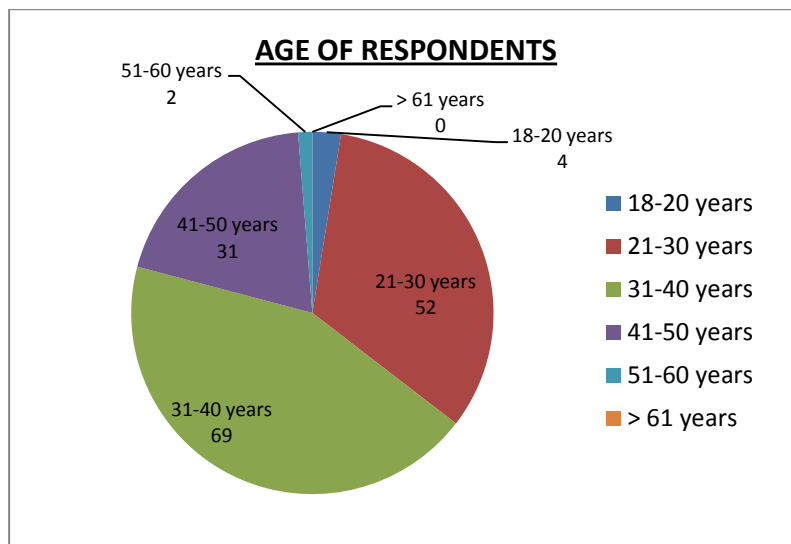


Figure 4.1: Age in percentage of eligible respondents

The majority of respondents were between the ages of 31 and 40 years (44%, n=69). There were few respondents between the ages of 18 – 20 (n=4), and no respondents more than 60 years of age.

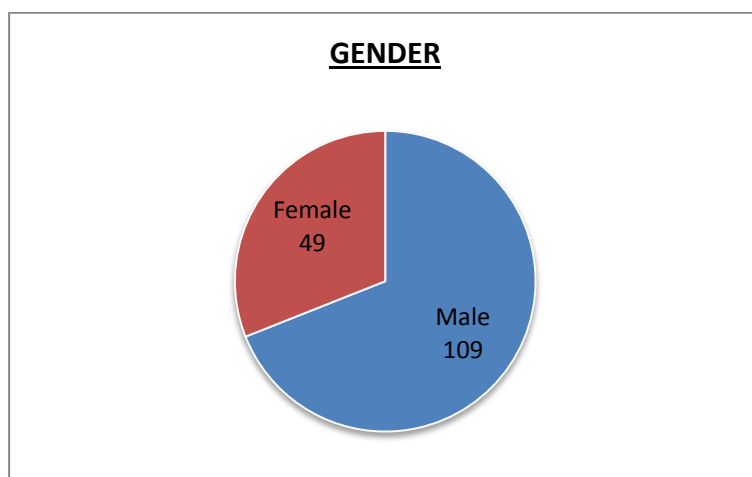


Figure 4.2: Gender of eligible respondents

Males accounted for the majority of respondents (69%, n=109).

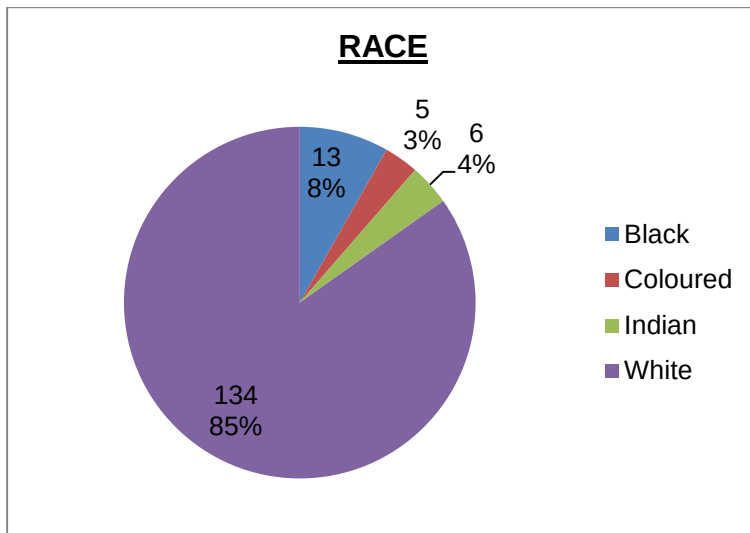


Figure 4.3: Race of respondents

The majority of respondents were white (85%; n=134) while 8% (n=13) of respondents were black.

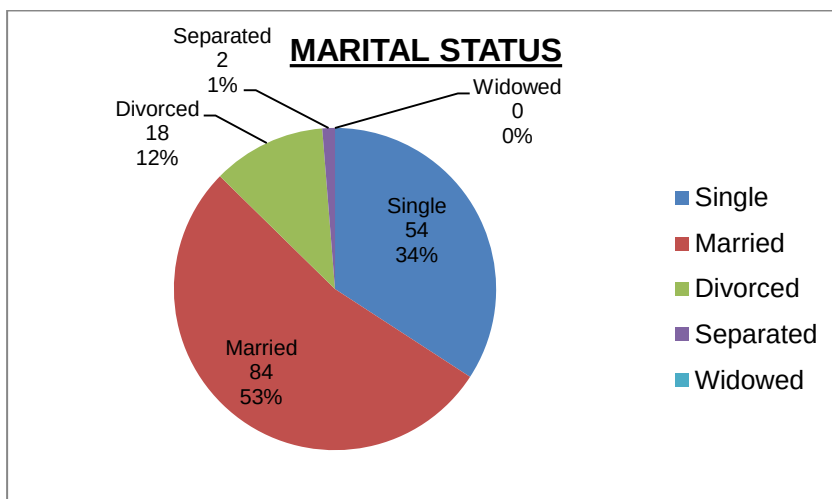


Figure 4.4 Marital status of eligible respondents

53% of respondents were married, 34% were single.

Of the female respondents, only 19 were married (40%) whereas 65 males (60%) were married. Each group of male and female had 9 divorcees and 1 separated respondent. There were 20 single females (41%) and 34 single males (31%).

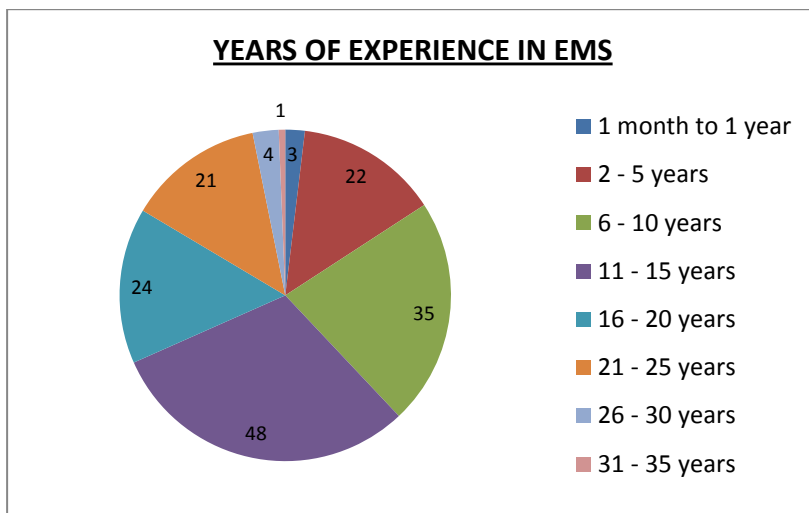


Figure 4.5: Years of experience in EMS

Most respondents had between 11 and 15 years (30%, n=48) of experience while 22% (n=35) of respondents had between 6 and 10 years of EMS experience.

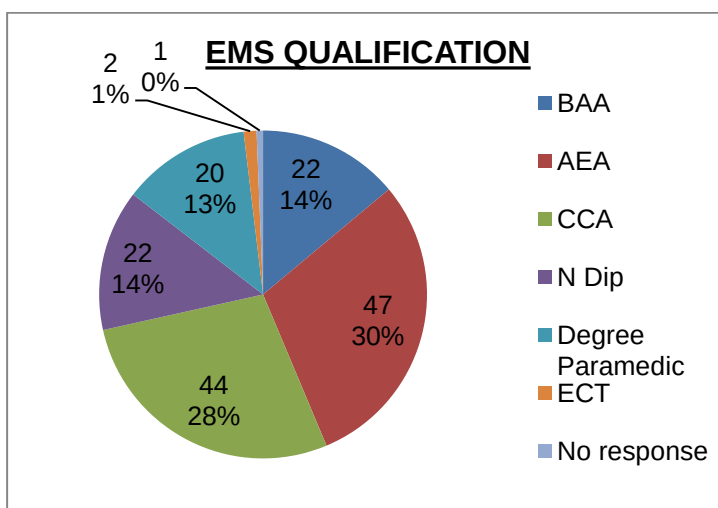


Figure 4.6: EMS Qualifications of respondents

(BAA = Basic Ambulance Attendant, AEA = Ambulance Emergency Assistant, CCA = Critical Care Assistant, N Dip = National Diploma in Emergency Care, ECT = Emergency Care Technician, Degree Paramedic = those ALS practitioners with a Bachelor's Degree in Emergency Care or Bachelor of Health Sciences in Emergency Medical Care.)

The majority of respondents held an Ambulance Emergency Assistant qualification (30%; n=47), followed by Critical Care Assistants (28%, n=44) followed by Basic Ambulance Assistants and National Diplomats (14%, n=22). The respondents who held a degree in Emergency Medical Care or an Emergency Care Technician qualification respectively constitute 1%.

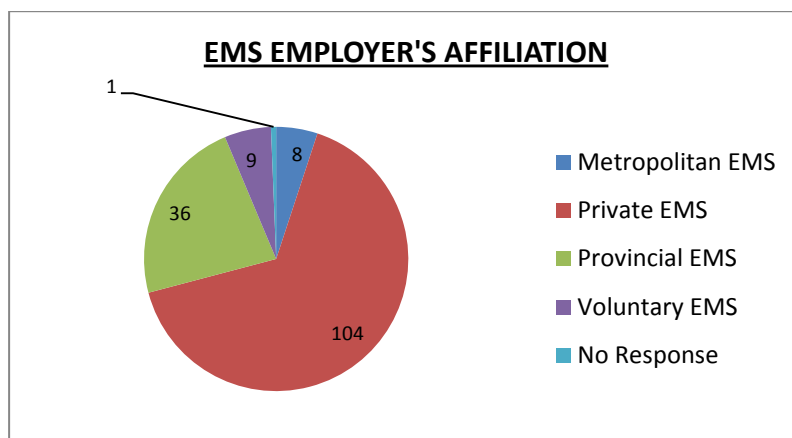


Figure 4.7: EMS Employer's affiliation

The majority of respondents were employed in the Private EMS sector (66%; n=104). The Provincial EMS sector accounted for 22.7% (n=36). Metropolitan EMS and voluntary EMS accounted for 5% and 6% respectively. A single respondent did not disclose a work sector.

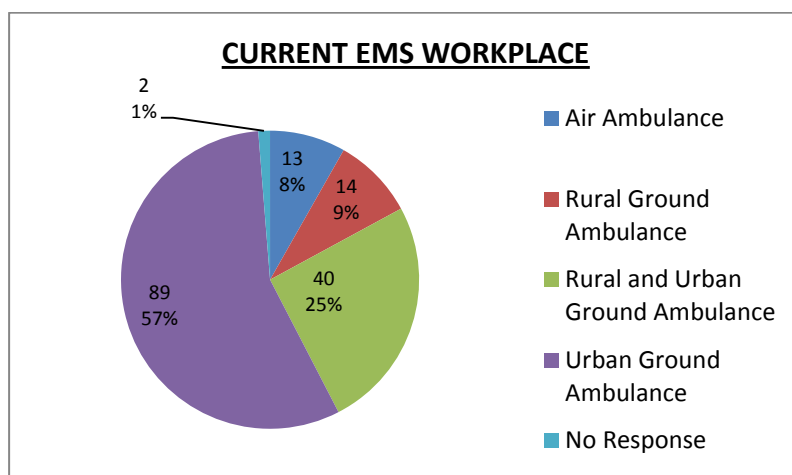


Figure 4.8: Site of current EMS workplace

More than half (57%; n=89) of the sample size worked on an Urban Ground Ambulance service. Rural and Urban Ground Ambulance services accounted for a quarter of the sample (25%; n=40) while 9% (n=14) worked on a Rural Ground Ambulance, and 8% (n=13) worked on an Air Ambulance respectively. The air ambulance group represented the minority of respondents who disclosed their work environment. Two respondents did not disclose where they worked.

4.2 Safety

The Likert responses obtained have been grouped into 4 key safety concerns, namely stress and burnout, fatigue, patient safety and road safety.

	Agree Strongly	Agree Slightly	Neutral	Disagree Slightly	Disagree Strongly
Management support my daily efforts	19.6% (n=31)	18.4% (n=29)	26.6% (n=42)	24.7% (n=39)	10.8% (n=17)
It is difficult to discuss errors here	15.8% (n=25)	22.8% (n=36)	20.3% (n=32)	24.1% (n=38)	17.1% (n=27)
Management does not knowingly compromise the safety of patients	29.1% (n=46)	24.8% (n=39)	18.4% (n=29)	17.2% (n=27)	10.1% (n=16)
The amount of staff is sufficient to handle call volume	20.2% (n=32)	24.7% (n=39)	13.3% (n=21)	19.6% (n=31)	22.2% (n=35)
It is difficult to speak up if I experience a problem with patient care	10.8% (n=17)	19.6% (n=31)	17.7% (n=28)	27.8% (n=44)	24.1% (n=38)
When my workload is excessive, my performance is impaired	24.8% (n=39)	24.8% (n=39)	24.2% (n=38)	15.9% (n=25)	10.2% (n=16)
I have seen others make errors that have the potential to harm others	26.1% (n=41)	28.7% (n=45)	23.6% (n=37)	9.6% (n=15)	12.1% (n=19)
I am less effective at work when tired	33.8% (n=53)	34.4% (n=54)	17.2% (n=27)	8.9% (n=14)	5.7% (n=9)
I am more likely to make errors in tense or hostile situations	12.1% (n=19)	22.9% (n=36)	17.2% (n=27)	26.8% (n=42)	21% (n=33)
I have the support I need from other personnel to care for patients	27.4% (n=43)	34.4% (n=54)	18.5% (n=29)	14% (n=22)	5.7% (n=9)
I have made errors that had the potential to harm patients	4.5% (n=7)	24.2% (n=38)	15.3% (n=24)	17.8% (n=28)	38.2% (n=60)
Fatigue impairs my performance during emergency situations	21.2% (n=33)	35.9% (n=56)	19.2% (n=30)	16.7% (n=26)	7.1% (n=11)
A confidential reporting system is helpful for improving patient safety	48.7% (n=76)	33.3% (n=52)	14.7% (n=23)	1.3% (n=2)	1.9% (n=3)
My work provides me with the training to avoid ambulance driving accidents	18.5% (n=29)	12.1% (n=19)	19.1% (n=30)	13.4% (n=21)	36.9% (n=58)
My employer could do more to improve emergency vehicle driver safety	45.5% (n=71)	26.9% (n=42)	17.3% (n=27)	4.5% (n=7)	5.8% (n=9)
When moving a patient, I have the training to avoid injury to the patient	52.6% (n=82)	21.8% (n=34)	13.5% (n=21)	4.5% (n=7)	7.7% (n=12)
When moving a patient, I have the right equipment to avoid injury to the patient	40.8% (n=64)	26.1% (n=41)	16.6% (n=26)	13.4% (n=21)	3.2% (n=5)
Patient safety is constantly reinforced here	31.2% (n=49)	21% (n=33)	23.6% (n=37)	16.6% (n=26)	7.6% (n=12)
Emergency vehicle accidents occur here	27.1% (n=42)	27.1% (n=42)	18.1% (n=28)	14.8% (n=23)	12.9% (n=20)
Patient handling mishaps (eg patient fall) occur here	8.3% (n=13)	23.7% (n=37)	17.9% (n=28)	19.2% (n=30)	30.8% (n=48)
Medical adverse events occur here (eg patient harmed by medical care/ equipment)	12.7% (n=20)	14.6% (n=23)	21% (n=33)	19.7% (n=31)	31.8% (n=50)

Stress and burnout
Fatigue
Patient safety
Road Safety

Table 4.1: Likert responses to safety questions

A 5 point rating was used for the Likert responses. Each of the responses was grouped into 4 key safety related concerns.

4.2.1 Stress

The following statements were included in the assessment of organisational stress.

“Management support my daily efforts”. The result of this was a 38% (n=60) positive response (the combination of Agree Strongly and Agree Slightly), 26.5% (n=42) neutral response, and 35.5% (n=56) negative response (Disagree Slightly + Disagree Strongly) indicating that the positive and negative responses are almost the same.

“The amount of staff is sufficient to handle call volume”. A slight positive response to this response was found. There were 44.9% (n=71) positive responses, 13.3% (n=21) neutral respondents, and 41.8% (n=66) who disagreed.

More respondents disagreed with the statement “I am more likely to make errors in tense or hostile situations” (47.8%; n=75), than agreed (35%; n=55). There were 27 respondents (17.2%) who remained neutral.

The majority of respondents agreed to the statement “I have the support I need from other personnel to care for patients” (61.8%, n=97). Only 19.7% (n=31) of respondents disagreed with this statement, and 18.5% (n=29) remained neutral.

The Likert question “I like my job” was plotted against marital status for comparison and to assess whether a relationship existed between these 2 variables. The Likert question “I like my job” was plotted against marital status for comparison. Job satisfaction, as measured in the statement “I like my job” is not affected by marital status ($p = 0.6$).

4.2.2 Fatigue

There were 3 phrases analysed to evaluate fatigue:

“When my workload is excessive, my performance is impaired.” The result of this was 49.6% (n=78) agreed (Sum of Agreed Strongly plus Agreed Slightly), 26.1% disagreed (n=41), and 24.2% (n=38) who remained neutral.

“I am less effective at work when tired.” The result of this was that the majority felt they were less effective at work when tired: 68.2% (n=107).

“Fatigue impairs my performance during emergency situations.” Over half of the respondents agreed that fatigue particularly affected them in emergency situations (57.1%; n=89). Only 7.1% (n=11) strongly disagreed with this statement.

4.2.3 Patient safety

The following statements had reference to patient safety.

“Management does not knowingly compromise the safety of patients.” The majority agreed with this statement (53.9%, n=85) versus 27.3% (n=43) who disagreed.

There were several respondents who remained neutral (18.4%, n=29).

“It is difficult to discuss errors here.” There was little difference between respondents that felt it was easy to report errors in their EMS (41.2%, n=65), and the 38.6% (n=61) agreeing that it was difficult to discuss error. A consistent proportion of respondents remained neutral (20.3%, n=32).

“It is difficult to speak up if I experience a problem with patient care.” The majority of respondents disagreed with this statement (51.9%, n=82), and 30.4% (n=48) agreed.

“I have seen others make errors that have the potential to harm others.” Most respondents agreed that they had seen others make errors that are harmful. Only 21.7% (n=34) disagreed with the statement.

“I have made errors that have the potential to harm others.” Only 28.7% (n=45) of respondents admitted that they had made errors that had the potential to harm patients. On the contrary, 56% (n=88) disagreed they had harmed patients.

“A confidential reporting system is helpful for improving patient safety.” Most respondents agreed with this statement (82%, n=128). A very small percentage disagreed (3.3%, n=5).

“Patient safety is constantly reinforced here.” A positive response of 52.2% was received and 24.2% (n=38) disagreed.

“Patient handling mishaps (e.g. patient fall) occur here.” Most respondents disagreed with this statement (50%, n=78), versus 32% (n=50) who agreed and 28 respondents remained neutral.

“Medical adverse events (e.g. patient harmed by medical care/ equipment) occur here.” The majority of respondents disagreed with this statement (51.5%, n=81), and 27.3% (n=43) agreed.

“When moving a patient I have the training to avoid injury to the patient.” There was strong support that the respondents were given adequate training to avoid injury when moving a patient, as evidenced by 52.6% (n=82) strongly supporting the statement and 21.8% (n=34) slightly agreeable. Only 12.2% (n=19) disagreed.

“When moving a patient I have the right equipment to avoid injury to the patient.” The majority of respondents felt that they had the right equipment to avoid injury to patients.” The majority of respondents stated they had the right equipment for avoiding injury when moving a patient (40.8%, n=64 strongly agreeing and 26.1%, n=41 slightly agreeable).

4.2.4 Road safety

Three statements within the Likert responses were clustered for road and vehicle safety. “My work provides me with the training to avoid ambulance driving accidents.” Half of the respondents (50.3%, n=79) disagreed with this statement, whilst 30.6% (n=48) agreed with this statement. Of those that disagreed, 18.5% (n=29) strongly disagreed with the statement.

“My employer could do more to improve emergency vehicle driver safety.” Most respondents agreed with this statement (72.4%, n=113) and 45.5% (n=71) strongly supported this statement. Only 10.3% disagreed (n=76).

“Emergency vehicle accidents occur here.” Emergency vehicle accidents occurred in 54.2% (n=84) of EMS as evidenced by a positive response, 21% of respondents (n=33) remained neutral regarding whether emergency vehicle accidents occurred at their workplace, and 27.7% (n=43) disagreed.

4.3 Violence

Respondents were asked whether they had ever been assaulted. It is inferred that this is in the line of duty.

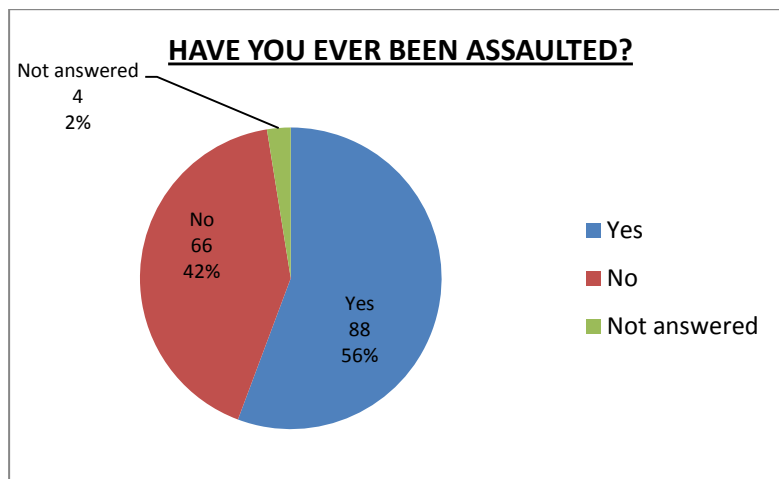


Figure 4.9: Response to: "Have you ever been assaulted?"

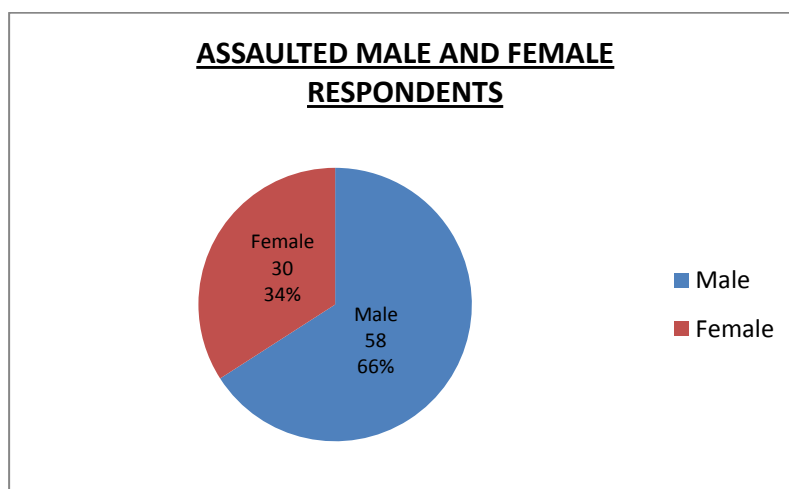


Figure 4.10: Gender distribution of assaulted respondents

More males were assaulted than females. The prevalence of violence however was not associated with gender ($p = 0.3$).

Of the 88 respondents that answered yes to being assaulted, their work environment is represented as follows:

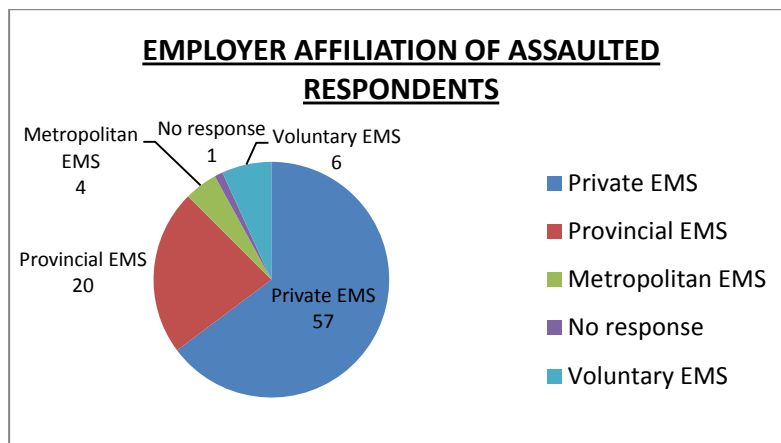


Figure 4.11: Employer affiliation of assaulted respondents

Respondents from the Private sector (n = 57) and the Provincial and Metropolitan sector (n= 24) had been assaulted previously. Volunteers had also been assaulted (n=6), and 1 person did not respond. These figures represent 56% of each the private and provincial sector employees being assaulted, 75% of volunteers (n=6/ total respondents n=8), and 50% of Metropolitan employees being assaulted.

The amount of times each respondent had been assaulted was not asked directly, however several respondents volunteered the information, specifically if they had been assaulted more than once, in the free text response regarding assault in the workplace. The methods of assault included shooting, stabbing, punching and biting. There was 1 respondent who expressed that they had no support from management after the assault. The prevalence of violence was not associated with the EMS employment sector ($p = 0.56$).

A free text block followed the questions regarding whether the respondent had been assaulted and these responses were analysed. The abuse type and whom the respondent was abused by were counted and summarised only if the respondent mentioned a type of abuse or who committed the abuse.

Abuse type		By whom	
Physical abuse	45.5% (n=25)	Patient	67.3% (n=37)
Verbal abuse	20% (n=11)	Bystanders	18.2% (n=10)
Sexual abuse	0	Colleague	9.1% (n=5)
Unclassified	34.5% (n=19)	Unclassified	5.5% (n=3)

Table 4.2: Types of violence reported

4.4 Submitted in survey but not utilised in results

The following data, presented in the survey was not utilised for this research:

- Which 1 of the following best describes your employment status: The majority of respondents (83%, n=152) were employed and working more than 40 or more hours a week.
- How many full time staff are employed by the service at the site you are talking about? It was deemed by the researcher in consultation with a statistician that this question was not clearly understood. 15.95% of respondents replied that there was between 101 to 400 staff at their base of operation.
- On average, how many patients does the site you are working at transport in a month? It appears that some of the respondents answered this question according to how many patients they personally transported, and not the base. This question was omitted due to the wide variation of information and statistical deviance.
- What percentage of your site's (branch's) patients are cardiac arrests or life-threatening trauma? The responses do not reflect what is known about

EMS case load where 10 – 15% of cases are life threatening hence this question was omitted.

- The Likert questions regarding organisational culture were omitted and the categories for the safety assessment questionnaire were assigned according to the 4 variables to be discussed. These were initially analysed by the researcher according to the study conducted by Patterson et al but this has little reference to perceptions about safety and the organisational culture analysis will be written up as a separate paper from this study, as the findings are similar to those of Patterson et al.¹⁰⁰ Special note: The researcher did receive permission from Professor Patterson prior to using the Safety Assessment Questionnaire.
- The priorities afforded for safety threats are beyond the scope of this thesis due to the sheer volume of information collected by the researcher. It is recommended that this be discussed in a separate paper.

Chapter 5: Discussion

The tragic news clip of the ER24 accident near Witbank highlights the risks the EMS is exposed to.¹ Despite their combined experience in the profession, geographical knowledge, driver skill, and an appropriately modified rescue vehicle, the driver died during the call of duty. The provisional investigation revealed that the oncoming driver overtook a truck and did not see the ER24 vehicle responding to the incident. The oncoming driver did not see the warning lights or hear the siren. It was this, and several other incidents which prompted the researcher to review safety in EMS. The potential safety related risks encountered by EMS are not only as a result of road traffic accidents but also the risk of infection, fatigue, vehicle safety, and violence. Violence was rated as the highest safety concern for this group of respondents'. Statistically this was significant ($p < 0.05$).

Organisational culture may affect the impact of these safety concerns. The organisational culture factors which contributed may include job satisfaction, stress, working conditions, management support and teamwork.^{8,32,100} Hence the researcher reviewed workplace safety and elements of safety culture to determine the opinion of South African EMS personnel regarding their perception of personal and patient safety in the EMS. There is evidence to support the lack of advanced life support paramedics in South Africa.^{18,19} Compared to the globally accepted ratio of 1:10 000, there is currently approximately 1 paramedic to 40 000 population in South Africa.¹⁹ This resource depletion may affect safety as the existing ALS, as well as their EMS colleagues, may be placed under additional stress as a result of a lack of adequate resources.

5.1 Demographics

Safety concerns in the pre-hospital environment are common for EMS personnel due to the very nature of their work environment. They are expected to respond to assist a patient regardless of the environment, weather conditions and time of day.² Hence the expectation for a large response to this survey request, as these EMS personnel would want to express their concerns related to safety in their work environment.

This was not evident in the response to this survey, as the response rate was 26.9%. Of the 164 responses received 158 responses were submitted for analysis.

There are approximately 1 600 CCA's, 290 degree paramedics, 56 000 BAA's and 8500 AEA's registered with the PBEC at the HPCSA.¹⁰² However, approximately 30 000 of the BAA registrations have been removed due to non-payment of fees. The intention was to forward the invitation for participation to all practitioners registered with the HPCSA, however electronic mail addresses were not freely available. The response rate is not unusual for electronically requested surveys in the EMS in South Africa for many reasons which may include literacy, access to computers and cultural distribution. In their research on critical incidents and mental health issues in emergency services, Ward et al found a 28.2% response rate which they attributed to administrative challenges.²⁹ On the contrary, a better response from electronic questionnaires was achieved by Hackland and Stein (52%)¹⁹ and Iwu (69%).¹⁷ Hackland's response rate was 52% after removal of rejected electronic mails which may have affected his response rate, and he specifically looked at ALS practitioners in his survey whom may have had more access to electronic media. Iwu distributed his printed survey via team managers hence his 69% response rate. These managers were also responsible for collecting completed questionnaires, and there

could have been a power hierarchy here. The researcher submitted an electronic survey which participants had the opportunity to delete if they chose not to partake. Naude and Rothman had a response rate of 21.6% and their reasons for this response rate were call-outs, rotating shift schedules and leave. This cannot be attributed to the researcher's survey, as the survey for this study was internet based and electronically submitted.

Although in the past, the HPCSA may have distributed research requests, this opportunity is no longer afforded to researchers. This may be as a result of the logistics surrounding a number of researchers applying for this data base. Confidentiality also prevents the distribution of this known list of professionals. The researcher did make use of an older (2009), purchased list of HPCSA professionals via her employer, but the number of email addresses on this list appears incomplete relative to the amount of registered practitioners. Although there were more basic life support practitioners in this list than any other qualification, they may have been contactable via their cell phones and addresses, and not an email address. This group of telephonically accessible individuals were excluded from the survey and may skew the results.

5.1.1 Age of respondents

The majority of respondents were in the age group of 31 – 40 (44%, n=69), and 64% (n=100) of the total respondents were older than 30. This correlated with years of EMS experience as the majority of respondents had between 11 and 15 years' experience. It is uncertain why the majority of respondents for this survey were within this age category as it could have been either that this is the majority that received the survey, or that these are the respondents that took the time to respond having

had adequate experience in the EMS, and have access to the internet as a result of their seniority or other factors unknown. Whatever the reason, the results cannot be applied to the EMS population in general.

Likewise when comparing the age and employer affiliation. In the private sector, 62.5% (n=65) were above the age of 30, 55.5% (n=5) in the voluntary EMS, and 69.9% (n=30) in the state sector (provincial and metropolitan EMS).

The results could be affected by this larger distribution of seemingly middle aged EMS personnel. The degree of influence these older, more experienced individuals have will be different to those that have recently graduated due to their years of pre-hospital experience.¹⁷ Several researchers identified the EMS personnel's age as a reason for wanting to leave the EMS.^{18,19} They become more concerned about their safety as they become more family orientated, and passion for health care is overcome by responsibility for their family which may impact on safety responses.¹⁰¹

As a result of this responsibility, an older employee may choose financially incentivising career options such as a position in management or may seek international management positions as there are insufficient in South Africa.^{17,19,21}

These financially incentivising positions are relevant to the South African EMS environment, as they have been identified as reasons for migration from the South African EMS. This migration of the management group decreases the leadership potential in EMS and may result in a less safe standard of care. The less qualified individuals, will remain and affect the safety, leadership and standards in South Africa.¹⁹ These experienced leaders would not be present for employees to emulate. Hence immigration of graduates is a concern for EMS in South Africa and may have a direct effect safety in EMS. Hamilton et al expressed concern that the longer an individual spent in the EMS, the more they become dispassionate about their

operational work environment.¹⁰² The implication for the profession of the before-mentioned would be the loss of these employees experience and skill.

Only 4 respondents were between the ages of 18 – 20. All 4 of these respondents were male. It is possible, as a result of the distribution groups to older individuals, that the younger EMS personnel may not have been represented in this survey; hence the age distribution is not surprising. Results should thus be interpreted within the age group distribution and not applied across all age categories.

5.1.2 Gender

It cannot be determined whether the predominance of male respondents is in line with HPCSA data regarding EMS, as gender data was not available.¹⁰² The majority of respondents were male (69%, n=109) in all age categories. There was a higher incidence of male respondents in the age group from 31 – 60 (71.6%, n=73) versus the age group 18 – 30 (64.3%, n=36). This is interesting as even though the distribution was slanted to the private sector, and age distribution groups, the gender distribution remains unchanged. The fact that older males form the majority of respondents in this survey must affect the results of perceptions regarding safety in the EMS. Just as car insurance claims would predominate in the young (Avis car hire in personal telephonic discussion on 23 December 2014), the same could be extrapolated to those younger individuals exposed to the EMS. The older respondents, having experience and knowledge regarding safety, would be more likely to be safety conscious.

Internationally there is evidence that females are more prone to assault, stress and burnout in the EMS.^{25,27,33} In this study, 31% (n=49) of respondents were female. It is not known whether the group of female respondents were willing to disclose their

record of assault as they may not trust the survey's anonymity, or because it recalls previous events. Again, as with the male respondents we see a higher distribution of respondents in the age groups of greater than 30 (59.2%, n=29). However in the female group the majority of respondents are all under the age of 40 (85.7%, n=42). Perhaps this distribution may be as a result of females leaving the profession earlier, but since the distribution of female respondents is small and the number and age distribution of females in the profession is not known, one cannot simply surmise this. Regardless of gender, there will be a higher incidence of potential exposure to violence the longer an EMS professional remains in operational duty.

5.1.3 Race

According to Statistics South Africa, the midyear population estimates for 2014 is 54 002 000. 51% of the population is female, 80.2% African, 8.8% Coloured, 8.4% White, and, 2.5% Indian/ Asian.¹⁰³

As can be seen from the results, the majority of participants in this survey were White (84%, n=134). The survey was distributed to a predominantly white group of EMS personnel, according to the name list of distribution obtained by the researcher post invitation, and this will have resulted in a source of limitation and bias. This may fit in with the race distribution of graduates who, although now over 30, when they graduated, EMS was a predominantly white male dominated profession particularly in the private sector. Although the HPCSA registrations today may be more equally distributed amongst all race groups, this list did not materialise, and the list obtained did not equalise the population groups. Hackland et al, in their review of ALS paramedics planning to leave South Africa had a similar response of 86% white individuals.¹⁹ A small number of respondents in both the research conducted and

aforementioned study were black. The data regarding the racial statistics of EMS personnel is not publicised, but it is clear from the findings that this research is not representative of EMS in general.

5.1.4 Marital status

As can be seen from the results, the majority of respondents were married (53%, n=84), 34% (n=54) were single, 12% (n=18) were divorced, and of the married respondents, the majority (74.1%, n=60) were male.

Of the female respondents, only 21 were married (42.9%) whereas 60 males (74.1%) were married. Each group of male and female had 9 divorcees and 1 separated respondent. There were 20 single females (40.1%) and 34 males (31.2%) who were single.

Respondents above the age of 30 were mostly divorced or single. There were 44.4% (n=8) of divorcees beyond the age of 30, and 70.4% (n=38) of the same age group that were single. This may be as a result of their commitment to the profession, lack of time to socialise, or that they do not find partners who are willing to endure the safety concerns inherent in the profession. This can be evidenced by 12% of respondents that are already divorced. In South Africa the percentage of divorced individuals is approximately 13.6% of the population, and the EMS divorce rate is unknown.¹⁰³ The prevalence of divorce is considered a risk factor for stress in EMS, as it is known to be higher than the general population internationally.²³

5.1.5 EMS work sector

The majority of respondents were employed in the Private EMS (66%; n=104). The Provincial EMS accounted for 22.7% (n=36). Metropolitan EMS and voluntary EMS

services accounted for 5% and 6% respectively. A single respondent did not disclose a work sector.

Analysis of the work affiliation results revealed that the majority of respondents were employed in the private sector (66%, n= 104). This is probably the result of the distribution of the initial survey. Of the 4 people distributing the survey, the majority was to the private sector.

In the South African EMS, those that work in private will mostly work exclusively in this environment. It is possible that the affiliation that respondents put down may not have been their main source of employment. They may work in the provincial sector, and respond based on their affiliation with a private sector. Some of the respondents that stated they were working in the private sector may have been working abroad, or working in EMS remote site operations, but may have responded that they were working in the private sector due to the nature of their contract. These remote site respondents are not known to the researcher. For example, there is a senior paramedic who works in the oil industry in Kazakhstan. He may have responded to the survey and based his answers on his employer in Kazakhstan. Due to anonymity, this would not be known by the researcher.

5.1.6 EMS setting

As was expected the majority (91%, n=143) of the respondents indicated that they were employed in a ground ambulance service. This is in keeping with current EMS setting characteristics in South Africa. Only a handful (8%, n=13) of EMS were employed solely in the aviation environment. This is a limited, complex, expensive service, with the number of EMS providers proportional to the number of aircraft. It is possible that these respondents may be expected to assist with ground work during

their employ. This may be evidenced by 1% (n=2) of respondents who did not categorise where they worked, as they may be working in more than one environment such as ground and air ambulance. Their workplace may also not have been included in the survey for example an off shore clinic environment.

The majority of respondents described their EMS setting as that of an urban ground ambulance (57%, n=89). This is not surprising as there are mainly private sector respondents. There were 53.9% (n=55) of respondents from the private sector, and 100% from the voluntary group who responded that they worked in an urban environment. Only 47% (n=17) of the provincial respondents worked in a solely urban environment.

5.1.7 Years of experience in EMS

It is not surprising that 62% (n=98) of respondents had beyond 11 years of experience in EMS. This figure correlates with age where 44% (n=69) were beyond the age of 30. This further substantiates the researcher's impression that the respondents represent a sample of more senior EMS personnel. These respondents have experience, skills, may be part of administration, and be email and computer literate. They would be very able to fill in questionnaire and complete reports in their own employment.

The majority of provincial and Metro EMS respondents have been qualified for more than 11 years (70%, n=31) as opposed to the private sector (58.7%, n=61) and voluntary EMS (55.6%, n=5). This is to be expected as the private sector EMS in South Africa only developed in the late 1990's.¹⁵

5.1.8 EMS Qualification

EMS qualification by means of treatment responsibility is represented by 55% (n=86) ALS, 1% (n=2) ECT, 30% (n=47) AEA and 14% (n=22) BAA. There are only 22 BAA's despite the invitation sent to a proportionate amount of BAA's. The number of BAA's is underrepresented and skewed in terms of the reality of BAA's in South Africa, which should represent the majority of EMS. This may be as a result of lack of access to email addresses, and subsequent poorly represented sample size. The amount of AEA's which are related internationally to Intermediate Life Support are those practitioners that can do invasive procedures such as intravenous therapy and the administration of certain drugs such as Dextrose intravenously and Beta2 nebulisers. Again, this sample is underrepresented when compared to the register of PBEC practitioners. Although this ILS group would become experienced, they very rarely traditionally become managers. The majority (55%, n=86) are Advanced Life Support paramedics which is due to the distribution method and is in no way representative of the country's ALS practitioners. It is these paramedics that will traditionally be promoted to managerial and higher levels of employment, and this may slant the result, as there is thus predominantly managerial level of respondents.

5.2 Stress

Stress is an emotional response to adverse or demanding circumstances.²⁸ Exposure to both chronic and acute stressors such as violent or traumatic scenes, crisis situations, a responsibility to care for critically ill patients, and prolonged work hours within the EMS may lead to a higher incidence of stress in this profession in comparison to other professions.^{28,29,33}

Most EMS personnel in South Africa have been exposed to acute stressors due to the nature of their job.²⁷ Perceptions of stress in this study were assessed through questions to assess the support that management and peers provides to the EMS, staffing, inter-personal hostility, errors. These components are risk factors for stress in the EMS as can be seen from the following 5 South African studies.^{23,31,33}

Iwu et al identified long hours, lack of knowledge, financial incentives resulting in prolonged duty hours and the lack of opportunities for promotion as sources of stress and reasons for staff turnover in the EMS.¹⁷

In Govender's study on why EMS personnel were leaving South Africa one of the reasons was working conditions which may be related to the stress in EMS. Another reason was physical security, but it is not certain whether this was personal security within the country, or work related security. Economic considerations may be a stressor as the respondents may not have been earning sufficient money, or they were doing additional hours which may be a stressor.¹⁸

Hackland and Stein, in their publication on the reasons why ALS paramedics chose to leave clinical operational practice identified the following factors: occupational benefits such as dissatisfaction with their salaries, communication concerns including a perception of not being able to change their current work environment or discuss concerns with middle management, lack of opportunity of promotion operationally, operational risks and hazards including faulty or inadequate equipment and vehicles, and personal concerns such as family pressure, racial discrimination and the disadvantage of the shift work system.¹⁹

Naude et al's research in stress in EMS personnel in Gauteng identified that occupational stressors due to short staffing and a lack of progression and promotion were reasons for emotional stress.³³

Stassen et al found a higher incidence of burnout in South African ALS than internationally and they attributed this to the case load seen by the ALS, the high incidence of injury and inter-personal violence seen in the high trauma patient load and lack of staff.²⁵

5.3 Management and peer support

The organisational aspects of the work environment do affect stress in the longer term in EMS.^{23,27,33} These organisational aspects include control and the lines of authority, unrealistic expectations from management, and equality of decisions by the management team.³¹ Several of these factors, such as: too little pay, job stress, the impact on their family's lives, and long hours were cited by South African authors as stressful contributors to paramedics giving up their jobs.^{17,18,19}

Administrative stressors such as low salaries, lack of support from superiors and the way that ambulance personnel are treated at emergency departments may contribute more to stress than the actual stressor of treating critically ill or injured patients.²⁶

It can be seen that an almost equal amount of respondents felt that management supported their daily efforts (38%, n = 60) than did not (35.5%, n = 56). This is a concern as a third of management may not support their employee's daily efforts. Some respondents remained neutral (26.6%, n = 42). The analysis of where the respondents were employed (state versus private sector) did reveal a difference of opinion regarding management support. There is a slight positive response within the private sector for management support as evidenced by 40.4% (n=42) agreeing with

the statement that management support their daily efforts and 32.7% (n=34) disagreeing.

In the state sector which was calculated by a combination of the opinions of metropolitan and provincial EMS as they are both governmental organisations, there is evidence that employees felt management did not support their daily efforts (50%, n=22) versus only 27.3% (n=12) agreeing that management supported their daily efforts.

Management support varied amongst employer affiliations. Only a third of state sector employees were of the opinion that the state sector supported their daily efforts. This may be as a result of the opportunities for promotion and access to management. The private sector, which is a primarily commercially based EMS, may support their staff more than the state sector. This is expected as the commercial success of the business is largely dependent on the operational efficiencies of their staff, hence the investment into ensuring they are happy employees. Although only a small sample, 55% (n=4) of those in voluntary EMS felt supported by their management team. This high perception of management support is to be expected as they are in voluntary service, and would leave if they were unhappy, unless they were there for experiential exposure in order to further their careers in the EMS.

The lack of management support is a large stressor in the research group.

In contradiction to the management support, there is an overall positive response to the opportunity to discuss error. This is evidenced by 51.9% of respondents (n = 82) disagreeing with the statement that it is difficult to discuss errors regarding patient care, and only 30.4% (n=48) of respondents agreeing that it is difficult to discuss error.

The private sector personnel felt more able to discuss error (40.4%, n=42) than their state colleagues (34.1%, n=15).

Once again, this is almost the same variance between the two groups as with management support. The private sector management team, again, may be more willing to discuss error with their teams, as their livelihood would be dependent on such concerns being corrected. This incidence between the two sectors (private versus state) would be interesting if the respondents worked in the same environment, such as operationally on an ambulance, or response vehicle without any management responsibilities, however this cannot be deduced from the survey. It is also unknown if all the respondents in the private sector were working for one company or several different companies. The hierarchy levels within the company or state environment would skew this response. Depending on the size of the company or state EMS, there may be a difference in how they relate to errors. Within the private sector, there may be a discrepancy amongst the various organisations regarding management decisions, access to managers and approach to staff. There may also be a hierarchy, and the staff may not know who their senior managers are. Some of the private services are national services and may have a national footprint. This may make access to senior management difficult since the EMS head office may be remote from where the respondents are based. Those that disagreed with their management support may be an elderly person, and have experience, but may still be worker. Even if there is an open door policy the employee may not feel they can approach the manager. Alternatively, since this is an older, more experienced group, they may be in a middle management level, and are unlikely to feel unsupported by management. Respondents within management positions would naturally tend towards believing in the support that they provide to their sub-ordinates

and they would be employed in positions where they were consulted on decision-making within the organisation, shown to decrease stress.³⁴

The management access, management decision, and access to staff in the government sector may be the same factors contributing to an opinion regarding management support as in private, but government hierarchy is different to private where promotion and support may be as a result of political incentive.

These high numbers tie in with the studies done by Naude and Rothman, Iwu, Hackland, and Stein and Regher et al, who found that lack of management support is a stressor for the EMS.^{17,18,19,33} They did however use different to reach their conclusion such as the Maslach Burnout Inventory and the Utrecht Work Engagement Scale.³³

Lack of management and peer support was identified as one of the reasons for the exodus of EMS from South Africa.^{18,19} These were both South African studies hence their relevance to this research. Hackland et al identified lack of communication with management as one of their top fifteen reasons for ALS wanting to migrate from operational practice, and Govender et al identified working conditions as one of their top 3 reasons for migration. It is the opinion of the researcher that it is possible that some of the reasons why management cannot help the respondents were as per Naude's research that includes budgetary constraints. These may prevent certain measures from being improved that would then make it easier for the worker, and this may be expressed as negativity towards management, a negative attitude towards emergency services, performance of tasks not in their job description, violence, and the experience of new or unfamiliar emergency situations.³³

Internationally, these results are similar to a Canadian study where Regehr et al found that the majority of employees were dissatisfied with management support and this contributed towards organisational stress. They found that 35% of respondents indicated their employer was not supportive at all and 23% said their employer was a little supportive.⁵⁴

Hence organisational based stress as can be seen by negativity towards an organisation is apparent in this research.²²

Organisational support, and particularly peer support is important and is a strong support basis for coping with traumatic situations and avoiding stress in the EMS work environment.^{17,29} The majority of respondents (61.8%, n=97) agreed that their peers supported them. Only 19.7% (n = 31) replied they did not have the support of their colleagues when caring for patients. Again we see a trend for respondents to remain neutral (18.5%, n=29). The support that EMS personnel enjoy from management and peers might act as coping mechanism within the local context of resource-poor emergency care.

Both married and unmarried EMS personnel were happy with their jobs. The Likert question “I like my job” was analysed to assess the possibility of a relationship between marital status and job stress. 91.66% of respondents agree with the statement “I like my job”. Of those 91.66% who “like their job”, 72% of divorced respondents responded strongly to this statement, 75% of married respondents, and 77% of single respondents. Unmarried EMS personnel felt more strongly towards their job than their married ones according to Iwu.¹⁷ Iwu went on further to say that the EMS profession may favour unmarried individuals, and the nature of work may be a source of stress for families, however the same cannot be deduced from this study.

There is not a statistically significant difference in the responses of this question between those married and those who are single, $p= 0.6026$. Job satisfaction - as measured by "I like my job" is not influenced by marital status.

Physical safety is another cause for stress in the workplace.^{13,17,18,21,22} A significant number of respondents (35%, $n=55$) agreed that they were more likely to make errors in tense or hostile situations. In consideration of why a larger proportion of respondents disagreed (47.8%, $n = 75$), there may be no difference in immediate stress levels and the respondents may not have been aware of the errors made. Mock et al found that although the paramedic working environment was stressful, violent encounters did not affect the immediate stress levels of EMS. There is sufficient evidence in the research group to highlight that physical safety, and in particular violent encounters contribute to the respondents stress levels. This will be discussed further in section 5.6.

Inadequate staffing, particularly in the current context of a resource deprived ALS environment may contribute to stress of employees.^{17,18,19} Govender et al identified working conditions as 1 of their top 3 reasons why ALS paramedics made the decision to migrate from South Africa.¹⁸ Many respondents (41.8%, $n=66$) were of the opinion that their EMS was under resourced. The lack of availability of staffing resources may contribute towards stress. An important factor is to remain cognisant of is that 66% of the sample are employed within the private sector where more resources are available. Hence the reasons for stress to appear as though it may not be as a result of inadequate staffing (44.9%, $n=71$).

There is evidence of stress within the research group with the contributing factors being lack of management support, communication, and physical safety.

5.4 Fatigue

Fatigue is an uncomfortable feeling associated with a lack of energy that may not be resolved with sufficient sleep.⁶² Fatigue has been identified as a leading factor in health care error and has been the reason why initiatives such as the European working time directive have been implemented.⁶³ Unlike the European medical environment there are few restrictions on work hours for the health care sector in South Africa. Alertness is vital in this fast paced environment. Poor sleep quality and fatigue are common in the EMS profession due to long hours and shift work.⁶² If the EMS personnel were tired and fatigued, the personnel would be less effective, and if the practitioner worked too many hours he (or she) would be tired.⁶⁸ The effect of this fatigue includes making commonly identified errors such as deviations from protocol, medication administration error, patient falls from stretchers, and even life- saving interventions such as securing a patient's airway.⁶³ Contributing factors to fatigue, and subsequently safety error, include shift length, the amount of calls per shift, and amount of shifts done in a month.⁶²

The majority of respondents agreed that they were less effective when tired, that fatigue impairs performance during emergency situations, and that when their workload is excessive their performance is impaired. EMS personnel are required to perform intricate procedures and make difficult decisions regarding life and death. The researcher is concerned that these practitioners acknowledge they are less effective at work when tired (68.2%, n=107). How can this group of individuals come to work knowing they are tired and will be less effective at work? The risk of negative outcomes is high and practitioners need to be alert at all times to avoid these negative outcomes.

There was a slightly higher acknowledgement of being less effective at work when tired from those employed in the private sector (69%, n=72) than their provincial counterparts (66%, n= 23). This may be as a result of the state sector employees supplementing their salaries by working ad hoc shifts in the private sector. There were several respondents from the private sector who remained neutral (14%, n=15). The reason for this may be that those respondents are in management positions and did not feel it was appropriate to respond to the statement or that they may be in office type positions.

Some of the respondents in the volunteer group may not be full time in EMS and have other responsibilities outside of their rostered shift, hence the 44% (n=4) who chose to remain neutral, as fatigue and shift rosters would not be a concern for them as they are doing this as their passion over and above their usual responsibilities.

There was only 1 respondent who disagreed with the statement.

Despite the above responses regarding fatigue affecting performance, only 29.7% (n=45) admitted having made errors that had the potential to harm patients, and only 32% (n=50) agreed that patient handling mishaps occurred in their work environment. This demonstrates that the practitioners may not be aware of their own errors, or they may not work in an environment where patient care is their priority, as the errors must happen in this fast and challenging environment.

The aviation environment is unique, and despite pilot hours being managed by strict flight and duty times, this does not apply to the medical crew. Although it was not asked whether these individuals were predominantly rostered for fixed wing or rotary wing duties, the fixed wing environment is challenging with its irregular, unpredictable hours and long mission times. Hence it is not surprising that 69% (n=9) agreed that fatigue affects their performance. The aviation environment is unique as other factors

contribute to fatigue and the stressors of flight for example blade flicker in the rotor wing environment, dehydration, and altitude.⁵⁵

The majority of respondents agree that fatigue affects their performance in emergency situations (57.1%, n=89) and only 23.8% (n=37) of respondents disagreed with the statement. These 37 individuals may be those EMS personnel whose performance does improve in an emergency by the very nature of their personality.⁶² Perhaps this was a personal reflection or emotional response as opposed to an intellectual decision regarding fatigue and the effect it has on performance.

In summary, there is evidence to suggest that the sample group experiences fatigue and they are less effective at work when tired, but they do not equate their own fatigue to error. There is consistency with Patterson's findings that fatigue affects safety outcomes.⁶²

5.5 Patient mishaps and near misses

Patient safety is the reduction and mitigation of unsafe acts through best practice resulting in optimal patient outcomes.²² It addresses those aspects of patient care that may affect patient outcome.² The unique challenges, for example weather, response driving and the unknown work environment, within the EMS environment pose additional consequences for provider, public and patient safety. Hence EMS safety and the safety of the patient are two concepts that cannot be divorced.²²

The incidence of EMS patient safety error is not well recorded however, if the hospital environment in developed country studies was used as a predictor for this

percentage then 10% of patients would be exposed to medical errors which adversely affect patients.²

5.5.1 Mishaps

Patient handling mishaps do occur within the sample group, as evidenced by 32% (n=50) of the respondents supporting that patient handling mishaps example patient falls occurred, 17% remained neutral, and 50% (n=78) said that patient handling mishaps did not occur. This is unusual, as it is the researcher's opinion that patient handling mishaps do happen within the EMS and the acknowledgement would be higher than 32% especially since the majority of respondents were senior males in the private sector. A cross tab of age and patient handling mishaps explains this anomaly: In the combined age groups of 18 - 20 and 21 - 30, 50.9% (n=28) disagreed that patient handling mishaps occurred, 20% (n=11) remained neutral, and only 29.1% (n=16) agreed. An average of the age group 31 – 40 and 41 – 50 showed that 50.5% (n=50) agreed that patient handling mishaps occurred, 15.2% (n=15) remained neutral, and 33.3% (n=33) disagreed. This may have been because the younger employees were not exposed to the mishaps that had occurred.

A chi-squared test was performed to evaluate whether there was an association between qualification and mishaps. An association exists between the individuals qualification and mishaps ($p = 0.018$). The higher the qualification, the more likely the practitioner was to make an error. This could be explained by a few reasons. The higher qualified the practitioner, the greater the eventual responsibility, the more complex the patient and the greater the amount of interventions applied to the patient. Higher qualified practitioners might also have the insight and maturity factor, due to higher levels of education, to understand the complications of interventions

and to identify medical mishaps. This may also be attributed to the fact that better educated practitioners are more likely to feel confident in acknowledging the error, in the interest of self-reflection, self-regulation, quality improvement and clinical governance.

This response is further supported by the response to medical adverse events occurring. Only 27.3% (n=43) of respondents agreed that medical adverse events occurred, and 51.5% (n=81) disagreed.

5.5.2 Error

So does this infer that South African paramedics are perfect? To the contrary as the majority stated that they had seen others make errors (54.8%, n=86). Yet the respondents were reluctant to admit that they had made an error. Only 28.7% (n=45) of respondents admitted that they had made errors which affected patients. This denial to admit they have made mistakes could be life-threatening. This may be as a result of a technical imperative which is supported during EMS training.¹⁰⁴ A specific action or technical intervention is reinforced, for example intubation.¹⁰⁴ The intubation skill is rehearsed and hence the need for action to occur, should the technical need be there to intervene. Although a technical skill is accomplished, there may be little acceptance of any blame for error, as the moral need to intervene in this specific intervention has been achieved.¹⁰⁴ Hence the error may only be appreciated once the patient arrives at the hospital. The researcher is concerned that this may result in a lack of proactive error reporting.

5.3 Management interventions

It does appear that there is evidence of patient safety being reinforced, as 52.2% (n=82) of respondents replied that patient safety is constantly reinforced. There was little difference between the employer affiliation and whether patient safety was reinforced. 46.5% (n=20) of state employees and 52.9% (n=55) of those employed in the private sector agreed that patient safety was reinforced.

The most common EMS patient mishaps include collapse or fall of the stretcher, injury to the EMS personnel, and a malfunction of a stretcher part such as the side rail.¹⁰⁵ There was strong support that the respondents were given adequate training to avoid injury when moving a patient (84.4%, n=116). Only 12.2% (n=19) disagreed. Even if employed in a management role the respondents would be answerable to whether they had adequate training or not. In support of this the majority of respondents not only stated they had sufficient training, but also that they had the right equipment for avoiding injury when moving a patient (66.9%, n=105; 40.8%, n=64 strongly agreeing and 26.1%, n=41 slightly agreeable). Both of the above responses show that management is doing something regarding initiatives to mitigate the mishaps. However, the management response does not appear to extend to error reporting, as 51.9% (n=82) of respondents agreed that it was difficult to speak up if they had made an error. This is an alarming finding, and speaks to the essence of clinical governance. In such an environment, no improvements may be possible. Development of a confidential reporting tool is strongly supported by the respondents (48.7%, n=76), and only 3.3% (n=5) respondents disagreed that a confidential reporting system would be helpful for improving patient safety. There are reporting

tools available and their strategic recognition and value need to be recognised and supported by the management team.

From the above mentioned responses a positive attitude towards mishaps and near misses can be seen from management extending to EMS personnel. Whether this is a true understanding of patient safety, since the emphasis on patient safety including medication error appears to have received a low priority for overall safety concerns, needs to be explored further.

5.4 Road safety

A critical factor in the effectiveness of any EMS is the ability to get personnel and equipment to the scene of the emergency in a timely manner. EMS personnel are expected to respond to any life-threatening emergency call within 5 to 15 minutes in an urban environment and 40 minutes in a rural environment.¹⁵ Hence riding in the back of an ambulance is associated with morbidity and mortality for the patient, EMS crew and other road users.^{75,77,78}

5.5 Vehicle accidents

The majority of respondents did admit that vehicle accidents occur (54.2%, n=84). Despite this the EMS personnel responding to the survey have rated driving related offenses as one of their lowest safety related hazards. Perhaps the explanation to be afforded for this low rating may be as a result of the high incidence of road accidents in South Africa, and the subsequent normalisation of deviance which has occurred. Another explanation could be that a driving offence may not have been understood to be the same as a driving accident, hence the low priority given to a driving offence.

It is clear that the respondents have some concerns related to vehicles and driving safety as evidenced by their response to the Likert statement “my employer could do more to improve emergency vehicle driver safety” which was agreed to in 74.4% (n=116) responses. It is interesting that the respondents are quick to blame their employer as the responsible party for doing more to improve vehicle driver safety. The respondents agree that accidents happen, yet the employer is apportioned the blame for the accidents that occur.

This could be understood if the respondents expected a custom designed and ergonomically configured ambulance. Sadly, the South African EMS makes use of ambulances that are not custom designed. Adapted ambulances are a safety concern but there are financial and logistical reasons for rather adapting a chassis than purchasing a custom designed ambulance. However, there are a number of factors which could affect driver safety which are not the responsibilities of the employer such as weather, time of day, fatigue, sleep patterns and stress.⁵⁷

Driver training is necessary and every EMS driver should attend the training. It is not known how many EMS have driver trainers, the employer the researcher works for in the private sector has a trainer, but the respondents still feel this is insufficient as evidenced by the Likert responses. The majority disagreed (50.3%, n=79) that there were sufficient training initiatives to avoid ambulance driving accidents.

Internationally it appears that the aviation environment is safer than the road transport environment.¹⁰⁶ Literature suggests that the biggest environmental safety concern in the aviation environment is the ability to communicate, and not road safety as this is the concern for ground EMS teams.¹⁰⁶ The Likert responses to “my employer could do more to improve emergency vehicle driver safety” were interesting

for the Air Ambulance group as 69% (n=9) agreed that their employer could do more to improve emergency vehicle driver safety. This may be because their employers have a road affiliated service for which they have formulated an opinion despite their involvement in the Air Ambulance environment.

Other safety concerns related to the EMS vehicle environment such as seat belt usage and the result of inadequate vehicle conversions cannot reliably be calculated in this series of questions, and in view of the majority of respondents expressing that their employer could do more to improve emergency vehicle driver safety, these concerns need to be explored further.

5.6 Interpersonal violence

The EMS is required to care for patients in an environment which places the personnel at risk. Violence towards EMS has been described in several publications in the literature.^{2,40,41,43,44,45,47} The EMS are expected to respond to incidents where violence and injury has occurred. There are also certain patients that present with acute psychiatric, psychological problems either due to organic or substance/chemical intoxication such as alcohol. Therefore it is not unreasonable for the EMS to expect abuse either verbally or physically, either in the environment or by the patients who have an acute condition. It is not something unusual in the EMS. Verbal abuse is expected and physical abuse is not unexpected. There is no response that can be said to be risk free. However, in order to mitigate this part of the training is to assess the safety of the scene you are about to enter, and, if necessary call for a security service to assist in this environment before entering the scene.

Data obtained from this survey showed that 56% (n=88) of respondents had been assaulted while at work. The majority of those assaulted were male (66%, n=58). Verbal abuse was described as the type of abuse by 20% (n=11) of those volunteering a response (n=55), and physical abuse in 45.5% (n=25) of responses. This would include swearing, spitting, biting and stabbing either in a violent situation or because the patient was behaviourally challenged. The patient may be expected as the assailant but the bystander or a colleague not.

Internationally the percentage of EMS reporting abuse is 61% in the USA, with 25% having sustained an injury from the incident.⁵⁷ Interestingly, and by extrapolation, since the EMS has sustained an injury there is physical abuse. The total abuse of this group is similar to that obtained by the researcher; however the perceived amount of verbal abuse in the South African group is slightly lower. In Australia, 87.5% of paramedics report violent episodes at least once a year and 20% reporting violent episodes at least once a month.⁴⁵ The reported percentage of physical abuse (45.5%, n=25) was higher than a Canadian study, where physical assault is present in approximately 26.2% of cases.^{45,47} Their overall incidence of exposure to workplace violence was 75.2%.⁴⁵

Although the perception amongst respondents appears to demonstrate that assault occurs less than that of international EMS studies, there is evidence to suggest the nature of abuse in South Africa is severe.

The reported percentage of staff exposed to workplace violence is 56% in SA, 61% in USA, 75.2% in Canada, and 87.5% in Australia. This would make South Africa one of the safest environments for the EMS personnel. This is an interesting observation and the researcher does not know why the perception regarding violence is lower in South Africa. It is possible that this may occur either because the EMS is more

vigilant and better prepared as a result of the crime rate or because they call for assistance from security sooner. The reason for this could have been that the majority of respondents were from the private sector, but the calculated percentage was equal in both sectors (Provincial EMS 55.5%, n=20, private EMS 56.4%, n=57). The highest amount of perceived assault was recorded in volunteers during this survey (75%, n=6) but this should be interpreted with caution due to the small sample size. It is interesting that despite the perception of assault towards a volunteer group, they remain committed to EMS.

Perhaps the expected incidence of violence in our South African environment has sensitised EMS to be more alert and vigilant. Alternatively, there could be underreporting in the group in assault arising from verbal abuse, in assault not resulting in injury being under reported, and the EMS considering this to be part of their job. This is evident in the data when compared with international trends. The international incidence of verbal abuse is around 67% whereas this survey's respondents only reported a perception of verbal abuse in 20% of responses.^{45,47}

The assaults reported were not associated with gender ($p=0.35$) or employment sector ($p=0.56$). Gender is a predictor for sexual assault well described in the literature related to violence in EMS but contrary to what was expected, gender related violence was not evident in this survey.^{45,47} Perhaps a reason for this is that most EMS still has a male dominated work force, and most teams are mixed gender.

The perpetrator was found to be a patient in 67.3% (n=37) of the reported incidents, bystanders in 18.2% (n=10), and colleagues in 9.1% (n=5).

A patient being the perpetrator of violence is to be expected and the majority of studies report the patient as being the major perpetrator of violence, for example in

an American study patients accounted for most of the violent behaviour 89.7% of the time.³⁸ This is slightly higher than the incidence found by the researcher. Although some respondents described their assault by a colleague as verbal or threatening in nature, one respondent explained that they had been stabbed by a colleague. This is a major concern for the researcher, as surely colleagues should be protecting each other, and not the perpetrator of violence. It is possible that these verbal assaults by a colleague may have been misconstrued as assault. By the very nature of the challenging environment EMS is exposed to, swearing during an emotional case may not necessary constitute verbal abuse. This may be a normal operational variant of a colleague psychologically unloading after a bad day. Physical abuse is however different, no matter how bad a day, a colleague should never be assaulted by another colleague. This needs to be further interrogated as this may require psychological debrief.

But the lower incidence of violence in South Africa does not mean that violence does not chase EMS personnel away from the profession. Although normal and expected or understood, it does not mean that it is accepted, and violence may become an unrealistic problem because of its frequency in South Africa. The concerns regarding violence have been highlighted by other South African authors who mentioned violence a reason for ALS practitioners migrating from South Africa.^{15,18} It is thus surprising that the incidence of assault appears lower than that of international literature. The definitions of workplace abuse (now standardised by the World Health Organisation) and the direct questions related to the form of abuse were not included in the survey, hence scientific accuracy may be a concern. This incidence of violence in the South African EMS needs to be explored in more detail.

Chapter 6: Conclusion

Mostly white males within the private sector aged between 21 – 30 years responded to the survey. The vast majority had between 11 and 15 years of experience and were short course qualified, having either AEA or CCA. Personal safety is a concern for all pre-hospital EMS personnel, with the area of highest concern being that of exposure to violence while at work. EMS experiences assault towards its personnel. Some of these assaults are violent and serious. This incidence of assault is lower than international rates.

Although the incidence of exposure to EMS accidents is higher than their international colleagues, the EMS did not perceive this to be a risk for their safety. Practitioners acknowledge that fatigue and stress affect safety. They do experience support within their work environment, which is in contrast to the literature. There is a strong evidence of a growing knowledge regarding patient safety but there is insufficient evidence to substantiate a true culture of safety in the EMS.

Throughout the text there is evidence of concern for lack of safety within their work environment despite the positive findings in the research and there is evidence that violence has affected the respondents, quoted below:

- *“Five years ago I didn't think I'd ever work with a bullet proof-now I do, every shift.”*
- *“Money seems to take precedence to patient care and safety of crews! Hospitals refusing acceptance of patients, even to stabilise. The patients have to travel further and further to hospitals because no one seems to care!”*

- *“There should be more continuous monitoring of what is done by crews and what is not done, and offences should be followed up and have consequences, not just covered up. More corrective measures. Patients suffer because of lazy crews with bad attitudes.”*
- *“In general, I think there should be more awareness regarding safety in the back of an ambulance while transporting a patient. How equipment, the patient and the paramedic is secured. I also think that a study should be done to determine the link between responding with lights and sirens and accidents. In our province we are doing away with lights and sirens...”*
- *“Work is becoming unsafe and the lack of government funds to supply working and adequate equipment is poor. This poses a great risk with regards to patient care.”*

These perceived effects need to be analysed further to implement changes within the EMS system to encourage and support personnel wellbeing.

6.1 Limitations of the study

The researcher acknowledges the following limitations of the study:

- The convenience sample does not represent all EMS and self-selection bias exists, however there is not another alternative to the sample method employed. Hence caution should be afforded as these results may not be representative of all EMS personnel in South Africa. The survey was distributed to 610 respondents. This equates to a response rate of 26.9%. This survey cannot be considered representative of EMS personnel registered

with the PBEC but only for the respondents to whom this observational survey was distributed to, and should be considered a limitation of the study.

- Validity: Certain questions in the survey are not validated.
- External validity is of concern as there was limited response in comparison to the large register of EMS personnel; respondents not registered with the HPCSA were excluded from the study.
- The researcher is currently employed by a private EMS. This may have affected the response from the private EMS; however the negative or positive effect thereof cannot be determined.
- The self-reported data in the free text questions cannot be independently verified. The risk of recall bias, telescoping and exaggeration is possible.

6.2 Recommendations and further research

- A representative sample for all EMS based on qualification, gender, race, age and employment sector should be obtained.
- It will be valuable to repeat the initial analysis using interviewing techniques to appreciate the cause of certain beliefs.
- A research project on workplace violence and the effect on South African paramedics should be done.
- The researcher should compare and publish the findings of the organisational safety assessment questionnaire to those obtained by Patterson et al.¹⁰⁰

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Annexure A: Questionnaire to participants: The opinion of Emergency Medical Service personnel regarding safety in pre-hospital emergency care practice.

1. Are you male or female

- ☐ Male
- ☐ Female

2. What is your Age?

- ☐ 18-20 years
- ☐ 21-30 years
- ☐ 31-40 years
- ☐ 41-50 years
- ☐ 51-60 years
- ☐ >60 years

3. Race?

- ☐ Black
- ☐ White
- ☐ Coloured
- ☐ Indian
- ☐ Asian
- ☐ Other

4. Marital status

- ☐ Single
- ☐ Married
- ☐ Divorced
- ☐ Separated
- ☐ Widow

5. What is your EMS experience?

- ☐ < 30 days
- ☐ 31 days - 364 days
- ☐ 1 - 5 years
- ☐ 6 - 10 years
- ☐ 11 - 15 years
- ☐ 16 - 20 years
- ☐ 21 - 25 years
- ☐ 26 - 30 years
- ☐ 31 - 35 years
- ☐ 36 - 40 years
- ☐ > 40 years

6. How many years have you been employed at your current employer (that you're completing the survey about)?

- ☐ < 30 days
- ☐ 31 - 364 days
- ☐ 1 - 5 years
- ☐ 6 - 10 years
- ☐ 11 - 15 years
- ☐ 16 - 20 years
- ☐ 21 - 25 years
- ☐ 26 - 30 years
- ☐ > 30 years

7. Which 1 of the following categories best describes your employment status?

- ☐ Working 1-29 hours per week (part time)
- ☐ Working 30 - 40 hours per week (Part time)
- ☐ Employed, working 40 or more hours per week (full time)
- ☐ Employed, working 39 or less hours per week (full time)
- ☐ Not employed, looking for work
- ☐ Not employed, NOT looking for work
- ☐ Retired
- ☐ Disabled, not able to work
- ☐ Voluntary Service

8. Which of the following best describes the site of your current workplace (your current EMS base)?

- ☐ Rural (out of the city) Ambulance
- ☐ Urban (town or city) ground Ambulance
- ☐ Rural and Urban Ambulance
- ☐ Air Ambulance Only (eg AMS, Aerocare, ISOS ect)

9. How many full time staff are employed by the service at the site you're talking about?

- ☐ 1 - 20
- ☐ 21 - 50
- ☐ 51 - 100
- ☐ 101 - 400
- ☐ Don't know

10. On average, how many patients does the site you're working at transport in a month?

- ☐ < 50
- ☐ 51 - 100
- ☐ 101 - 200
- ☐ 201 - 300
- ☐ 301 - 400
- ☐ 401 - 500
- ☐ > 500
- ☐ Don't know

11. What best describes your EMS employer's affiliation

- ☐ Provincial EMS
- ☐ Metropolitan EMS
- ☐ Private EMS
- ☐ Voluntary EMS

12. What percentage of your site's (branch's) patients are Cardiac arrest or life threatening trauma?

- ☐ < 2 %
- ☐ 3 - 10%
- ☐ 11 - 20%
- ☐ > 20%
- ☐ Don't know

13. What is your highest academic qualification

	Mark
Did not complete matriculation	☐
Matriculation certificate	☐
National Diploma	☐
Bachelor degree	☐
Honours degree	☐
Masters degree	☐
PhD	☐

Other (please specify)

14. What is your highest EMS qualification

- ☐ Basic Ambulance Attendant
- ☐ Ambulance Emergency Attendant
- ☐ Critical Care Assistant
- ☐ National Diploma in Emergency Care
- ☐ Bachelor of Technology in Emergency Care
- ☐ Bachelor of Emergency Care

Other (please specify)

15. For each of the phrases below, please fill in your most correct answer

	Disagree Strongly	Disagree Slightly	Neutral	Agree Slightly	Agree Strongly
I like my job	☐	☐	☐	☐	☐
EMS Personnel input is well received by my employer	☐	☐	☐	☐	☐
Medical errors are handled appropriately here	☐	☐	☐	☐	☐
Our employer does a good job of training new employees	☐	☐	☐	☐	☐
Working here is like being part of a big family	☐	☐	☐	☐	☐
Management support my daily efforts	☐	☐	☐	☐	☐
I receive appropriate feedback about my performance	☐	☐	☐	☐	☐
It is difficult to discuss errors here	☐	☐	☐	☐	☐
Staff turnover is high here	☐	☐	☐	☐	☐
This is a good place to work	☐	☐	☐	☐	☐
Management does not knowingly compromise the safety of patients	☐	☐	☐	☐	☐
The amount of staff is sufficient to handle call volume	☐	☐	☐	☐	☐
I am encouraged by my colleagues to report any safety concerns I have	☐	☐	☐	☐	☐
It is easy to learn from the errors of others here	☐	☐	☐	☐	☐
My employer deals constructively with personal problems	☐	☐	☐	☐	☐
It is difficult to speak up if I experience a	☐	☐	☐	☐	☐

problem with patient care

When my workload is excessive, my performance is impaired

I am provided with adequate, timely information about events which might affect my work

Many staff here have other full or part time jobs

I have seen others make errors that have the potential to harm others

I know the proper channels to direct questions regarding patient safety

I am proud to work here

Disagreements are resolved appropriately (ie not who is right, but what is best for the patient)

I am less effective at work when tired

I am more likely to make errors in tense or hostile situations

I have the support I need from other personnel to care for patients

It is easy for the personnel to ask questions when there is something they don't understand

personnel here work in a well coordinated team

I have co-workers who are actively looking for additional full or part time work	☐	☐	☐	☐	☐
Morale here is high	☐	☐	☐	☐	☐
Trainees in my discipline are adequately supervised	☐	☐	☐	☐	☐
I have made errors that had the potential to harm patients	☐	☐	☐	☐	☐
Fatigue impairs my performance during emergency situations	☐	☐	☐	☐	☐
During emergency situations, my performance is not affected by inexperienced or less capable personnel	☐	☐	☐	☐	☐
Personnel frequently disregard rules or guidelines implemented here	☐	☐	☐	☐	☐
A confidential reporting system is helpful for improving patient safety	☐	☐	☐	☐	☐
I may hesitate to use a confidential reporting system because I am worried about being identified	☐	☐	☐	☐	☐
My work provides me with the training to avoid ambulance driving accidents	☐	☐	☐	☐	☐
I have co-workers who are actively looking for other employment	☐	☐	☐	☐	☐
My employer could do more to improve emergency vehicle driver safety	☐	☐	☐	☐	☐

When moving a patient, I have the training to avoid injury to the patient	☐	☐	☐	☐	☐
When moving a patient, I have the right equipment to avoid injury to the patient	☐	☐	☐	☐	☐
All the necessary information for treating patients is routinely available for me	☐	☐	☐	☐	☐
Patient safety is constantly reinforced here	☐	☐	☐	☐	☐
Emergency vehicle accidents occur here	☐	☐	☐	☐	☐
Emergency vehicle near misses occur here	☐	☐	☐	☐	☐
Patient handling mishaps (eg patient fall) occur here	☐	☐	☐	☐	☐
Medical adverse events occur here (eg patient harmed by medical care/ equipment)	☐	☐	☐	☐	☐
Medical near misses occur here.	☐	☐	☐	☐	☐

16. What measures have been instituted in your workplace to make your environment safe?

17. In your opinion, what methods should be added to make your environment safer?

18. Have you ever been assaulted at work by a patient or colleague?

☐ yes

☐ No

Comment

19. Prioritise the following safety threats according to your perceived concern (1 = highest concern; 9 = lowest concern)

Medication event: Wrong dose, interaction	<input type="text"/>
Malfunctioning equipment	<input type="text"/>
Potential dangerous procedures combined with limited space, light, bad weather	<input type="text"/>
Misunderstanding and lack of communication	<input type="text"/>
Contamination and infection	<input type="text"/>
Personal safety: violence	<input type="text"/>
Driving related offences	<input type="text"/>
Staffing/ crew experience and qualification	<input type="text"/>
Fatigue	<input type="text"/>

20. Are there any questions or comments you would like to add regarding safety in prehospital Emergency Care?

Thank you for your participation.

Dr Robyn Holgate

Email address: robynh@polka.co.za

Annexure B: Letter to participants

Hi

My name is Robyn Holgate. I am currently doing my Master of Science in Medicine in Emergency Medicine degree at the University of Witwatersrand, partial fulfilment of which consists of a research report. Ethics approval has been obtained from the Human Research Ethical Committee (Medical) of the Faculty of Health Sciences. The aim of my research is to understand what perceptions you as an EMS practitioner have about your safety and that of the patient in the EMS environment in which you work.

My main objectives are to collect important safety information from EMS personnel by means of an online survey. The results of the questionnaire will determine what EMS personnel perceive as important safety issues and what support structures should be put in place to improve safety. In order to ensure no duplication, please only complete the survey once per person.

You will remain anonymous at all times as it is not possible for me to trace the origin of any participant as SurveyMonkey.com will only provide me with the results and with no information about the participant. Therefore I will not know who you are or who you work for at all. The result of the survey will only be available to me and will be kept on a password-protected computer at all times. Please be so kind as to take 15 minutes to complete this survey for me.

Thank you for your time concerning this matter. I would like to invite you to participate in my research. Please continue to the following internet link to complete the online survey: <http://www.surveymonkey.com/s/3VV6JFM>. By following the link you have volunteered your time and given informed consent to participate in this

research study. Please try to complete the survey during 1 sitting, as a disruption may mean your valued opinion is discarded by SurveyMonkey.com

Regards

Dr Robyn Holgate

Cell: 083 454 1638

Annexure C: Ethical clearance



UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG
Division of the Deputy Registrar (Research)

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
R14/49 Dr Robyn Holgate

CLEARANCE CERTIFICATE

M120230

PROJECT

The Opinion of emergency Medical Services
Personnel Regarding Safety safety in Pre-
hospital Emergency Care Practice

INVESTIGATORS

Dr Robyn Holgate.

DEPARTMENT

Dept of Family Medicine/Emergency Medicine

DATE CONSIDERED

24/02/2012

DECISION OF THE COMMITTEE*

Approved unconditionally

Unless otherwise specified this ethical clearance is valid for 5 years and may be renewed upon application.

DATE 24/02/2012

CHAIRPERSON


(Professor PE Cleaton-Jones)

*Guidelines for written 'informed consent' attached where applicable
cc: Supervisor : Prof Efraim Kramer

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10004, 10th Floor, Senate House, University.

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to a completion of a yearly progress report.**

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES..