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Analysis of glass injuries in a district hospital

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ANALYSIS OF GLASS INJURIES IN A DISTRICT HOSPITAL

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A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, in partial fulfilment for the degree of MSc Med (Emergency Medicine)

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Head of Division of Emergency Medicine

Faculty of Health Sciences

Johannesburg 2015

DECLARATION

I, D.K. Nzaumvila, student number 587737, hereby declare the following:

- This research report submitted in partial fulfilment for the degree of MSc Med (Emergency Medicine) at the University of the Witwatersrand is my own work and no part of it has ever been submitted before for any qualification, certification or publication
- 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 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 work or that I have failed to acknowledge the source of the ideas or words in my writing.
- This research project was conducted in accordance with the approval of the Human Research Ethics Committee (Medical) of the Faculty of Human Sciences at the University of the Witwatersrand (clearance certificate number: ML 211109)

Signed:

Date: 27th of February, 2016

DEDICATION

I dedicate this report to:

My Lord and Saviour Jesus Christ, through whom I can do everything.

My wife, Rose, and my children Eliora and Ethan, for all your love and support.

.

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I would like to sincerely thank my supervisor, Professor E.B. Kramer, Head of Division of Emergency Medicine in the Faculty of Health Sciences, for his excellent care and patience, as well as his invaluable support, feedback and commitment, which motivated me throughout my studies.

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My thanks also go to my wife, Rose and my children, Eliora and Ethan, and I would like to express my deepest regrets for the time we spent apart while I attended classes and worked on this research report.

My thanks also go to the management staff of Embhuleni Hospital, who granted me permission to do this study.

Finally, my thanks go to the patients who, despite their pain, agreed to participate in this study.

ABSTRACT

Background and aim

The Emergency Department (ED) of Embhuleni Hospital is used to see patients with glass-related injuries on a regular basis. This study aimed to compile and analyse data on glass injuries presenting to the ED of Embhuleni Hospital.

Objectives

The objectives of the study were to describe the demographic profile of patients presenting to the ED of Embhuleni Hospital with glass injuries, to determine the type of glass causing these injuries, to describe the characteristics of the injuries resulting from glass, to identify and describe the circumstances associated with different types of glass injuries, and to determine the social impact of glass injuries.

Methods: This study was a prospective descriptive study. From the 1st of February 2013 to the 31st July 2013, the sample size that was used consisted of 104 participants. Descriptive statistics were used to assess the characteristics of the glass injuries.

Results: Five different types of glass were reported as the causes of injuries, namely car glass (7.69 %), glass ampoules (3.85 %), glass bottles (82.69%), glass windows (3.85%) and street glass shards (1.92%). Glass bottle injuries were mainly caused by assaults (90.47 %), and the victims were mostly young males (80.23 %). The assaults occurred on alcohol-licenced premises in 65.11% of the cases. These injuries happened mostly over weekends (83.72 %) between 18:00 hours and 4:00 hours. The face (34.23 %) and the scalp (26.84 %) were the most affected body parts.

Conclusion: Assault was the leading cause of glass injuries, especially on alcohol-licensed premises. Glass injuries generally resulted in minor lacerations with very few complications (2.68%).

Key words: glass injury, district hospital.

LIST OF ABBREVIATIONS

ALP:	Alcohol-Licenced Premises
cm:	Centimetres
ED:	Emergency Department
EMS:	Emergency Medical Services
MVA:	Motor Vehicle Accident
RSA:	Republic of Southern Africa
SAPS:	South African Police Services

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CHAPTER 1: INTRODUCTION

1.1. Background

Glass, even though it is an extremely important material, which is used in the form of glass bottles, cookware, containers, and building or decorative materials, has the potential to be very harmful. Throughout history, it has been associated with danger and is the cause of injuries which result in visits to Emergency Departments (EDs) throughout the world in different frequencies, according to place and type of hospital (1-4). Depending on the type of glass, these injuries can be accidental or non-intentional, such as from glazing, or due to assault or intentional injury, as well as glassing, which refers to alcohol-related violence using a glass bottle (1-3, 5, 6).

1.2. Definitions

1.2.1. Glass

Glass is defined as a hard, brittle, non-crystalline, more or less transparent substance produced by fusion, usually consisting of mutually dissolved silica and silicates that also contain soda and lime (7). There is a large variety of end-products, such as architectural glass in the form of home glass windows and glass doors, and non-architectural glass used for decoration, such as glass tables, or containers such as glass bottles. It is a very useful material but is potentially dangerous when broken, as it is then a sharp object that can cause an injury.

1.2.2. Injury

An injury can be defined as a wound or trauma, harm or hurt, and usually refers to damage inflicted on the body by an external force. There are many different types of injury, depending on the type of object (8). A broken glass can cause mainly laceration or cuts.

1.2.3. District hospital

A district hospital, previously called a level one hospital, is defined as a hospital which receives referrals from and provides generalist support to clinics and community health centres, with health treatment being administered by general health care practitioners or primary health care nurses (9). According to the number of beds, a district hospital can be categorised as small (with no less than 50 beds and no more than 150 beds), medium (more than 150 beds and no more than 300 beds) or large (with no less than 300 beds and no more than 600 beds). It provides in-patient, ambulatory health services, as well as emergency health services (10).

1.3. Motivation for the study

The ED of Embhuleni Hospital sees patients with glass- related injuries on a regular basis. The severity of wounds caused by glass varies a lot, with the majority of patients being discharged the same day from the ED after sutures and dressing. However, others may have a very bad outcome. Numerous cases have been noted, such as the loss of an eye and even death, like the case of a police officer in his thirties who had a gash on his face and ended up with facial paralysis. The wound

was difficult to heal due to the affected salivary gland, which was dripping saliva onto his cheek.

Glass is amongst the most frequently used materials in our society today. It is used to produce many types of instruments and objects which are indispensable to everyday life, such as spectacles, doors, windows, tables, bottles, ampoules, and windscreens. Unfortunately, however, glass is inherently dangerous. Depending on its constitution, glass may be shattered or broken into sharp jagged pieces or shards, and can therefore cause serious harm to people.

1.4. Literature review

1.4.1. Origin and history of glass

Injuries caused by glass of any type are a common reason for consultations in EDs throughout the world (1-3). This is explained by the fact that glass is amongst the most commonly used materials by people today. Its usage has been reported as far back as 12,000 BC, when glass-coated objects were first discovered (10). Glass is a non-crystallised solid material, which is very useful for different applications in various end-product types. It has been reported that it is not a human invention, but rather an adaptation of a natural phenomenon, as shown in Picture 1.1 below (10, 11).

Natural glass is the result of the melting of certain types of rocks due to naturally high temperatures, such as lightening, meteorites or volcanic eruptions, followed by rapid cooling without the formation of crystals The best- known type of glass is

obsidian, a volcanic glass, which was used in the past to manufacture jewellery, knives and weapons such as spears, as illustrated in Picture 1.2 below (11-13).



Picture 1.1: Glass formed by meteorite (14). (Researcher's collection)



Picture 1.2: Variety of tools made from obsidian (15) (Researcher's collection)

Glassmaking was a very costly and labour-intensive process. Some evidence suggests that around the 15th century BC, Egyptians were able to produce different glass products, especially beads, and the production techniques for glass products later spread throughout the Mediterranean. Romans introduced the blowpipe technique around the 1st century BC, as well as other techniques, in order to produce transparent and architectural glass.

Currently, glass production is dedicated to the production of many different types of instruments and objects, which are so indispensable to everyday life, such as spectacles, doors, windows, tables, bottles, ampoules, and windscreens. The worldwide production of float glass is around more than 52 million tonnes, valued at R308 billion per year, and economic analysts and experts are estimating that this market is growing at 4-5 % a year (16).

Unfortunately, even though its usefulness is undeniable, glass is a notoriously hazardous material. It is inherently dangerous when it breaks. When exposed to stress or external physical force, it can break in different ways, fragmenting into small pieces, crumbling into small granular chunks, or splintering into jagged shards, depending on the procedure used for its production, which determines the type of glass (17).

When analysing the literature, two main types of glass injury were identified:

- Non-intentional or accidental glass injury
- Intentional glass injury or glass injury due to assault or self-harm (suicidal and para-suicidal).

1.4.2. Non-intentional or accidental glass injuries

In this group, the following kinds of injuries are included:

- Domestic accidental glass injuries,
- Street shard glass injuries,
- Occupation-related glass injuries (restaurant and bar staff, as well as health workers), and
- Motor vehicle-related glass injuries (motor vehicle accident, pedestrian vehicle accident, motor bike accident).

1.4.2.1. Domestic accidental glass injuries

Glass injuries may unfortunately occur in a safe place such as at home, and this is referred to as a domestic glass injury or home injury. Domestic injuries or home

accidents are a worldwide public health problem. They can be defined as any injury which occurs within the residence and its dependencies (18). In 1086 consecutive injuries caused by glass, home was reported as the first place where glass injuries happened (19). Grieshaber and Stegmann reported that glass and other sharp objects represented almost 48% of penetrating eye injuries among South African children (20). There are many different types of glass found within the household, which are mainly grouped into two categories. The first is architectural glass such as glass windows and doors. The second is non-architectural glass such as cookware (plates, drinking glasses), decorative glass (glass table), and glass bottles.

1.4.2.2. Architectural glass injuries

Glazing has offered many opportunities for the architectural design of houses and buildings using its transparency and thermo-regulation glass properties. Architectural glass, however good, has nevertheless been responsible for serious injuries, mostly associated with the male gender and young ages (5, 6, 21-23). Children's safety with regard to architectural glass has been the subject of debate for years. This major public health problem motivated many architectural regulations mentioned in the literature (24-26). Locally, the South African Glass and Glazing Association is the authority in this field, and is mandated to provide regulations for architectural glazing (27).

Among domestic injuries, architectural glass injuries are so severe that they are presented in the literature as a case report on a single patient, with the focus on a particular field of medicine (28). For example, these types of injuries are discussed as emergencies, such as in the fields of maxillofacial surgery. Gur et al. reported on

13 patients who were treated for facial soft-tissue injuries caused by falling through large, clear glass doors. They strongly recommend the introduction of regulations for reinforcement of architectural glass and prevention from injuries resulting from this type of glass, such as using either tempered glass, laminated glass with decorations or warning stickers, or reducing its transparency (23). Other medical fields are included, such as urology, as reported by Shindel et al. or retained foreign bodies, such as the case reported by Baghai and Sheptak (29, 30). Another case has been more recently reported by Akcakaya et al. (31). Locally, Van Zyl reported a severe bilateral vision loss due to a unilateral eye-penetrating injury (32).

1.4.2.3. Non-architectural domestic glass injuries

Among non-architectural glass injuries, glass tables are the leading cause of domestic glass injuries (33, 34). Most victims are children, like the 174 glass-table injuries reported by Kimia and colleagues. They concluded that glass table injuries are associated with significant morbidity. The use of tempered glass can reduce the rate and severity of such injuries, and even prevent almost half of these injuries. They strongly recommend that parents should refrain from purchasing untampered glass tables, and that legislation mandating the use of tempered glass should be introduced (34).

Although glass doors and windshields are mandated to contain tempered glass, glass tables can still be made of annealed glass, which is dangerous because it breaks into large, jagged shards of glass. The South African Glass and Glazing Association recommends that if the table is made of annealed glass, it should be supported for no less than 50% of its perimeter, and that the support should be in at

least two non-adjacent regions, and not more than 100mm from the edge of the glass (35).

Many domestic injuries caused by glass are mentioned in the literature, and two main types of articles can be identified in this regard. Most of them are case reports, in which the authors are more interested in the outcome of the injury or the lesion caused by the glass, as this relates to their particular field of interest, such as hand surgery, maxillofacial surgery and urology, than in the circumstances surrounding the injury and the type of glass causing the injury. The other types of articles were those focusing on injuries caused by a particular type of glass, such as door glass or a glass table or window, or all indoor glass accidents. It has been clearly demonstrated that glass tables are the leading cause of home glass injuries. Unlike other glass objects found in the home, glass tables, for the most part, are not tempered and can easily shatter into sharp, jagged shards. For this reason, they are considered to be a real hazard, especially for children.

1.4.2.4. Street shard glass injuries

A street shard glass is a piece of broken glass (bottle, window glass, table glass) improperly disposed in a public place such as the street. In some studies, it was the leading cause of glass injuries for children outside the house, since the shard can be copiously disposed of or littered, most often next to alcohol-licenced premises, or accidentally disposed of, such as in a car accident (36). Littered glass is a public health concern, not only because of the untidy, unsightly or polluted environment that is created, but also because it may become a hazard. Recycling glass, reusing or properly disposing of glass (especially glass bottles) has been shown to be

ecologically and economically very cost effective (37-39). Glass bottles or any other type of glass end- product can be continuously recycled, without losing any quality or purity, and less energy is needed, which means that there is less pollution than when making new glass from raw materials. This saves 315kg of CO_2 per tonnes of glass that is recycled, compared to new glass being produced (39). In many countries, the existence of functional and reinforcement legislation, which makes the recycling of glass bottles compulsory, has helped to increase the percentage of recycled glass bottles. For example, Australia has 49%, Brazil has 47%, the United Kingdom has 41%, and the United States of America has 34% (37). Although there is no compulsory legislation for glass bottle recycling, the recycling of bottles has been increasing from just 18% in 2005/6 to 47% at present. In the Republic of South Africa (RSA), the issue of glass bottles is currently a public health problem for municipalities. The recycling of glass bottles is a teaching and education subject in schools, as well as a business or job creation opportunity for many other people, who are collecting bottles to be recycled. In 2012, South Africa saved more than 100,000 tonnes of CO_2 by recycling glass bottles through private initiatives (40).

Although many hazards can result in injuries on the street, broken bottles are the leading cause of injuries that occur outdoors, and these injuries often result in functional impairment or complications. Children are the main victims of street shard glass injuries. In this regard, the feet are the most affected body parts. Preventive measures should consider the reduction of discarded glass objects, improved furniture design, footwear education, glass recycling and improved municipal services (37, 38).



Picture 1.3: Street shards (Researcher's collection)



Picture 1.4: Street shard glass collected for recycling

1.4.3. Occupation-related glass injuries

The amended compensation for occupational injuries and diseases act of the RSA defines an occupation-related injury as a personal injury sustained as a result of an accident arising out of and during the course of an employee's employment, and which leads to the injury, illness or death of the employee (41). Many types of employees are at risk of percutaneous injuries due to glass, such as barmen health workers (42-45).

Glass capillaries and ampoules have been widely used as containers for blood, body fluids and drugs, because glass possesses various properties. For example, it can filter specific light waves, thereby enabling it to contain photosensitive substances. In addition, it can tolerate heat sterilisation due to high his high fusion points without breaking, it is chemically neutral and therefore does not react with its contents, is impermeable, and is easily produced in the form of a series (46).

Although glass ampoules have the necessary qualities for the proper transport and conservation of drugs, they are potentially dangerous if not opened according to an

appropriate technique, which can then increase the incidence of percutaneous injuries. One study reported that glass ampoules represent 26% of needleless-stick and sharp injuries, which can be like any other type of injury and might need microsurgery and extensive rehabilitation, especially when fingers are injured in this way (47). In addition to the perceived pain and unlike other glass injuries, those resulting from glass ampoules occur in a medical environment, where there is a significant risk of contamination by blood- borne pathogens or body fluids or secretions, such as the Human Immunodeficiency Virus (HIV) and hepatitis B and C, from patients to health workers (46, 47). The risk of needleless-stick injuries can be extended to non-health workers such as cleaners, which can occur when broken glass ampoules and vials are not disposed of in an appropriate container. Among the health workers who are more likely to be exposed to glass ampoules injuries are those who are administering treatment to patients, such as paramedics, nurses and doctors, especially anaesthesiologists (48, 49). Smith et al. found in their study that one in three nurses have experienced an injury while opening a glass ampoule, while Pulnitiporn and colleagues found that 54% of accidental injuries to anaesthesia personnel were caused by broken ampoules (47, 48). Parker reported that ampoule cuts occur in approximately 6% of anaesthetic sessions (50). To avoid this risk, some voices have been raised calling for, in addition to an appropriate technique, the mandatory use of gloves, which has been shown to significantly reduce the incidence of percutaneous injuries and contamination in the workplace as a result of obvious or occult blood or body fluids on monitor surfaces or anaesthesia equipment (51, 52). Alternatively, a special device could be used with the ampoules. It is also possible to merely replace the bulb with a plastic container, which fits directly into the syringe, without a needle to aspirate the drug, as shown in Picture 1.5 below.



Picture 1.5: Plastic ampoule fitted to a syringe (researcher' collection).

1.4.4. Other types of accidental glass injuries

Other types of accidental glass injury are found among road traffic accident victims, and are usually caused by the windscreen or windshield of a motor vehicle. These types of glass are designed to break in a predictable way, the first one being made of laminated glass, which, when broken, produces small shards of glass which are kept together. The second one is made of toughened glass, which breaks into granular pieces, and this reduces the hazard that may result during motor vehicle crashes (11, 17).

In a motor vehicle, there are mainly two types of glass end-products, namely windshield and windscreen which is designed to offer maximum security to occupants in case of car crash or motor vehicle accident, as well as to the pedestrian in case of a pedestrian vehicle accident or anyone else if the glass is broken.

The windshield is a "toughened glass" obtained from annealed glass by controlled thermal or chemical treatments, in order to make it stronger and more resistant to external pressure. The annealed glass is heated above the annealing point. The

surface is rapidly cooled while the deeper part is still hot, and this procedure is known as tempering. This allows internal balance and distribution of pressure to be added to the structure of the glass, so that it can break into granular pieces or multiple fragments, which prevent serious injuries. An anti-splinter film can be applied to the glass, so that it does not fall out of its frame when broken (11, 17). Toughened glass is treated to be far more resistant to breakage than simple annealed glass, and in order for it to break in a more predictable way, thus providing a major safety advantage.

The windscreen is a “laminated glass” obtained by the insertion of polymeric material (such as polyvinyl butyral, ethyl vinyl acetate and polyurethane) or cast in place material, which is bonded between the glass layers. The main property of laminated glass is its resistance to projectile penetration and whenever it is broken, shattered glass fragments are kept together by the interlayer, which also has other benefits for the production such as colouring, sound dampening, resistance to fire, and ultraviolet filtering (11). Injuries from these two types of glass have long been recognised to be both common and serious. The size of glass granules, in cases where serious injuries are prevented, are often the cause of litigations for retained foreign bodies (53, 54). Compared to other types of glass, such as a glass bottle, whose fragments are visible on X- rays (2, 55). The granules from car glass are often difficult to see. Their size compromises their visibility on X-rays, even though fragments larger than 0.5 mm are supposed to be radio-opaque as long as they are not projected over bone (55). Many case reports are found in the literature, especially in the fields of ophthalmology, maxillofacial surgery, ear-nose-throat surgery and radiology, in which authors report the unusual or uncommon presentation of injuries, or glass as a

retained foreign body that is missed by conventional radiography (56-58). Many scholars have appealed for a thorough examination and new methods of glass fragment detection (4, 57).

1.4.5. Intentional glass injuries

The second type of glass injuries is intentional glass injuries. In this group, glass injuries are secondary to assault or intentional violence. The World Health Organisation has defined violence as the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community that either results in, or has a high likelihood of resulting in, injury, death, psychological harm, maldevelopment or deprivation (59). The incidence and prevalence of violence varies between countries, and intentional injuries presenting to EDs throughout the world are mainly associated with alcohol (60-62).

In the RSA, violence is very common, to such an extent that it has become a normative and accepted strategy for resolving conflict. This fact has resulted in the country having one of the highest rates of interpersonal violence injury in the world, and this is associated with alcohol in 27 to 47% of all cases (63, 64). It has been demonstrated that there is a correlation between unemployment, consumption of alcohol and violence, in such way that socially disadvantaged communities are prone to interpersonal violence caused and entertained by unemployment and increased alcohol consumption (65-67). Interpersonal violence, recognised as an important public health problem, is the first choice for solving conflicts among many South Africans (63). It can result in any type of injury involving a variety of weapons, including glass bottles. This is mainly in the form of glass bottles used as impulsive

weapons on alcohol-licensed premises, at home or on the street. Numerous studies have shown that bottles are commonly used as a weapon in disputes and assaults. As mentioned above, intentional glass injuries are secondary to violence. The glass bottle was first recognised as a weapon in trauma surgery research in the 1980s in the UK, where it was found that the glass bottle is used in 8 to 10% of assaults, and is the most common weapon on liquor-licensed premises (68, 69-71). The body shape of the bottle has been reported as being easy to use in an assault, where the neck serves as a handle (3, 72). Many authors have demonstrated that it can be used when it is full or empty, without any significant difference, as a solid material that can cause blunt trauma. However, some studies have demonstrated that the glass bottle may be intact before assault, and may not be broken on impact (bottle struck) – if it is broken, the pieces could be used as a cutting weapon (3, 72-74).

Glass bottles are mainly used in assaults involving men, where sharp objects are more frequently used (75). It was explained that its use may be motivated by the opportunity to gain advantage over a serious physical adversary or enemy, and to cause consequent harm (69, 76). Although glass bottles can cause serious injuries, they are rarely fatal, but may need specialist attention, depending on the affected body part. These injuries are mostly located on the scalp and neck, and when they affect other parts of the body, such as the face and hands, they may result in long-term, unsightly facial scars, disabling hand injuries or other physical deformities, together with post-traumatic stress (1, 72, 74-77).

1.5. Aim of the study

The aim of this study was to compile and analyse data on glass injuries presenting to the ED of Embhuleni Hospital.

1.6. Objectives of the study

In order to better understand the phenomenon of glass injuries, the researcher identified the following objectives:

1) To describe the demographic profile of patients presenting to the ED of Embhuleni Hospital for glass injuries.
2) To determine the type of glass causing the injuries presenting to the ED of Embhuleni Hospital.
3) To describe the characteristics of the wounds (length, anatomical localisation, and complications) resulting from glass injuries presenting to the ED of Embhuleni Hospital.
4) To identify and describe the circumstances of different types of glass injuries presenting to the ED of Embhuleni Hospital.
5) To identify the social impact of glass injuries.

CHAPTER 2: METHODS

This was a cross sectional prospective study conducted in the ED of the Embhuleni Hospital from the 1st February to the 31st of July 2013.



Picture 2.1: Embhuleni Hospital (researcher' collection)

2.1. Inclusion criteria

Patients presenting to the ED of Embhuleni Hospital with glass injuries:

- who have consented to participate in the study;
- whose consent has been obtained from a family member or guardian to participate in this study; or
- whose waiver of consent has been obtained to participate in the study.

2.2. Exclusion criteria

Patients presenting to the ED of Embhuleni Hospital with glass injuries:

- who are not under the influence of any recreational drug or alcohol and who have refused to participate in this study.

2.3. Sample

From the 1st of February 2013 to the 31st July 2013, the sample size was 104, according to the abovementioned criteria.

2.4. Variables

The following variables were used in this study:

- Participant details (gender, age, location or address, occupation, highest level of education).
- Escort or persons accompanying the patient to the ED: Emergency Medical Service (EMS) officers, South African Police Services (SAPS) officers, family members, friends, or alone).
- Circumstances of injury (place where the glass injuries occurred, days on which the glass injuries occurred, estimated time at which the injuries occurred).
- Type of glass (car glass, glass ampoule, glass bottle, glass window or street shard glass).
- Type of injury (intentional/ patient going to lay a charge with the SAPS, non-intentional).
- Place of injury (alcohol- licenced premises, home, road (MVA), street, work, others).

- Treatment received (suture in ED, dressing, admission to ward, admission to short- stay ward, transferred, or deceased).
- Number of glass injuries (single injury, multiple injuries).
- Characteristics of injury (site, length, complications).

2.5. Data collection

The data collection for this study started on the 1st of February 2013, after approval to conduct the study was obtained from the Human Research Ethics Committee of the Faculty of Human Sciences at the Witwatersrand University, and from the Chief Executive Office of Embhuleni Hospital. It took six months to complete the data collection process.

Data was collected in the ED of Embhuleni Hospital by the researcher, when available, and by designated and dedicated ED nurses who were not on duty. There were 3 nurses who were voluntarily trained by the researcher during a thirty-minute session, in which he explained the aim and objectives of the study and how to collect the data. The researcher and the 3 nurses had an agreement to pay R20 per participant, even if no consent was obtained. Nurses in the ED were requested to call out one of the trained nurses according to a set roster displayed at the nursing station, in order to collect data whenever a patient presented to the ED with a glass injury during the period of study.

The researcher requested from the matron in charge of the ED and sister in charge of the crisis centre (sexual assault) that disposable paper rulers calibrated in centimetres, unused or left over from the forensic rape kit, were kept in the first

drawer of the desk office of the trauma room situated within the ED. The collection of these calibrated paper rulers started from January 2012. They were used for the measurement of the length of the laceration. The calibrated paper rectilinear was applied at least 1finger away from the lesion. For angulated lacerations, the length was the sum of both parts of the laceration.

Since the paper ruler was not a sterile material, the width and depth of the lacerations were not measured, in order to avoid exposing participants to infections.

2.6. Data analysis

The researcher used Microsoft Excel 2010 ™ software to store the data of the study on an Excel spreadsheet containing the variables of the study. Numeric data such as age of the participants or length of the wound were captured unchanged, whereas non-numerical data such as gender of participants and types of glass were coded into numbers in an alphabetical order, in order to capture them more easily on the Excel spreadsheet.

The researcher also used INSTAT ™ software (version 2005) to calculate means and standard deviations for parametric data, and medians and confidence intervals for non-parametric data.

To describe the demographic profile of the participants, which was the first objective of the study, means and standard deviations were used for the parametric data, while non-parametric data, such as gender and professional qualifications, were expressed in frequencies and percentages.

To describe the wounds from glass injury, means and standard deviations were used to describe the wounds' length as parametric data, and frequencies and percentages were used for non-parametric data such as site of the body and body parts.

To identify factors associated with different types of glass injuries, means and standard deviations were used for parametric data such as estimated time of injuries, while frequencies and percentages were used for non-parametric data such as day and place of injuries.

The results are presented in tables and figures in chapter 3, and then discussed in chapter 4 of this study.

2.7. Ethics

The researcher had requested and obtained the approval to conduct the study from the Chief Executive Officer of Embhuleni Hospital.

Approval to conduct the study was then obtained from the Human Research Ethics committee of the Faculty of Human Sciences at the Witwatersrand University (certificate number ML 211109).

The ethical aspects of the study were a crucial element, as it was observed that many patients presenting to the ED with glass injuries are under the influence of alcohol, and cannot therefore give their valid and informed consent. With regard to those who were unable to give consent for various reasons, the following was done:

- Consent was sought from any family member (in the following order: spouse or partner of the patient or, in the absence of such spouse or partner, a parent, grandparent, adult child, brother or sister of the patient).

- Consent was sought retrospectively from admitted patients.
- A waiver of consent was requested if the patient was discharged. They were given an information note stating that the data that was collected was for a research report and that should they wish to have their data excluded, they were free to contact the researcher in this regard.

A participant information sheet was provided for every participant. Written consent was required from every participant or from the guardian or parents of those younger than 14 years of age.

CHAPTER 3: RESULTS

3.1. Types of glass

Five different types of glass were reported as causes of injuries: eight participants with injuries from car glass, four participants with injuries from glass ampoules, eighty-six patients glass with injuries from glass bottles, four participants with injuries from glass windows and two participants with injuries from street shard glass.

These glass injuries occurred in many different places or locations, such as alcohol - licensed premises, home, road traffic accidents, streets and workplaces. It was noted that workplaces overlapped for some participants who were injured while on duty on alcohol-licenced premises and in road traffic accidents. Glass ampoules were strictly found to be the cause of injuries at work, and street shard glass injuries were strictly limited to the street, whereas car glass injuries were found in road traffic accidents and at the workplace.

Figure 3.1 Type of glass

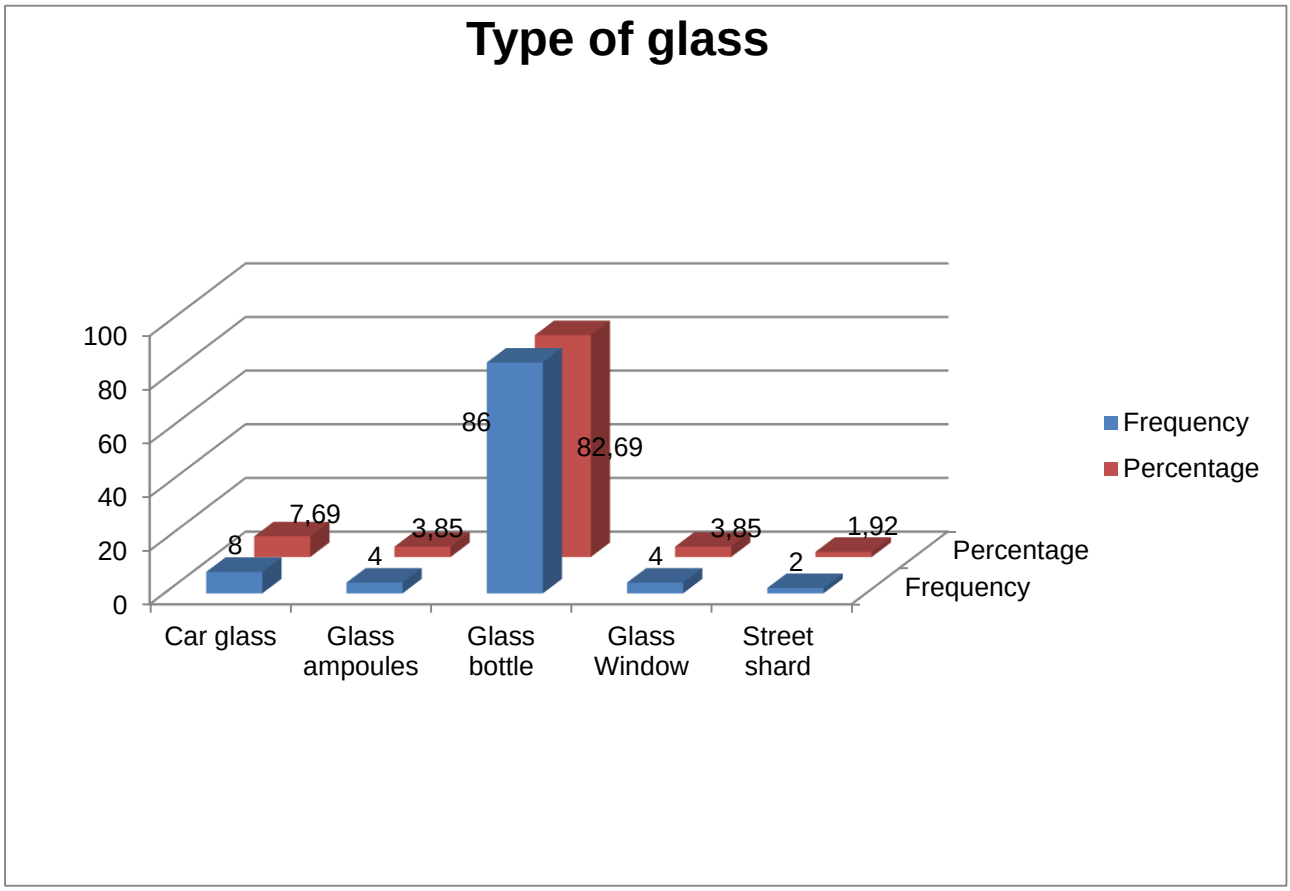
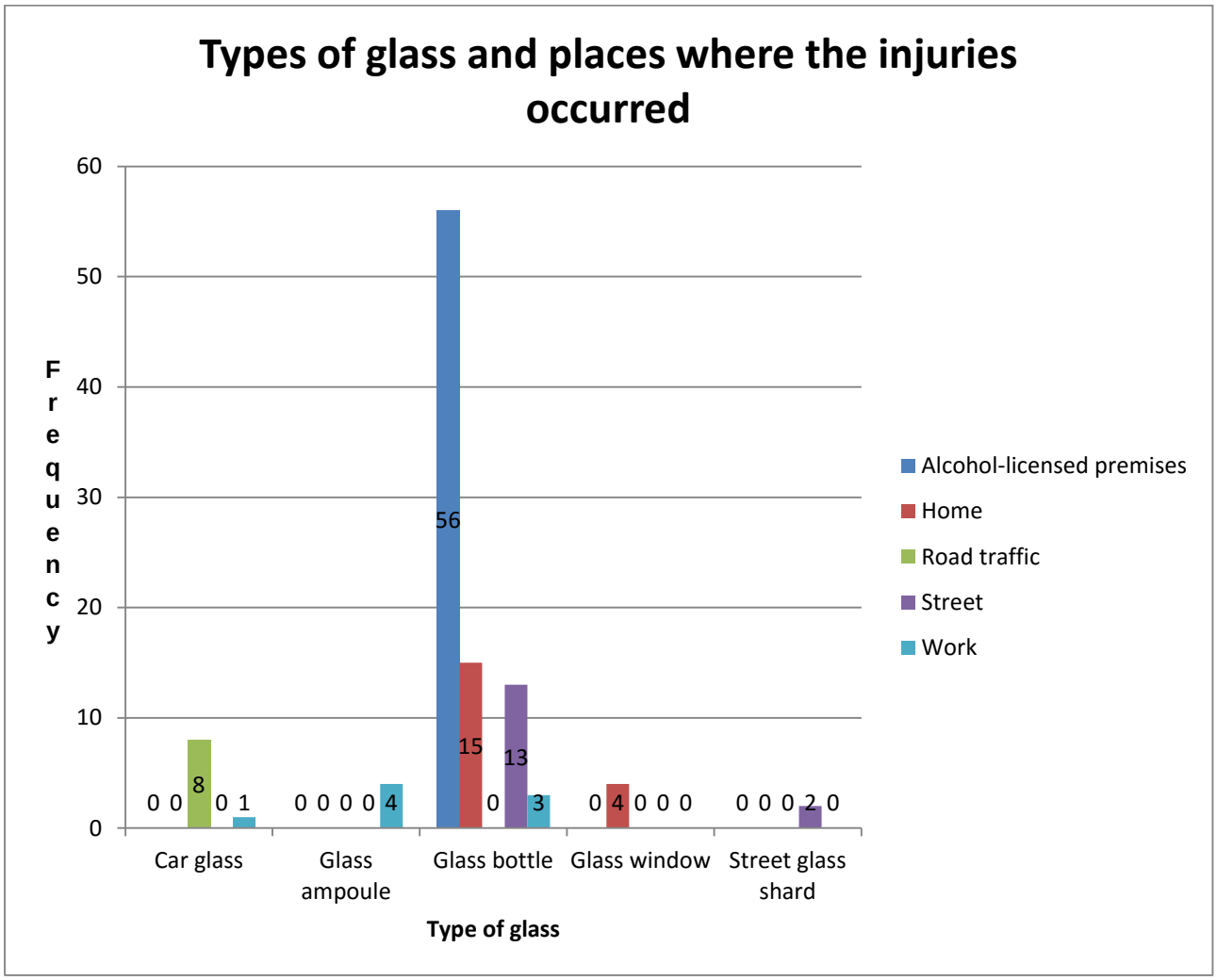


Figure 3.2 Type of glass and places where the injuries occurred

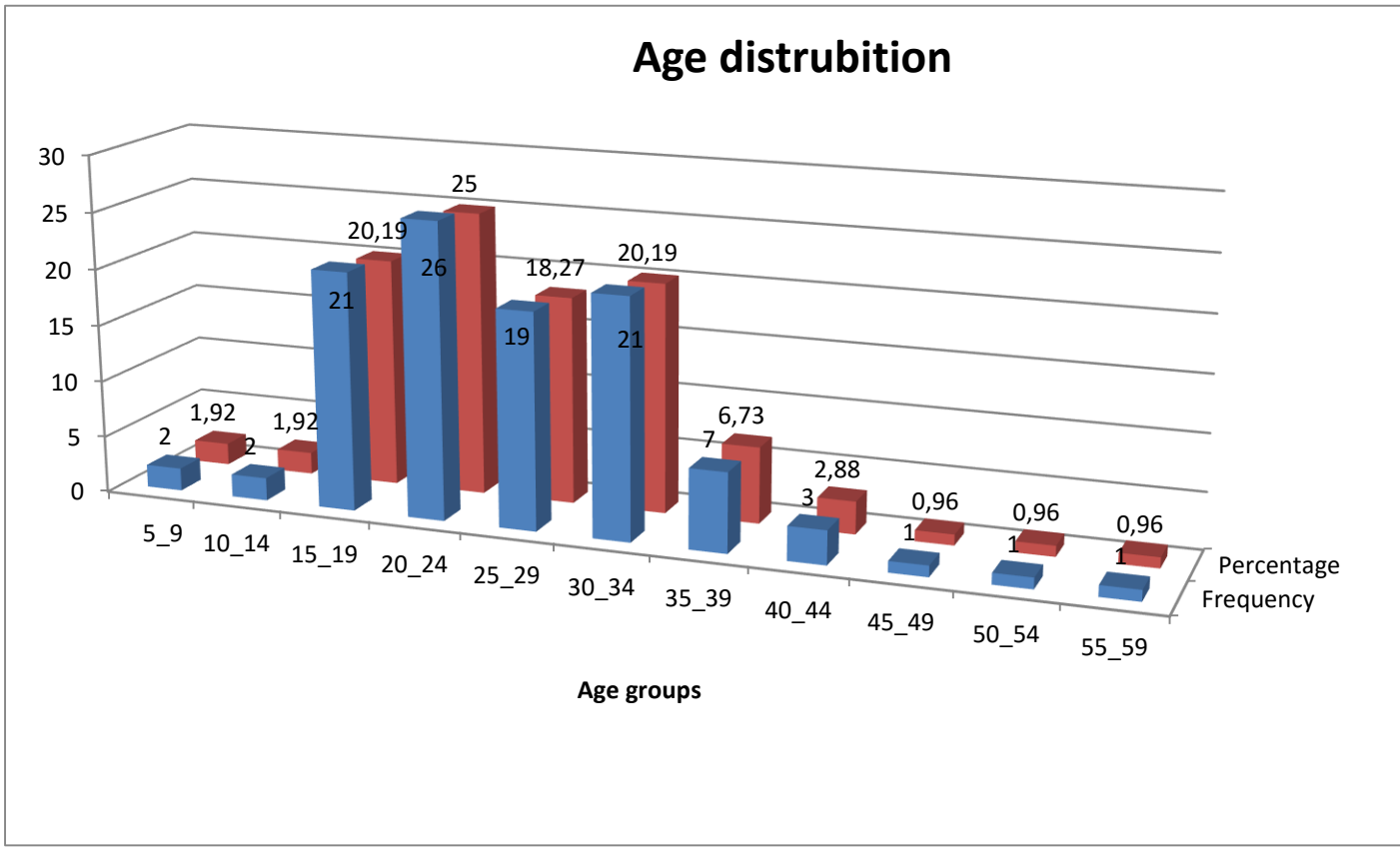


3.2. Demographic profile of participants

3.2.1. Age of participants

The age distribution of the participants in this the study is a Gaussian distribution. The minimum age of participants was 6 years old and the maximum was 57 years old. The mean was 26.038, with a standard deviation of 8.326. The age distribution of participants is presented in Figure 3.3 below.

Figure 3.3 Age distribution



The demographic characteristics of participants (gender, occupation, level of education and age group) are indicated in relation to the five different glass types in Table 3.1 below.

Table 3.1: Demographic characteristics of glass injuries

Characteristics	Car glass (N=8) N (%)	Glass ampoule N(4) N (%)	Glass bottle N(86) N (%)	Glass window N(4) N (%)	Street shards N(2) N (%)	Total N(104) N (%)
Gender						
Female	1(12.5)	4(100)	17(19.77)	0	1(50)	23(22.1)
Male	***7(87.5)***	**0**	***69(80.23)***	***4(100)***	***1(50)***	***81(77.9)***
Occupation						
Employed	***4(50)***	***0***	***29(33.72)***	***2(50)***	***0***	***35(33.65)***
Pupil	2(25)	0	14(16.28)	1(25)	2(100)	19(18.27)
Self employed	2(25)	0	8(9.3)	1(25)	0	11(10.58)
Student	0	4(100)	2(2.32)	0	0	6(5.77)
Unemployed	0	0	33(38.37)	0	0	33(31.73)
Level of education						
No formal education	1(12.5)	0	6(6.98)	0	0	7(6.73)
Primary school	1(12.5)	0	3(3.49)	1(25)	2(100)	7(6.73)
Secondary school	***6(75)***	***0***	***75(87.2)***	***3(75)***	***0***	***84(80.77)***
Tertiary school	0	4(100)	2(2.32)	0	0	6(5.77)
Age groups						
5-9	1(12.5)	0	0	0	1(50)	2(1.92)
10-14	0	0	0	1(25)	1(50)	2(1.92)
15-19	1(12.5)	0	20(23.26)	0	0	21(20.19)
20-24	***0***	***0***	***26(30.23)***	***0***	***0***	***26(25)***
25-29	1(12.5)	2(50)	15(17.44)	1(25)	0	19(18.27)
30-34	3(37.5)	1(25)	16(18.6)	1(25)	0	21(20.19)
35-39	1(12.5)	0	5(5.81)	1(25)	0	7(6.73)
40-44	0	1(25)	2(2.33)	0	0	3(2.88)
45-49	1(12.5)	0	1(1.16)	0	0	1(0.96)
50-54	0	0	0	0	0	1(0.96)
55-59	0	0	1(1.16)	0	0	1(0.96

N: frequency, %: percentage

3.3. Circumstances and factors associated with glass injuries

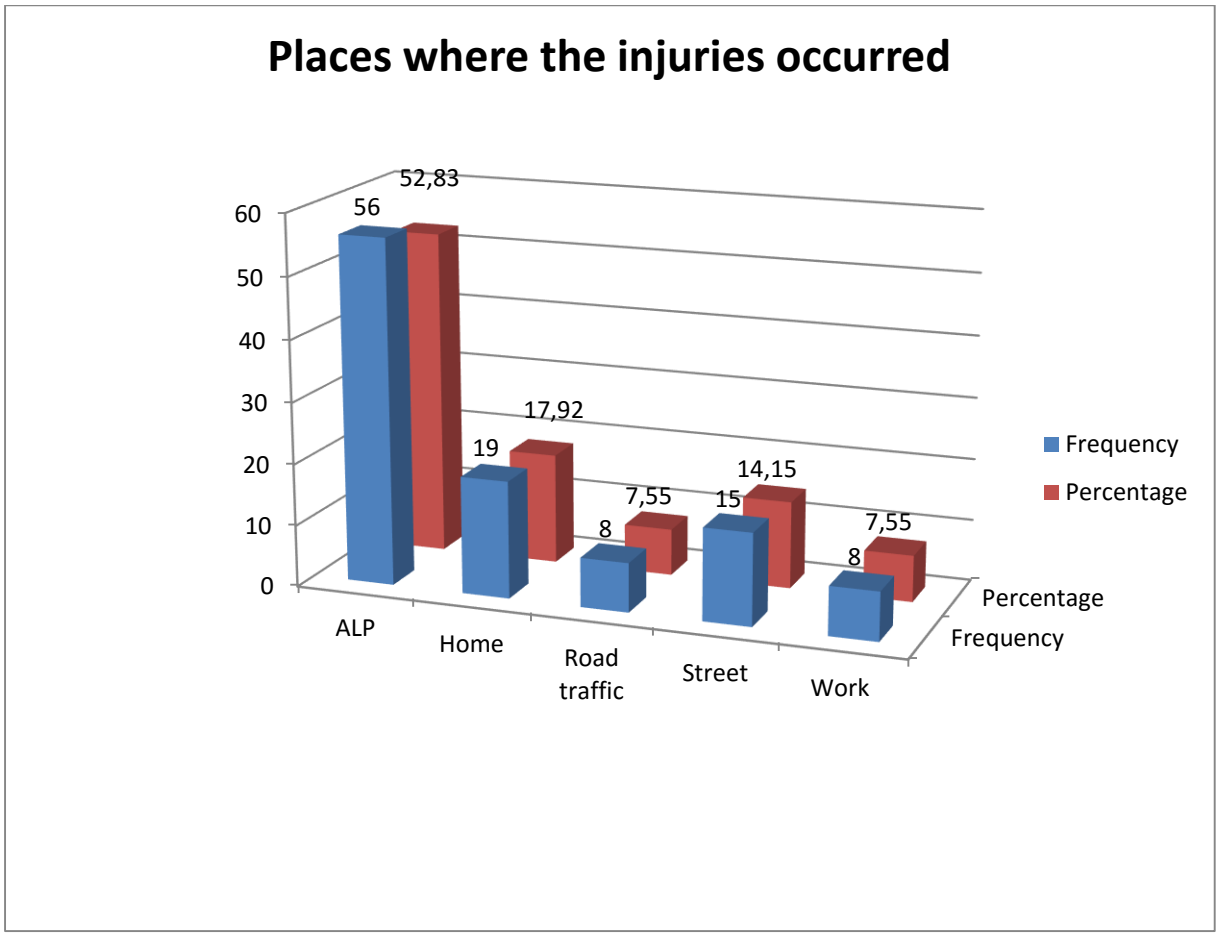
In this study, glass injuries occurred under certain circumstances, namely: the location or place where the injuries occurred, days when the injuries occurred, the

estimated time at which the injuries occurred, types of injuries (intentional and non-intentional), and the person who escorted the victims of glass injuries to the ED.

3.3.1. Places where the injuries occurred

The places where the injuries occurred are shown in Figure 3.4 and Table 3.8 below.

Figure 3.4 Places where the injuries occurred

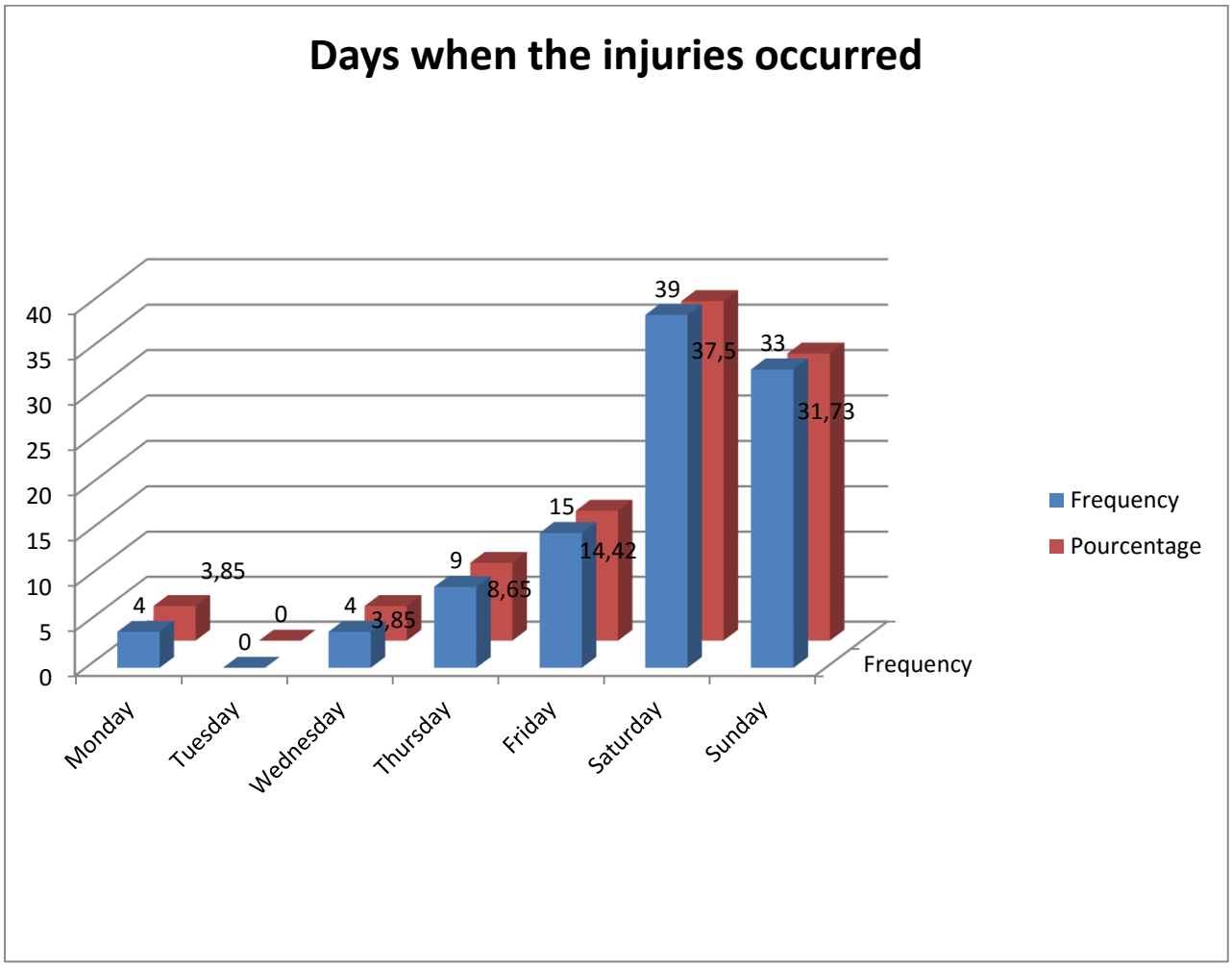


ALP: Alcohol-Licensed Premises

3.3.2. Days when the injuries occurred

The days on which the injuries occurred are presented in Figure 3.5 below.

Figure 3.5: Days when the injuries occurred



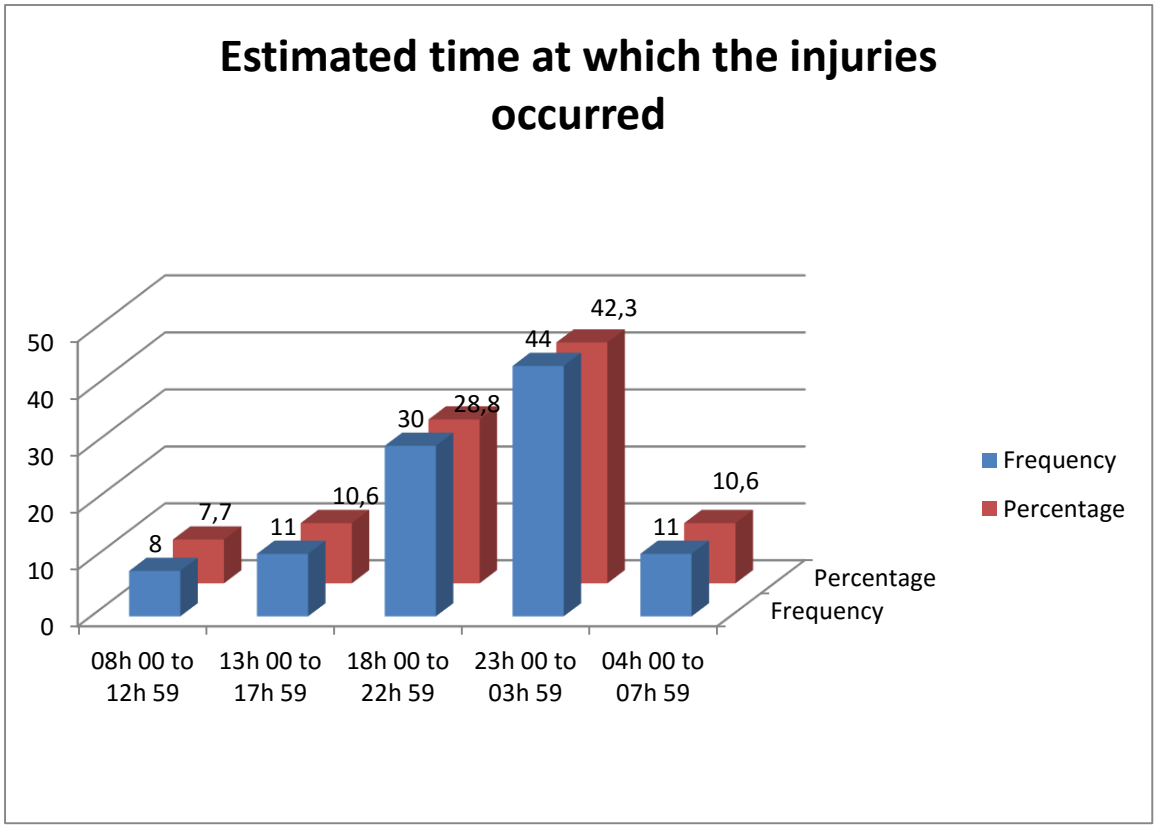
3.3.3. Types of injuries

Intentional glass injuries were found only with glass bottles. Among eighty-six glass bottle injuries, eighty (93%) participants reported that they were assaulted with glass bottles, and fifty-one of them (63.75%) laid charges against the perpetrator with the SAPS.

3.3.4. Estimated time at which the injuries occurred

The estimated times of injuries are presented in Figure 3.6 below.

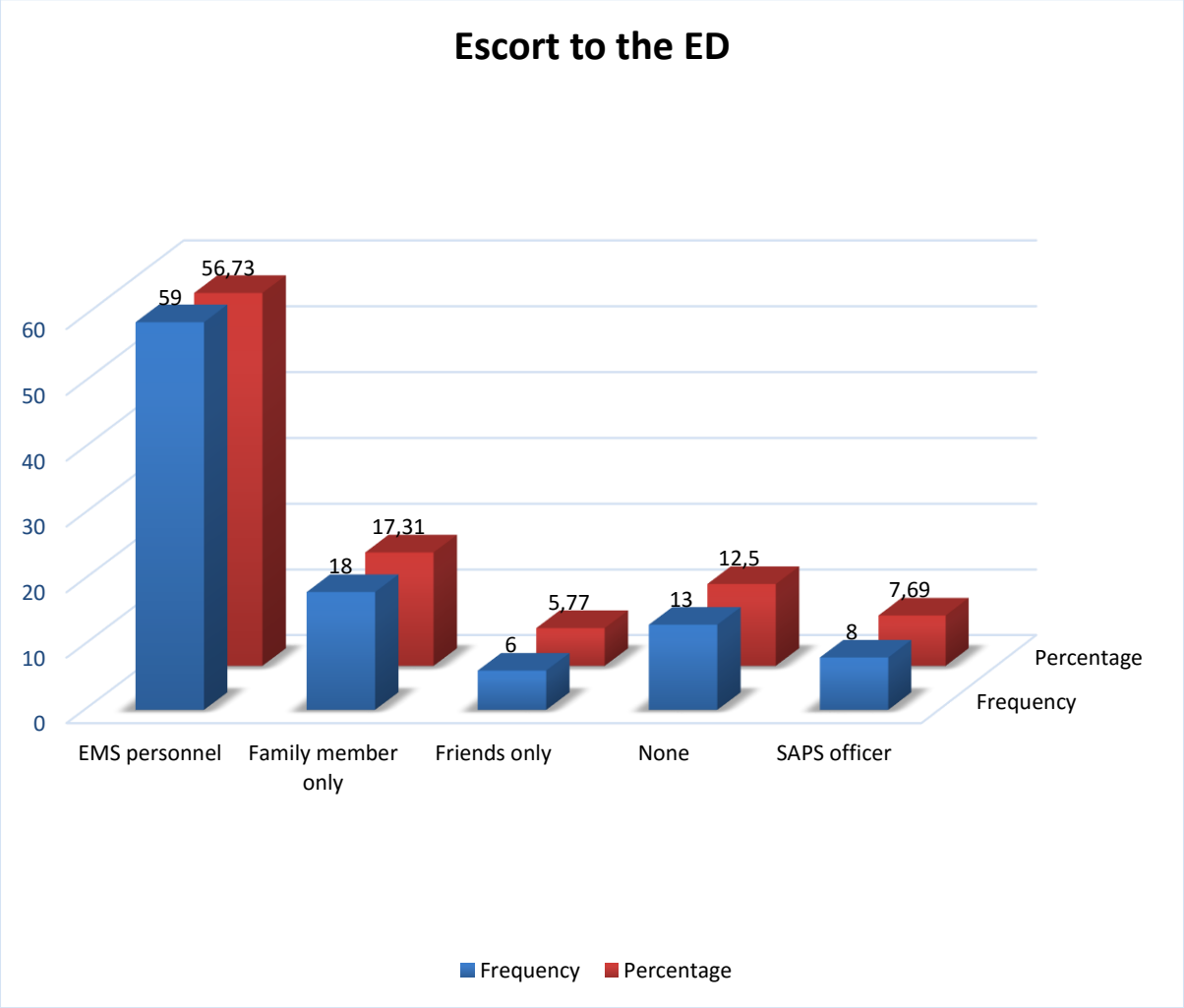
Figure 3.6 Estimated times at which the injuries occurred



3.3.5. Escort to the ED

There were four different types of escorts identified in this study, as illustrated in Figure 3.7 below.

Figure 3.7 Escort to the ED



Overall results on the circumstances of glass injuries are presented in Table 3.2 below.

Table 3.2 Circumstances of glass injuries

Characteristics	Car glass (N=8) N (%)	Glass ampoule N(4) N (%)	Glass bottle N(86) N (%)	Glass window N(4) N (%)	Street shards N(2) N (%)	Total N(104) N (%)
Days						
Monday	0	0	4(4.65)	0	0	4(3.85)
Tuesday	0	0	0	0	0	0
Wednesday	0	0	2(2.33)	1(25)	1(50)	4(3.85)
Thursday	1(12.5)	0	7(8.14)	0	1(50)	9(8.65)
Friday	3(37.5)	0	11(12.79)	1(25)	0	15(14.42)
Saturday	1(12.5)	0	37(43.02)	1(25)	0	39(37.5)
Sunday	3(37.5)	4(100)	25(29.07)	1(25)	0	33(31.73)
Estimated time when the injury happened						
08h00-12h59	0	2(50)	5(5.81)	1(25)	0	8(7.69)
13h00-17h59l	1(12.5)	1(25)	8(9.30)	0	1(50)	11(10.58)
18h00-22h59	3(37.5)	1(25)	22(25.58)	3(75)	1(50)	30(28.85)
23h00-03h59	2(25)	0	42(48.84)	0	0	44(42.31)
04h00-07h59	2(25)	0	9(10.47)	0	0	11(10.58)
Location where the injuries occurred						
ALP	0	0	56(65.12)	0	0	56(52.92)
Home	0	0	15(17.44)	4(100)	0	19(17.92)
Road traffic	8(87.5)	0	0	0	0	8(7.55)
Street	0	0	13(15.12)	0	2(100)	15(14.15)
Work	1(12.5)	4(100)	3(2.32)	0	0	8(7.55)
Escort						
EMS personnel	7(87.5)	0	50(58.14)	0	2(100)	59(56.73)
Family member only	1(12.5)0	0	13(15.12)	4(100)	0	18(17.31)
Friends only	0	0	6(6.98)	0	0	6(5.77)
None	0	4(100)	9(10.46)	0	0	13(12.5)
SAPS officer	0	0	8(9.30)	0	0	8(7.69)

N: frequency, %: percentage.

3.4. Characteristics of glass injuries

3.4.1. Number of glass injuries per participant

The number of injuries per participant is shown in the table below.

Table 3.3 Number of glass injuries per participant

Number of injuries	Car glass	Glass ampoules	Glass bottle	Glass window	Street glass	Total %
Single	4(50)	4(100)	47(54.65)	4(100)	2(100)	61(58.65)
Multiple	4(50)	0	39(45.35)	0	0	43(41.35)
N (%)	**8(7.69)**	**4(3.85)**	**86(82.69)**	**4(3.85)**	**2(1.92)**	**104(100)**

N: frequency, %: percentage.

3.5.2. Length of injuries

The length distribution of glass injuries was of an exponential shape, and the one tailed p value is 0.0002, which is considered to be extremely significant. The minimum length was 0.5 cm and the maximum was 16 cm. There was a mean of 3.67 cm and a standard deviation of 2.468. The length distribution of glass injuries is presented in Table 3.4 below.

Table 3.4 Length distribution of glass injuries

Length (cm)	Number	Percentage (%)
≤5	121	81.21
>5 and ≤ 10	24	16.11
>10 and ≤15	3	2.01
≥15	1	0.67
Total	**149**	**100**

≤: Lesser or equal to

>: Greater than

≥: Greater than or equal to

3.4.3. Body parts injured by glass

Results for the body parts injured by glass are presented in Figure 3.8 below, and those for body parts injured by different types of glass are presented in Table 3.5.

Figure 3.8: Body parts injured by glass

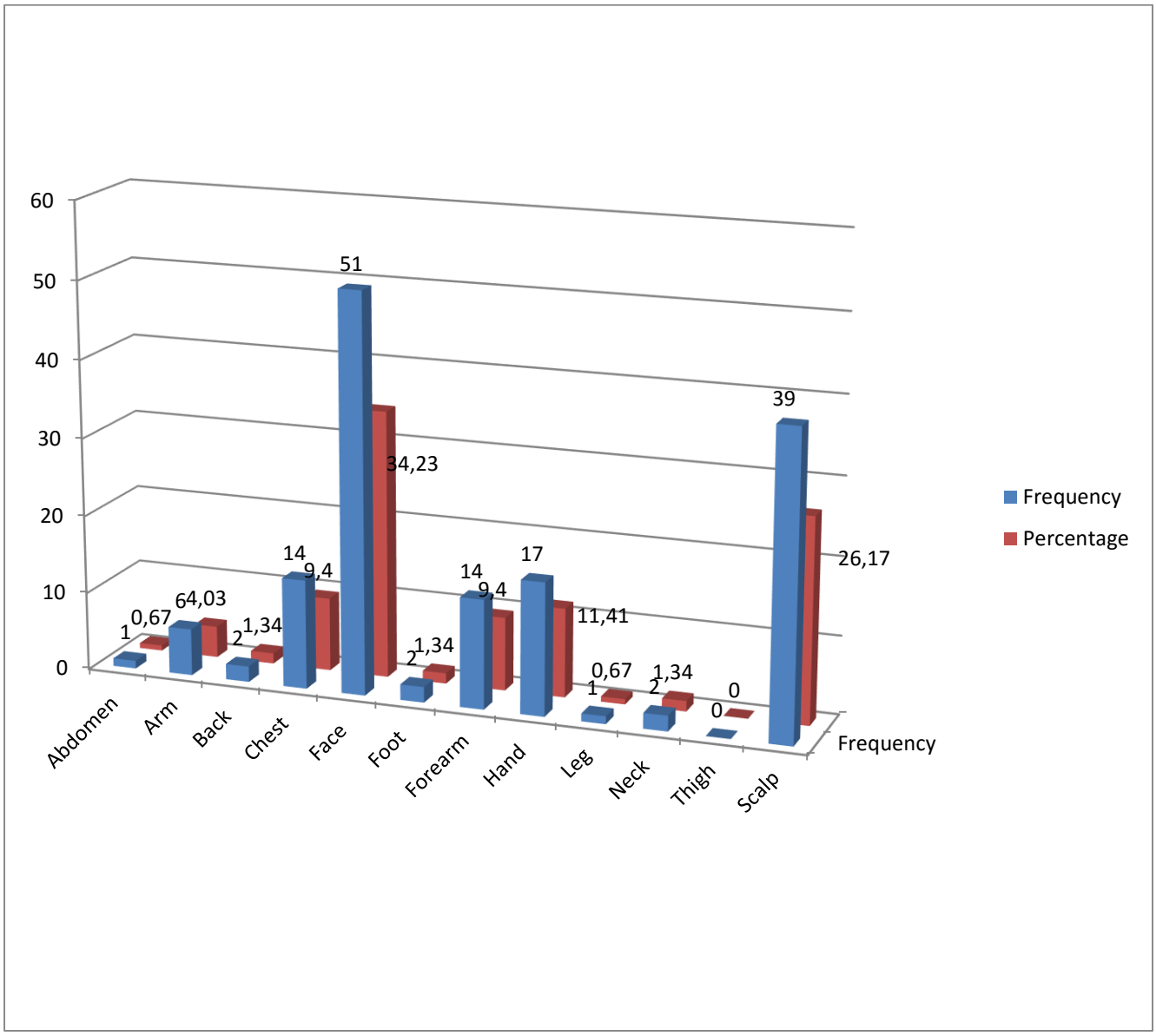


Table 3.5: Body parts injured and types of glass

Body parts	Car glass	Glass ampoules	Glass bottle	Glass windows	Street shards glass	Total (%)
Abdomen	0	0	1(1)	0	0	1(1)
Arm	0	0	6(4.8)	0	0	6(4.03)
Back	2(14.28)	0	0	0	0	2(1.34)
Chest	0	0	14(11.2)	0	0	14(9.39)
Face	***9(64.28)***	***0***	***42(33.6)***	***0***	***0***	***51(34.23)***
Foot	0	0	0	0	2(100)	2(1.34)
Forearm	1(7.14)	0	12(9.6)	1(25)	0	14(9.39)
Hand	0	4(100)	10(8)	3(75)	0	17(11.41)
Leg	0	0	0	0	0	1(0.67)
Neck	0	0	2(1.6)	0	0	2(1.34)
Thigh	0	0	0	0	0	0
Scalp	2(14.28)	0	38(30.4)	0	0	40(26.84)
Total (%)	**14(9)**	**4(3)**	**125(84)**	**4(3)**	**2(1)**	**149**

N: frequency, %: percentage

3.5. Disposition of patients with glass injuries

The disposition of patients with glass injuries is presented in the table below.

Table 3.6: Disposition of patients with glass injuries

Characteristics	**Car glass (N=8) N (%)**	**Glass ampoule N(4) N (%)**	**Glass bottle N(86) N (%)**	**Glass window N(4) N (%)**	**Street shards N(2) N (%)**	**Total N(104) N (%)**
Disposition						
Discharged after treatment in ED	8(100)	3(75)	77(89.53)	***0***	***2(100)***	***94(90.38)***
Admitted in short stay room in ED	0	0	6(6.98)	0	0	6(5.77)
Transferred	0	1(25)	3(3.49)		0	4(3.85)
Complications						
Anxiety disorder	0	1(25)	0	0	0	1(0.96)
Disembowelment	0	0	1(1.16)	0	0	1(0.96)
Eye ball perforation	0	0	1(1.16)	0	0	1(0.96)
Tendon injury	0	0	1(1.16)	0	0	1(0.96)

N: frequency, %: percentage

The minimal cost of a glass injury, as per the International Classification of Diseases code 10 (ICD 10), was estimated to be one thousand two hundred and sixty-seven South African rands and forty-seven cents, as shown in Table 3.7 below.

Table 3.7: Estimated cost of glass injury as per International Classification of Diseases code 10

ICD 10 code	Description	Price in Rand
	New and established patient	
0190	Consultation	228.00
0146	Emergency consultation	108.48
	Procedures	
0300	Stitching of soft tissue injuries	117.50
2222	Injection and materials	19.10
	Materials	
0201	Dressing kit minor procedure	707.94
0201	Syringe and needle 5ml	2.46
	Acute medicine dispensed	
	Tetavax	82.5
	Diclofenac	1.33
	Painamol 500mg 18 tabs	2.62
TOTAL		**1267.47**

3.6. Particularities of different types of glass

3.6.1. Particularities of glass bottle injuries

The figure below shows the age distribution of participants with glass bottle injuries.

Figure 3.9: Age distribution of participants with glass bottle injuries

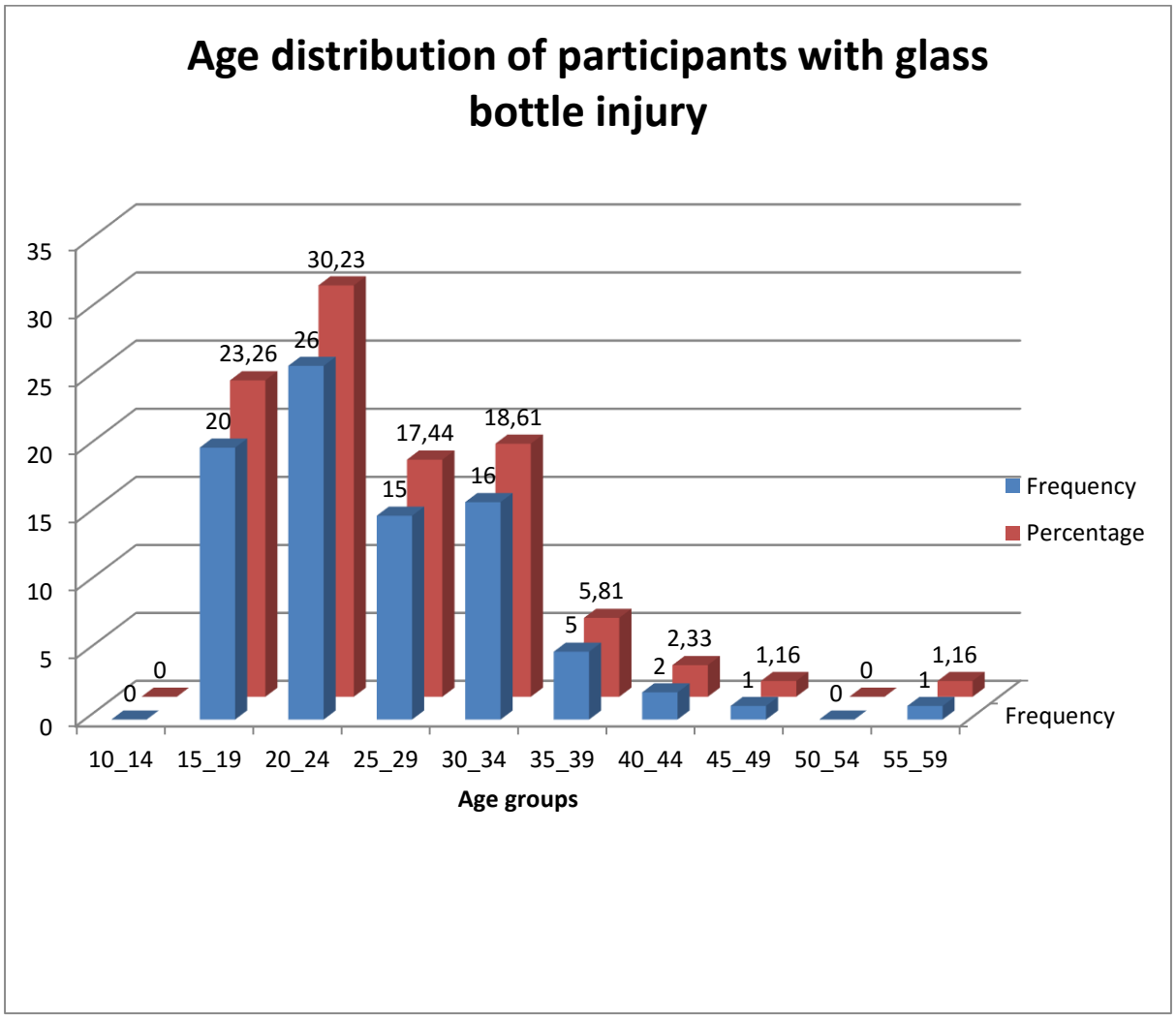


Table 3.8: Demographic characteristics of participants with glass bottle injuries

Characteristics	Frequency	Percentage
Gender		
Female	17	19.77
Male	69	80.23
Occupation		
Employed	29	33.78
Pupil	14	16.28
Self employed	8	9.30
Student	2	2.33
Unemployed	33	38.37
Level of education		
No formal education	6	6.98
Primary school	3	3.49
Secondary school	75	87.21
Tertiary school	2	2.33
Age groups		
5-9	0	0
10-14	0	0
15-19	20	23.26
20-24	26	30.23
25-29	15	17.44
30-34	16	18.61
35-39	5	5.81
40-44	2	2.33
45-49	1	1.16
50-54	0	0
55-59	1	1.16

The glass bottle injuries were intentional in 90.47 %(n=76) of cases, and were single in 54.76 % (N=46) of occurrences.

Out of one hundred and twenty-five, forty-two (33.6%) injuries were situated on the face and thirty-eight (30.4%) on the scalp, which means that the face and the scalp were affected in almost two-thirds of glass bottle injuries.

Table 3.9: Circumstances of glass bottle injuries

Characteristics	Frequency	Percentage
Types on injury		
Intentional	***80***	***93.02***
Non intentional	6	6.98
Places where the injury occurred		
Alcohol-licensed premises	***56***	***65.11***
Home	15	17.44
Street	13	15.12
Work	2	2.33
Days on which injuries occurred		
Monday	4	4.65
Tuesday	0	0
Wednesday	2	2.33
Thursday	7	8.14
Friday	11	12.79
Saturday	***37***	***43.02***
Sunday	25	29.07
Time at which the injuries occurred	5	5.81
08h00-12h59	9	10.47
13h00-17h59	22	23.26
18h00-22h59	***41***	***47.67***
22h00-03h59	9	10.47
04h00-07h00		

3.762. Particularities of car glass injuries

Car glass injuries were found in 7.69 % of the participants in this study, as shown in Figure 3.1. The ages varied from 9 to 50 years old and 87.5% were males. These injuries were reported as being due to MVAs, which happened mostly over weekends (87.5%) between 02:00 and 19:00 hours. The face was affected in 50% of the MVA victims (as indicated in Table 3.5) and the length of the injuries was between 1.5 and 7 cm.

3.6.3. Particularities of glass ampoule injuries

Glass ampoule injuries accounted for 3.85% of injuries, as shown in Figure 3.1. All participants in this category were females ranging in age from 25 to 40 years old. These injuries only happened to students in this study, occurring on Sundays and while they were on duty. The mechanism reported was that it happened when they tried to open the ampoule.

3.6.4. Particularities of glass window injuries

Glass windows also accounted for 3.85 % of injuries, as indicated in Figure 3.1. All victims of glass window injuries were males from 12 to 36 years of age. These injuries were all domestic injuries. The mechanism reported was that it happened when they were fixing, closing, or jumping through the window.

3.6.5. Particularities of street shard glass injuries

Two participants had injuries caused by street shard glass, as indicated in Figure 3.1. The feet were the only affected body parts. The mechanism reported was that they were walking barefoot.

CHAPTER 4: DISCUSSION

The discussion will be presented according to the study's objectives.

4.1. Demographic profile of participants

4.1.1. Gender

This study showed that a large percentage (77.9%) of participants were males, and this applied to all types of glass, as shown in Table 3.1. This finding is consistent with other international studies, which found that more males are injured than females, and this has been consistent over time. In 1982, a prospective study of 1086 consecutive injuries caused by glass found a 7:3 male to female ratio, and a 2013 study reported 72% of males in their study (1, 19). Laing et al. attributed the large proportion of males with glass bottle injuries directly to the consumption of alcohol by young men, to the extent that they exhibited greater risk-taking behaviour (1). This finding is similar to previous studies, which clearly established the relationship between the consumption of alcohol by males and violence using glass bottles on ALP(68, 70). In this study, even though the relationship between the consumption of alcohol and violence with glass bottles causing glass bottle injuries was neither established nor excluded, due to the fact that these injuries occurred on alcohol-licenced premises, as indicated in Figure 3.2 (types of glass and places where the injuries occurred), Figure 3.4 (places where the injuries occurred) and Table 3.2 (circumstances of glass injuries), it can be surmised that there could have been a correlation between alcohol consumption and glass bottle injuries.

The proportion of males was elevated for the four different glass types, except for glass ampoules. The latter type of injury was only found in females and students' nurses, which is similar to the finding made by Smith, who found needlestick and sharp object injuries among nursing students (47). This has to do with the fact that the nursing profession is to a large extent dominated by females.

4.1.2. Age

The overall results showed that the minimum age of participants was 6 years old and the maximum was 57. The standard deviation was 8.326 and the mean was 26.03, with the p value < 0.1. Table 3.1 indicated that more than 80 % of the participants were between 15 and 34 years of age. The highest percentage was 25 % (N=26) in the age group of 20 to 24 years, followed by the age groups of 15 to 19 and 30 to34, each of which accounted for 20.2 % (N=21). The age group of 25 to 29 years represented 18.3 % (N=19). Although glass injuries can affect any age group, some age groups are more prone to certain types of glass injuries, especially those inflicted by injuries from glass bottles and street shard glass. The discussion on age will therefore be more meaningful when considering the type of glass involved.

Glass bottles were the cause of the majority of glass injuries (82.69%), as shown in Table 3.1. The minimum age was 16 years and the maximum was 57, with a mean of 25.81, standard deviation of 7.524 and p value of 0.0426. Table 3.7 and Figure 3.9 indicated that 30.23% of participants with glass bottle injuries were between 20 and 24 years of age, which is consistent with the findings in the literature (1). Youth violence, particularly among males, is exceptionally high in South Africa (63). In this

study, intentional injuries were only found to be associated with glass bottles in 93.02% (N=80) of the participants, as indicated in Table 3.8.

Another fact that needs to be highlighted is that minors were among those injured on ALP (3.57%). Speculations can be made regarding the reasons for their presence in these types of facilities, in an attempt to support or refute their possible consumption of alcohol, but this study did not measure this. However, the RSA legislation is very clear on this matter, as the law prohibits the serving of alcohol to anyone under the age of 18, or for a registered employer to employ any person who has not yet reached the age of 16 in any position involving the manufacture or distribution of liquor or methylated spirits, unless the employee is undergoing training or apprenticeship (75). If they are allowed to be there, then the temptation to consume alcohol will obviously be great.

Street shard glass injuries (2%) were only found in children in this study, even though the percentage of these injuries is low. This is consistent with previous studies in which scholars focused on glass injuries in children only, and this could explain their higher percentage in these studies (25, 28, 36, 37). This type of injury is associated with bare feet. Shard glass is by its very nature a waste management problem, as it is harmful to the environment and can easily be prevented. Unlike some countries, South Africa does not have any compulsory legislation for glass bottle recycling, even though its recycling percentage has been increasing to reach that of developed countries, as well as providing work opportunities for people who can collect broken glass, especially at alcohol-licensed premises (38-40). Other types of glass injuries in children, as described by Kimia et al., were not found in this study, probably due to the rural location of the study population (34).

4.1.3. Level of education

The level of education of the participants in this study is illustrated in Table 3.1 of the results. Eighty-four participants (80.77%) had a secondary school level of education, either having completed secondary school, busy with it, or having dropping out of school at secondary school level. This has to do with the young age of the study sample, as it was noted that almost half of the participants (47.16%) are between 12 and 24 years of age.

4.1.4. Occupation

Occupational glass injuries accounted for 7.55 % of the injuries in this study. The frequency varied significantly according to different types of glass. Occupational injuries were found in 2.32 % of glass bottle injuries, 12.5 % of car glass injuries, and 100% of glass ampoule injuries.

A glass ampoule is used as a container because of its many chemical and physical proprieties, but can unfortunately cause injuries to health workers. This was the case with four student nurses in this study, and glass ampoules were the only cause of occupational glass injuries (4% n=4). It is known that needle-prick injuries are common in and around hospitals (44, 46, 47). The percentage in this study does not accurately reflect the reality of glass ampoule-related injuries at Embhuleni Hospital, for many reasons, one of which is that many health workers, especially nurses, are used to such minor injuries and know how to treat them without any further medical consultation. Although information about this study was given to health workers in the hospital and clinics, health workers were reluctant to participate in this study. Like nurses from the ED, most of them argued that they might be blamed for not

using the correct method for opening glass ampoules and it would involve a lengthy and tedious administrative procedure to be followed through the occupational health office. These under-reported injuries were also highlighted by Milner, who found that up to 70% of health workers failed to report such injuries for various reasons, such as the following: they occurred in sterile areas, there was little or no perception of risk, the employee felt overwhelmed, and there would be no follow-ups (49).

The four participants with glass ampoule injuries were female student nurses, with the injuries involving their fingers and occurring while on duty. They also reported that it was the first time that they had a glass ampoule injury, and they were probably therefore different to their senior colleagues and mentors, who do not report glass ampoule injuries. The findings of this study on glass ampoule injuries among students concurred with those of Smith et al. (47).

It was found that 2.32 % of glass bottle injuries were occupational glass injuries, whereby a security officer deployed on a liquor-licensed premise was assaulted while on duty, and a shop owner was assaulted during a robbery in his shop. The uniqueness of these two participants is that compared to other types of occupational glass injuries, such as those resulting from architectural glass (glass windows) or work material (bar glass for bar men and glass ampoules for health workers), as found in the literature (5, 6, 22). They were victims of an assault at their workplace with a glass bottle, which is a potentially dangerous weapon, whether broken or intact, given the advantage to the aggressor of using the neck as a handle (3, 72-74). In this study, intentional injuries were only caused by glass bottles and accounted for 93.02 % of injuries associated with this type of glass. In other words, these injuries were inflicted during an assault.

4.2. Types of glass

Five different types of glass were reported as causes of injuries, as shown in Figure 3.1. Glass bottles represented 82.69%, followed by car glass (7.69%). Glass ampoules represented 3.85% of injuries, as well as glass windows. Street shard glass accounted for 1.92% of injuries. Glass bottles were by far the main cause of glass injuries in this study. The other four types of glass represented less than 10 percent each, whereas glass bottles were over 80%. When considering the overall results, this finding is in keeping with what was found in the literature. Laing et al. found that the most common glass object was the glass bottle (75%) (1). When considering the places where the injuries occurred, many differences with other studies were found. Except for workplaces, where the glass bottle represented 37.5% of glass injuries, the large percentage for glass bottles in this study was almost the same (the highest) in the different places where the injuries occurred, from 78.95% at home to 86.67% on the streets and 100% on alcohol-licenced premises, as shown in Figure 3.2. This last finding clearly differed from other studies, because even though the glass bottle remained the leading cause of injuries, the percentage had significantly changed from 75% in general to 45% on alcohol-licensed premises, where other types of glass, such as drinking glasses, accounted for 44% of glass injuries (1). This should be understood in the context of the study setting. The first factor has to do with the local habits and customs on alcohol-licensed premises, where beer is not served in a drinking glass but in a glass bottle, unlike in other places (70). The second factor is that this study was conducted in a rural area, where some glass objects are considered to be luxuries (such as glass doors, glass tables) that the majority of the community members cannot afford.

4.3. Characteristic of injuries from glass

In this study, one hundred and forty-nine injuries due to glass were examined among one hundred and four participants. To describe these lesions, the author analysed the number of injuries per participant (single or multiple), length of injuries, body parts affected and the disposition of patients.

4.3.1 Number of injuries per participant

Table 3.3 showed that 58.65% of the participants (N=61) had a single glass injury. Multiple injuries were only associated with car glass, with a high percentage of multiples injuries (50%), and glass bottles (45.35%), compared to the other glass types, which only produced single injuries. This can be explained by the mechanism of injury resulting from a glass bottle. The glass bottle is mainly associated with assault, where the glass is held by the neck and breaks on impact, causing multiple lacerations (1, 2, 3 67-69). With regard to car glass, the explanation is based on its physical and chemical composition. There are two types of car glass: the windshield, which is made of toughened glass and breaks into granular pieces or multiple fragments and the windscreen, which is made of laminated glass, whose main property is the resistance to projectile penetration, and whenever it is broken, shattered glass fragments are kept together by the interlayer. Both types reduce the danger from glass in the case of car accidents (11, 17). These multiples fragments can cause multiple lesions, which are minor unless they affect the eyes or, due to their small size, become retained as foreign bodies.

4.3.2. Length of injuries

As a sharp object, glass can cause cuts and lacerations. In this study, the minimum length was 0.5 cm and the maximum was 16 cm, with a mean of 3.67 cm (p value <0.0002), and the large majority being less than 5cm (81% n=121), as shown in Table 3.6. The length of glass injuries varies a lot, as with any sharp instrument, depending on the edges, jagged pieces or shards of broken glass. The length of the glass injuries was not expressed as a variable in most of the studies, except in case studies of a particular patient. They tend to be small and superficial, as was also found in other studies, and it was noted that they were talking about the severity of the injury, not the length (1, 4, 60).

4.3.3 Body parts injured

Glass injuries can affect any anatomical body part. In this study, the wrist was not specifically individualised, neither were the fingers exposed to glass ampoule injuries. Depending on the type of glass, certain body parts are likely to be affected by particular types of glass. The results indicate that one hundred and forty-nine glass injuries from one hundred and forty-nine participants were located on different body parts. The face and the scalp represented 61.07% of the whole sample (face 34.23% and scalp 26.84%).

4.3.4. Body parts injured by car glass

In a motor vehicle, there are two main types of glass end-products, namely the windshield and windscreen, which are designed to offer maximum security to occupants in the case of a car crash or motor vehicle accident, as well as to the

pedestrian in the case of a pedestrian vehicle accident, or to anyone else if the glass is broken.

The windshield is a toughened glass, whereas the windscreen is a laminated glass. Injuries from these two types of glass have long been recognised as being both common and serious. On the one hand, they mostly cause penetrating neck wounds compromising the integrity of important vessels, nerves and organs in the neck and face (56, 58). On the other hand, due to their small size, they can be retained as foreign bodies. Unfortunately, however, these fragments are difficult to see on X-rays, even though fragments larger than 0.5 mm are supposed to be radio-opaque, as long as they are not projected over bone (55). This difficulty can be avoided by a thorough examination and new methods of identifying glass fragments (4, 55).

In this study, windscreens and windshields caused 9 % of glass injuries (N=14). All participants in this category were victims of MVAs, and the face was the most affected body part (64% N=9). This supports the existing literature, in which one can find many case reports written by maxillofacial scholars (56-58). However, this study differs from other studies, in which car glass caused mostly hand injuries (53). The difference between this study and Tuncer's study is due to the fact that the latter did a retrospective study on retained foreign bodies from glass injuries on a localised anatomical area, the hand, and then compared car glass to other types of glass (53).

4.3.5. Body parts injured by glass ampoules

The physical and chemical characteristics of glass ampoules and its easy production have resulted in them being widely used containers for drugs and other sterile substances (46). An appropriate technique must be used when opening glass

ampoules or literally breaking them in order to get access to the products inside. This manipulation exposes the hands to injuries or percutaneous lesions, which increase the biological risk of contamination with patients' body fluids or contaminated instruments. Glass ampoule injuries accounted for 4% of glass injuries, among which were occupational injuries which affected the hands, as was also found in the literature (47).

4.3.5 Body parts injured by glass bottles

A glass bottle is a dangerous weapon used in interpersonal violence. It can be used when broken or can be thrown, breaking on impact (1-3, 71-74). The head is affected in most cases of intentional injuries. In this study, it was found that glass bottles caused 84 % of injuries and affected virtually every body part. The head was affected in 61.07 % of glass bottle injuries (the face accounted for 34.23 % and the scalp 26.84 %). Other body parts, such as the hand and forearm, were also affected, but to a lesser degree than the head and face. The hand and forearm are not targeted by the perpetrator, but are used by the victim as a defence mechanism to protect the face, and they accounted for 9.39% and 11.41% of glass bottle injuries respectively. This finding is not significantly different from the overall findings in the literature regarding the body parts affected by glass bottle injuries, as reported by Magnis et al. and Laing et al. (1, 77).

4.3.6. Body parts injured by glass windows

Architectural glass, such as glass doors and glass windows, have been the cause of injuries for many years, to such an extent that regulations have been put in place in

terms of their quality, in order to provide adequate safety for consumers. With regard to the body parts affected, it was shown that glass windows mostly cause serious injuries to deep structures in the upper limbs, as reported by Armstrong and Molyneux and Shindel et al. (29, 30). Among architectural glass, glass windows are the leading cause of hand injuries (5, 6, 42). They are the only type of architectural glass which affected participants in this study. Of 4 % of participants with this type of injury, 75 % and 25 % were injured on the hand and forearm respectively. Of note, the wrist was not individualised in this study. These findings are in line with those in the literature (29, 30).

4.3.7. Body parts injured by street shard glass

A street shard glass is a piece of broken glass (bottle, window glass, table glass) that has been improperly disposed of (28). In this study, the foot was the only body part affected by street shard glass. However, it was found that 49 % of injuries from street shard glass affected the lower limbs, without specifying the foot (35). Other studies, such as the one conducted by Al-Khatib and Makary, also found that more than one body part could be affected by street shards (36, 37). Furthermore, another study conducted by Barker, which examined all the hazards created due to littering, including street shard glass, found that it was the cause of injury to many body parts, without any particular emphasis on one body part over the others. The finding of this study is inconsistent with other findings on street shard glass. The low number of participants with injuries caused by this type of glass, as shown in Table 3.1, played a major role in the findings of this study in comparison to other studies, which were conducted with a larger number of participants and e over longer periods of time than this study (25, 28, 36, 37).

4.4. Disposition of patients with glass injuries

Glass, as a sharp object, may be the cause of lacerations to any body part, and the injury can be complicated by lesions of noble and vital anatomical structures. As shown in Table 3.6, the large majority of participants were discharged after treatment from the ED (90.38%), while others were discharged after admission to the ward (5.77%), and only 4 were transferred for further management of acute complications. Out of the 149 glass injuries, complications were seen in 2.68%, as indicated in Table 3.6: one tendon injury to the hand, one eye injury, one disembowelment (all 3 due to glass bottles), and one psychological complication. In this study, the latter was in the form of anxiety after a glass ampoule injury to a student nurse, due to fear of possible contamination with the patient's body fluids.

The low rate of complications (2.68%) can be explained by the fact that only acute complications diagnosed at the time of consultation were considered in this study. In addition, the type and time period of the study did not allow for a large sample to be used, unlike in retrospective studies covering a period of more than a year. Although there were only a few complications, all four required a transfer for specialised medical care, which means that although glass injuries are mostly minor injuries, as found by many other scholars, complications may nevertheless occur and even be disastrous (28, 32, 42).

4.5. Circumstances of glass injuries

Circumstances such as the time and place, mechanism of injury and manner of seeking medical attention after glass injuries are discussed below.

4.5.1. Place where glass injuries occurred

Five different places were reported (alcohol-licensed premises, home, road traffic, streets and workplaces). There were two overlaps: one security officer was accidently injured on ALP while on duty, and one driver was involved in a car accident while on duty. Figure 3.2 and Figure 3.4 illustrate the types of glass and places where the injuries occurred, which were discussed in section 4.2.

4.5.2. Days on which injuries occurred

This study did not assess dates in terms of calendar days as from the first to the last day of each month, and public and school holidays were not mentioned. The overall results, as noted in Figure 3.5, showed a trend of an increase in glass injuries throughout the week, with 84% occurring between Fridays and Sundays, and the peak of 37.5% occurring on Saturdays. Table 3.2 provides further details regarding the different types of glass. This is more meaningful for two particular types of glass, namely glass ampoules and glass bottles.

Glass ampoule injuries happened exclusively on Sundays. There were a few of the participants with this type of injury (N=4), and this does not warrant an in-depth discussion. Table 3.8 indicates the circumstances of glass bottle injuries, and clearly showed a tendency towards more glass bottle injuries through the week, to the extent that nearly half of the glass bottle injuries (43.02%) happened on Saturdays, and 88.4% were due to assault. The trend in terms of days on which glass bottle injuries occurred is the same as the alcohol consumption in South Africa during the week (71). It was reported by Parry et al. that alcohol consumption among the youth is the cause of increasing concern in South Africa as a major contributor to crime,

violence and intentional and unintentional injuries, as well as other social, health and economic problems. This could explain why so many glass bottle injuries occur during the weekend and are associated with violence.

4.5.3. Estimated time at which injuries happened

The overall results, as shown in Figure 3.6, indicated a trend towards the occurrence of glass injuries from 18:00 hours onwards, with a peak between 23:00 hours and 4 hours, which means that more than 70% of glass injuries occurred between 18:00 hours and 04:00 hours of the next day. This is more meaningful when considering glass bottles injuries, which accounted for 82.69% of the study sample. 81.4% occurred between 18h00 and 07h59 of the next day, with almost half of glass injuries (47.67%) occurring between 22h59 and 03h59. This finding is consistent with other international and local studies, which focused on alcohol-related injuries presenting to the ED (1, 60-62, 71).

4.5.4. Types of glass injuries

Intentional glass injuries were found only with glass bottles and represented 93.02% of participants. This is not surprising, as it was reported that the glass bottle is clearly considered to be a potential weapon and is easy to use due to its shape, the neck being used as a handle (3, 69, 72-74). It is used in interpersonal violence, which takes place among 20 to 47% of alcohol consumers in South Africa (63). This finding of violence being associated with glass injuries is consistent with what is known about glass injuries (1, 2, 64). However, when considering the place of glass injuries due to assault, this study differed with the study conducted by Laing et al., who found more assaults occurring at home than on ALP (1).

It was also noted that these assaults with a glass bottle were reported to the SAPS in 61 % of the cases. This appears to be in contrast to other countries, where such assaults with minor lesions and complications, as found in this study, are generally under-reported (68).

4.5.5. Person escorting the participant to the ED

Participants in this study were escorted or accompanied to the ED by EMS officers, a family member, friends, SAPS officers or came on their own. Figure 3.7 showed that 56.73% of patients with glass injuries were escorted by EMS officers using a land ambulance. Much has been published in the past about glass injuries in South Africa and the world. However, little is known about either the use of EMS or pre-hospital care of glass injuries. One can perhaps wonder why, for minor injuries, as discussed above and shown in Table 3.4 and Table 3.6, patients have used the ambulance, which common sense dictates should only be used for emergencies. The main explanations for this will be considered here. The first explanation is the remote area of the study setting, the second explanation is the time when the injury occurred, and the last one is the body part affected by the glass injury.

Embhuleni Hospital is situated in a rural area. Members of poor communities in this area who do not have private transport and/or cannot afford the transport fare to the hospital then use the ambulance as a means to get access to medical services, irrespective of whether or not it is an emergency. The fact should also be considered that these injuries happened mainly at night, as shown in Table 3.6 (70%), when there is no public transport available and the ambulance is therefore the only means to travel to the hospital at this time. Lastly, the most injured body

parts were the scalp and the face, as shown in Table 3.8 (61.07%). Clinics in the area do not suture lacerations on the face and scalp, and patients are therefore referred to the Hospital for medical attention.

4.6. Social impact of glass bottle injuries

This study showed that the ED of Embhuleni Hospital saw patients with glass-related injuries on a regular basis, especially over the weekends as illustrated by the figure 3.5. The majority of patients being discharged the same day from the ED after suturing and dressing as shown in table3.6, contrasting with the use state ambulances in almost of the cases as demonstrated by the figure 3.5. This is an additional burden to the ED and EMS already known to be very solicited. these glass- related injuries can be avoidable and treated at lower level such as clinic. This would allow the ED medical officer to focus on other emergencies.

There are factors that can explain the use or choice of a glass bottle in interpersonal violence, the first one being the immediate environment, the second the shape of the bottle, followed by the value of the bottle and the gender of the victim.

In eighty-six percent of injuries resulting from interpersonal violence with glass bottles, these injuries occurred on alcohol-licensed premises. These areas are known to be the scenes of violence, where the instinctive impulses of anger and aggression are acted upon, which is made easier by the consumption of alcohol, since alcohol lowers the threshold of anger and impairs a person’s capacity for judgment (61-63, 64). The bottle neck is used as a handle in assaults, and the majority of beer bottles are light. They consist of a body and a neck, which is as long as any knife handle. This neck enables a person to secure an easy and comfortable

grasp around it and to throw it at or strike a person with a certain intensity of force, so that the glass bottle breaks on impact or stabs a person when broken, with minimal force (1, 72-74).

However, when considering the place of glass injuries due to assault, this study differed with the study conducted by Laing et al., who found more assaults occurring at home than on ALP else includes the price of the bottle. After consumption of alcohol, the bottle remains the property of the buyer and represents no value, which means that he or she can use it as he or she wishes, including smashing it against a wall or on someone's face. It does not therefore represent any financial loss if broken, since it is just an object which will eventually end up in the dustbin. The gender of the victim must also be considered as a social impact. In this study, out of 76 intentional glass bottle injuries, 59 males were inflicted with injuries, with the assailant using a glass bottle as a weapon, which can be defined as any object used to cause or threaten an injury (75). Although a glass bottle can be considered to be an impulsive weapon, it causes injuries which are similar to any sharp object, which is mainly used in interpersonal violence between males (75). One would probably subconsciously choose to use a bottle when facing a male during interpersonal violence, rather than any blunt object. The reason for this can be found in the attempt to take advantage of and neutralise a serious opponent (70, 76).

In addition to the above, other factors associated with glass bottle injuries were day and time. The day of injuries caused by glass bottles was very meaningful in this regard, as shown in Figure 3.4 and Table 3.8, which indicate that 84% of glass bottle injuries happened over weekends. With regard to the time of these injuries, as indicated in Figure 3.6, there was a trend of an increase in glass bottle injuries

between 17:00 hours and 03:00 hours the next day, with the peak being between 23:00 hours and 03:00 hours, which are the same findings that were reported in the literature (1, 68).

Table 3.1 shows that 33.65% of the participants were employed, 31.73% were unemployed and 10.58% were self-employed. The attention of the researcher was drawn to the fact that all the unemployed participants in this study were injured by only glass bottles as a result of interpersonal violence, of which 61% took place on liquor-licensed premises. The geographic location of the study setting could be the explanation for this. Another factor that needs to be highlighted is the relationship between glass bottle injuries and unemployment.

Glass bottles were the cause of the majority of participants' glass injuries (83%), as shown in Table 3.1. The age distribution showed that the mean is 25.81, which supports the findings in other studies (69). This represents the economically active age group within e society, who are viewed as being the most productive. Unfortunately, however, most of them were unemployed. In this age group, it was found that due to their negative socio-economic situation, they are subjected to increased alcohol consumption and interpersonal violence, especially in South Africa, which is already known to have very violent communities (63, 65-67). The correlation between unemployment caused by poverty and abuse of alcohol does exist, and both factors are widely known to be generators of violence. The findings of this study in this regard are in keeping with the literature (65-67). The above situation leads to a vicious circle, explaining why disadvantaged communities such as where the participants are from remain poor, as illustrated by Figure 4.1.

Table 3.8 showed that the estimated cost of a glass injury presented to the ED, as per the International Statistical Classification of Diseases 10th edition, that a glass injury costs around 1266.47 South African rand, which is a waste of resources because glass bottle injuries are inevitable.

An empty beer bottle can also be a job creation opportunity through recycling and reuse. Many non-governmental organisations, in cooperation with South African Breweries (SAB), are actually encouraging the disposal and collection of beer bottles from designated bags and next to ALP by communities, from where broken or empty bottles can be collected for recycling or reuse.



Picture 4.1: A resident stands next to her monticule of beer bottles



Picture 4.2: Bags filled with empty beer bottles for reuse that she collected for recycling (researcher' collection)

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

5.1. Limitations of the study

This study aimed to compile and analyse data on glass injuries among patients presenting to the ED of Embhuleni Hospital, and has several limitations:

- The study period was limited to the 1st of February to the 31st of July 2013.
- This study was conducted in a rural area of the Mpumalanga province of the RSA, and many differences should be expected from studies conducted in urban areas.
- The word “injuries” can be used to indicate many different corporal lesions, such as lacerations, bruises or abrasions. It goes without saying that glass, which is a solid object, may cause many and different kinds of physical lesions that are either blunt or penetrative. In this study, the term “injuries” was strictly limited to cuts or penetrative injuries caused by glass. Unfortunately, however, some characteristics of these wounds, such as breadth, could not be assessed, due to logistical issues such as asepsis.
- This study did not assess dates in terms of calendar days as from the first to the last day of each month, and public and school holidays were not mentioned. Since injuries to the wrist as a body part are strongly associated with defence mechanisms, the wrist was not specifically individualised, neither were the fingers exposed to glass ampoule injuries.

- There was a relatively low rate of other glass injuries in the case of glass ampoule injuries, which was due to the fact that health workers were reluctant to participate in the study, whereas with the other types of glass injuries, it probably had a lot to do with the location of the study in a remote area, where certain glass objects (glass doors, glass tables) are seen as a luxury.
- It also came to the attention of the researcher that clinics in the area sent all patients with scalp, face or hand injuries to the hospital, irrespective of the gravity of the injury, rather than treating these injuries themselves. This could be the reason why glass bottles injuries, which mostly affect the above-mentioned body parts, had such a high prevalence rate compared to other types of injuries, which rarely affect these body parts.

5.2. Conclusion

The conclusion and recommendations of this study will be aligned with the objectives of the study.

The first objective was to provide a demographic profile of patients presenting to the ED of Embhuleni Hospital for glass injuries. It was shown that victims of glass bottle injuries are usually young males, and that the unemployed participants in this study were injured on liquor-licensed premises. It was also found that glass window injuries occurred exclusively in males, whereas glass ampoule injuries were only found among female student nurses, and a large number of males were among the victims

of car glass and glass bottle injuries. In addition, more than half of the victims were escorted to the hospital by EMS personnel.

The second objective was to determine the type of glass that caused injuries presenting to the ED of Embhuleni Hospital. It was found that the glass bottle was the main cause of glass injuries presenting to the ED.

The third objective was to describe the characteristics of the wounds from glass injuries presenting to the ED of Embhuleni Hospital. It was found that these injuries were minor and that car glass can cause multiple injuries, whereas glass ampoule and street shard glass injuries were strictly single and mostly minor, less than 5 cm in length, and with patients being discharged from the ED with very few complications. The injuries from assaults were mostly located on the left side of the body, and when it came to body parts, the face was the most affected by car glass and glass bottle injuries, whereas the feet and hands were mostly affected by street shards and glass ampoules respectively.

The fourth objective was to describe the circumstances and identify factors associated with different types of glass injuries presenting to the ED of Embhuleni Hospital. It was found that glass bottle injuries were largely associated with assault, and many of these assaults were reported to the SAPS. It was also noted that the number of glass bottle injuries increased over the weekend from Fridays to Sundays, with a peak on Saturdays. With regard to time, it was found that there was an increase in glass bottle injuries from 18:0 0 hours to 04:00 hours of the next day, and these injuries occurred mostly on alcohol-licensed premises.

The fifth objective was to identify the social impact of glass injuries. It has been shown that glass-injured patients used mostly public land ambulances and that the medical treatment fee is considerably high, paid with taxpayers' money. However, it was also shown that glass reuse and recycling can generate job in the community.

5.3. Recommendations

The recommendations of this study are addressed to local community leaders, owners and managers of alcohol-licenced premises, Embhuleni Hospital management, the SAPS, and South African breweries.

5.3.1. Recommendations to community counsellors and leaders

Glass bottle injuries may be just banal, recurring incidents that occur over weekends, but they are a resource-consuming phenomenon linked to various factors, among which is the unemployment of young males who are potentially productive for their own communities. The community as a whole is trapped in a vicious circle (unemployment, increased alcohol consumption, interpersonal violence, waste of resources, and poverty). The following recommendations can therefore be made to community leaders:

- The researcher strongly recommends that local leaders urgently develop economic mechanisms or politically strategic plans to help these young people escape from this vicious cycle.
- In addition, local community leaders should create and champion a committee that will focus on preventing glass bottle injuries.

5.3.2. Recommendations to Embhuleni Hospital

The following recommendations can be made to Embhuleni Hospital:

- Embhuleni Hospital should be an active member of the abovementioned committee that will focus on preventing glass bottle injuries.
- It was shown that glass injuries are often minor injuries with very few complications. It is therefore recommended that except for obvious complications, glass bottle injuries should be safely treated at clinics, in order to reduce the workload of the already overwhelmed ED medical officer, who also has to attend to all the other emergencies.

5.3.3. Recommendations to the SAPS

- As a law enforcement service, the local SAPS should also be a member of the committee focusing on preventing glass injuries.
- Without telling the local SAPS how to prevent crimes, it is recommended that the police presence should be reinforced over weekends, particularly between 18:00 hours and 4:00 hours.

5.4.3.4. ALP

- Local ALP should also be a member of the committee focusing on preventing glass bottle injuries.
- These ALP should increase their security personnel over weekends, especially between 18:00 hours and 4: 00 hours.

5.3.4. Recommendations to South African breweries

- Breweries should consider providing safe containers for alcohol, such as plastic ones in which beer can be served over weekends. For example, Budweiser beer is served in cups at stadiums through the recommendations of the Federation International Football Association (FIFA), in order to avoid injuries associated with containers for beer.
- The reuse of glass bottles should be made compulsory, in order to ensure that clients return their empty bottles in exchange for cash or any other type of gratification.

Further studies on glass injuries should be conducted over an extended period of time (more than 6 months) and space (including clinics). If these studies are retrospective, health workers will hopefully be more willing to participate, as shown by other studies.

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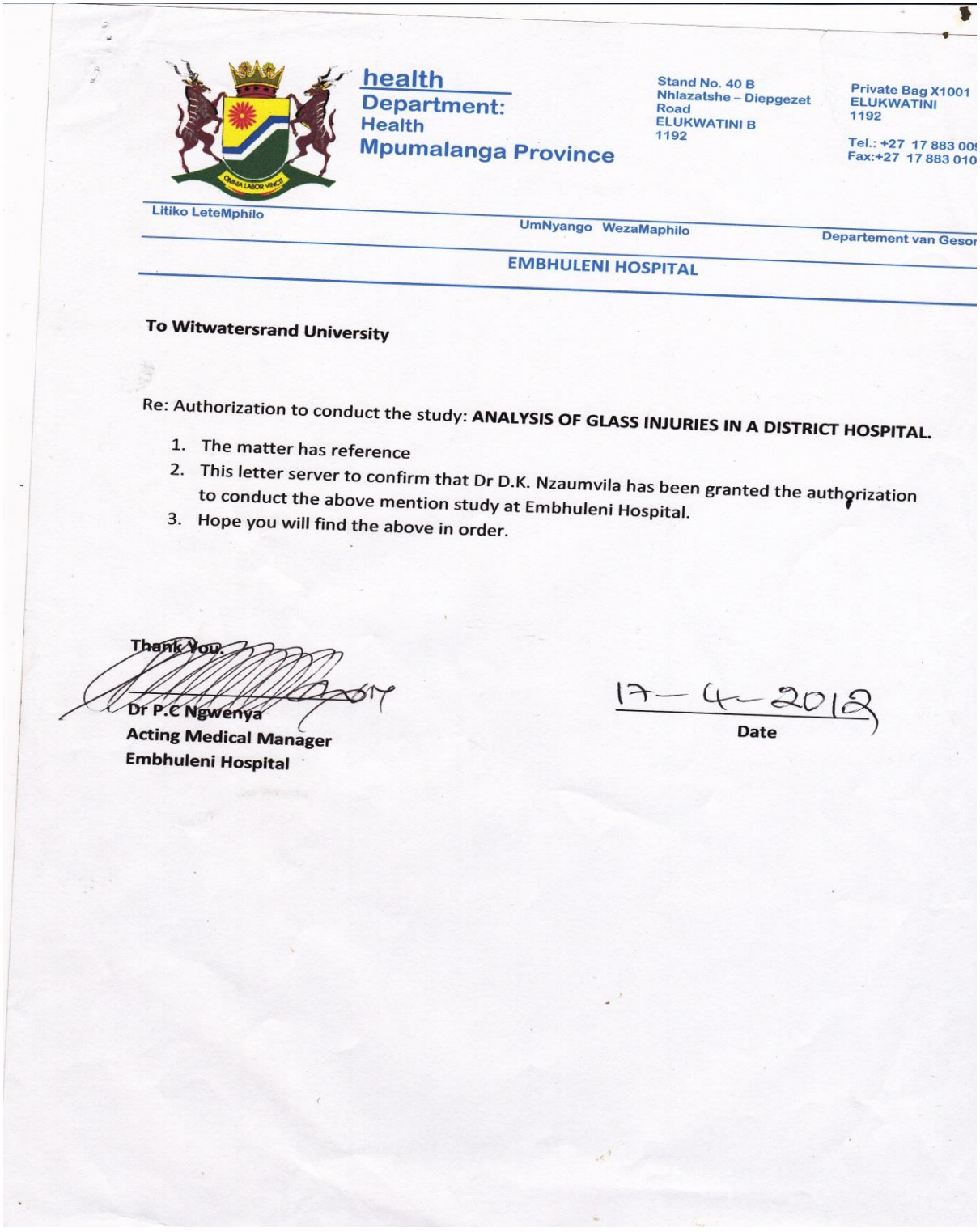
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7. Appendix

7.1. Approval from Embhuleni Hospital



health
Department:
Health
Mpumalanga Province

Stand No. 40 B
Nhlazatshe – Diepgezet
Road
ELUKWATINI B
1192

Private Bag X1001
ELUKWATINI
1192

Tel.: +27 17 883 00
Fax:+27 17 883 010

Litiko LeteMphilo | UmNyango WezaMaphilo | Departement van Gesor

EMBHULENI HOSPITAL

To Witwatersrand University

Re: Authorization to conduct the study: **ANALYSIS OF GLASS INJURIES IN A DISTRICT HOSPITAL.**

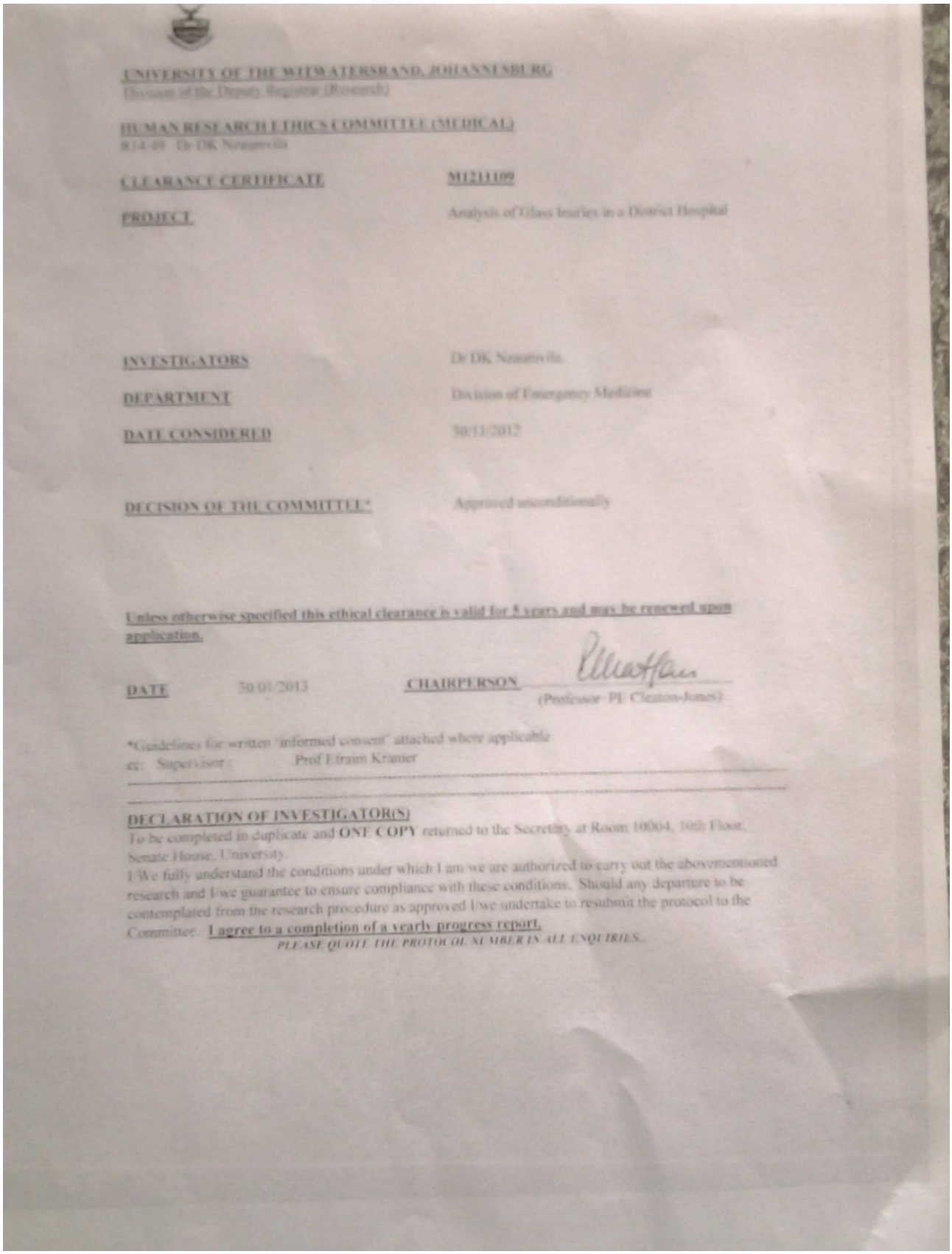
1. The matter has reference
2. This letter server to confirm that Dr D.K. Nzaumvila has been granted the authorization to conduct the above mention study at Embhuleni Hospital.
3. Hope you will find the above in order.

Thank You.

Dr P.C Ngwenya
Acting Medical Manager
Embhuleni Hospital

17-4-2012
Date

7.2. Authorization from Witwatersrand



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

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
R14/49 Dr DK Nzaumvila

CLEARANCE CERTIFICATE — M1211109

PROJECT — Analysis of Glass Injuries in a District Hospital

INVESTIGATORS — Dr DK Nzaumvila

DEPARTMENT — Division of Emergency Medicine

DATE CONSIDERED — 30/11/2012

DECISION OF THE COMMITTEE* — Approved unconditionally

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

DATE 30/01/2013 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.

7.3. Informed consent and data collection sheet

Participant's information document (English).

Study title: analysis of glass injuries in a district hospital

Dear patient,

Hello, I am Dr Nzaumvila, currently registered part time for the Master of Science in medicine degree at the university of the Witwatersrand. I am doing research on injuries caused by glass that present to the emergency department of Embhuleni district hospital.

I would like to invite you to be part of this research study, which means that i will ask you some questions about your personal details, the circumstances that caused the glass injury and examination of your injury. That should take no more than 20 minutes.

Your participation in this study is completely voluntary, there is no risk involved and there is no payment for your participation.

If you decide not to participate, it will not affect your treatment in anyway, and you may also change your mind at any time, and please feel free to ask any question. All your personal details will be kept secured, confidential and will only be seen by myself and the study supervisor.

If you are kind enough to partake in this study, you will be asked to sign a consent form to confirm that you understand all aspects of your involvement in the study.

If you would like more information on the study, you can contact DR. D.K. Nzaumvila at 076 6709070.

If you have any complaints or problem to report, you can contact the human research ethics committee (medical) committee.

Thank you very much.

Incwadzi yesatiso sihloko

Sesifundvo: analysis of glass injuries in a district hospital

Sawubona, ngingu dr nzaumvila lowenta tebucwepheshe be-science kutebudokodela enyuvesi yase witwatersrand. Ngenta lucwaningo ngetilondza letibangwa ngemabhodlela letetfulwa kubelitiko lwetingoti lwase Embhuleni Hospital. Ngitsandza kukumema kutsi ube yincenye yalesifundvo, lokusho kutsi uma uvuma ngitase ngikubuta imibuto lephetselene nawe, imbangela yesilondza ngiphindze ngihlole silondza. Konkhe loku angeke kutsatse sikhatsi lesengca imizuzu lengangemashumi lamabili. Kutsatsa kwakho indzima kulesifundvo kusekuholweni ngumoya, akunabungoti futsi awukuholeli. Uma ukhetsa kungabi yincenye kulesifundvo, akusho kutsi indlela lonakekelwa ngayo itawugucuka ngandlela tsite kantsi futsi usengawugucula umcondvo wakho nobe kunini. Uvumelekile kubuta nobe ngabe ngumuphi umbuto. Lwati lolumayelana nawe lutawugcinwa luphephile futsi luyimfihlo, lutawubonwa ngimi nalona lohlolisisa lesifundvo. Uma ukhetsa kutsatsa indzima, utawucelwa kutsi usayinde incwadzi yesivumelwano lecinisekisa kutsi uyakuvisisa kutibandzakanya kwakho kulesifundvo. Mawufuna kwati kabanti ngalesifunvo, ungachumana na dr d.k. nzaumvila kulenombolo: 076 6709 070.

uma unenkhinga kumbe sikhalo lesitsite lofuna kusibika, ungachumana ne-human research ethics committee(medical).

Ngiyabonga kakhulu

7.4. Informed consent form

Study title: analysis of glass injuries in a district hospital

I hereby confirm that I have been informed by doctor / nurse _____

about the details of the research study conducted by

Dr D.K. Nzaumvila called “analysis of glass injuries in a district hospital”.

I have received, read and understand the participant information sheet handed to me to read about this research study. I am aware that participation in this research study will involve writing down my personal details (or that of the patient i am responsible for if he/she is underage or unable to consent), the circumstances that caused the glass injury and examination of my injury. I am aware that i may withdraw from the research study at any time, that there are no risks in participating in this research study and that i will not receive any payment for participation. I am also aware that if I do not take part in the research study, it will not affect my treatment in any way. I have had sufficient opportunity to ask questions and declare myself prepared to participate in the study.

Participant / parent or guardian:

_____ _____ _____

printed name signature / mark or thumbprint date and time

I, _____ (name of nurse/doctor), herewith confirm that the above participant has been fully informed about the nature, conduct the above study.

_____

Printed name signature date and time

Incwadzi yesivumelwano sihloko

Sesifundvo: analysis of glass injuries in a district hospital

ngicinisekisa kutsi ngatisiwe kabanti ngudokotela/nesi …….nalesifundvo lesentiwa ngu Dr Nzaumvila lesibitwa ngekutsi yi-"analysis of glass injuries in a district hospital". Ngamukele, ngafundza futsi ngayivisisa incwadzi yesatiso lenginiketwe yona kutsi ngiyifundze mayelana nalesifundvo. Ngiyati kutsi kutsatsa indzima kwami kulesifundvo kutawufaka ekhatsi kubhala phansi lwati lolumayelana nami (kumbe lwati lolumayelana nesiguli lengisimele; uma siguli singaphansi kwemnyaka kumbe singakhoni kutimela), lwati mayelana nembangela yesilondza sami kantsi futsi nesilondza lenginaso sitase siyahlolwa. Ngiyati kutsi kusengayeka kuba yincenye kulesifundvo nobe kunini, kutsatsa indzima kulesifundvo akunabungoti futsi angeke ngikuholele. Ngiyati futsi kutsi kungatsatsi kwami indzima kulesifundvo angeke bese kuholela ekutseni indlela lenginakekelwa ngayo lapha emtfolamphilo bese iyagucuka. Ngibe nesikhatsi lesanele sekubuta imibuto nekutsi ngitive ngikwelungele kutsatsa indzima kulesifundvo.

umtsatsinzima/umtali/umgadzi

_____ _____ _____

Ligama ngalokugcwele sayina/imaki/sigcivito sesitfupha lusuku nesikhatsi

Mine (libito lanesi/dokotela),……. Ngicinisekisa kutsi lomtsatsindzima longenhla watisiwe kabanti mayalana nalesifundvo.

_____ _____ _____

ligama ngalokugcwele sisayino lusuku nesikhatsi

7.5. Waiver of consent

Study title: analysis of glass injuries in a district hospital

Dear patient,

Hello, I am Dr Nzaumvila, currently registered part time for the Master of Science in medicine degree at the university of the Witwatersrand. I am doing research on injuries caused by glass that present to the emergency department of Embhuleni district hospital.

On …(day) /(mm) / 2013… at hh: mm, you were treated at emergency department of Embhuleni Hospital for glass related injury.

This letter serves to inform you that your personal data and characteristic of your injury were captured for this research study. Your consent could not be obtained.

Should you wish your data to be excluded, please feel free to contact me at 0766709070

Waiver of consent

Sihloko sesifundvo: analysis of glass injuries in a district hospital

Sawubona

Ngingu Dr Nzaumvila lowenta tebucwepheshe bescience kutebubudokotela enyuvesi yase witwatersrand. Ngenta lucwaningo ngetilondza letibangwa ngemabhodlela letetfulwa kubelitiko lwetingoti esibhedlela embhuleni.

ngomhlaka.....(lilanga)..../(inyanga)/2013, ngalesikhatsi....., watfola lusito mayelana nesilondza sakho besibangwe libhodlela, lusito ulitfola kubelitiko lwetingoti embhuleni. Lencwadzi ikwatisa kutsi lwati loluphetselene nawe kunye nesilondza sakho latsatselwa lesifundvo. Uma ufisa kutsi lwati loluphetselene nawe lukhishwe, ungakhululeka uchumane nami kulenombolo: 076 6709 070

7.6. Assent document in (English)

Hello.

I am Dr Nzaumvila I am conducting a research study on injuries caused by glass such as broken bottle, broken windows, shards glass and others.

If you have such injuries, I would like to get your permission to ask some questions and find out how it has happened.

If you don’t wish to, it is fine and your treatment will remain the best.

You can ask questions as many as possible now or later by calling DR Nzaumvila (076-670-9070)

Assent document in Si Swati

Incwadzi yemvumelwano yebantfwana.

Sawubona,

Mine Dr Nzaumvila wenta lucwaningo lucwaningo ngesifundvo setilondza letibangelwe ngemabhodhke nyengemabhodlela laphukile, mafasitela emagwacweni.

Uma unetilondza letifana naleti, ngingatsandza kuba nemvumo yakho kute ngikwati kukubulta inibito futsi ngitole kabanti kutsi ulimele njani.

Uma ungufuni, kulungile futsi indlela lotfola ngayo lusito inibuto nanobe nguyiphi nayelana nalesifundvo nyalo nanobe nguyiphi mayelana nalesifundvo nyalo nanobe kini ngekutsintsana na dr nzaumvila (076-670-9070)

I (mine),…….print name (phala ligama lakho), accept (ngivumile)

_____ _____

Sign here (sayina) date (lusuku nesikhatsi)

7.7. Data collection sheet

Title: analysis of glass in a district hospital

Researcher: Dr D.K. Nzaumvila, Master of Science in medicine degree at the University of the Witwatersrand

1. **Participant details**:

Name: ……

Code…….

Gender: m/ f age…

Address: ….. … ….. ……

Occupation:

High level of education: …….

2. **Persons accompanying the patient:**

Emergency medical service personnel	
South African Police Officer	
Family member	
Friends	
Others	

3. **Circumstances of injury**

- Time
  - Estimated time of injury : h: min. Day:
  - Time of arrival at the hospital : h: min. Day:

- Type of injury

Intentional		Is the patient going to lay a charge with the saps?	Y	N
Non intentional				

- Type of glass

Glass bottle	
Glass window	
Street glass shards	
Car glass/windscreen	
Other(please specify)	

- Place of injury

ALP (bar, tavern)	
Home	
Motor vehicle accident	
Street	
Work	
Others	

4. Treatment

Type of treatment	Y	n
Suture in ED		
Suture in theatre		
Dressing		

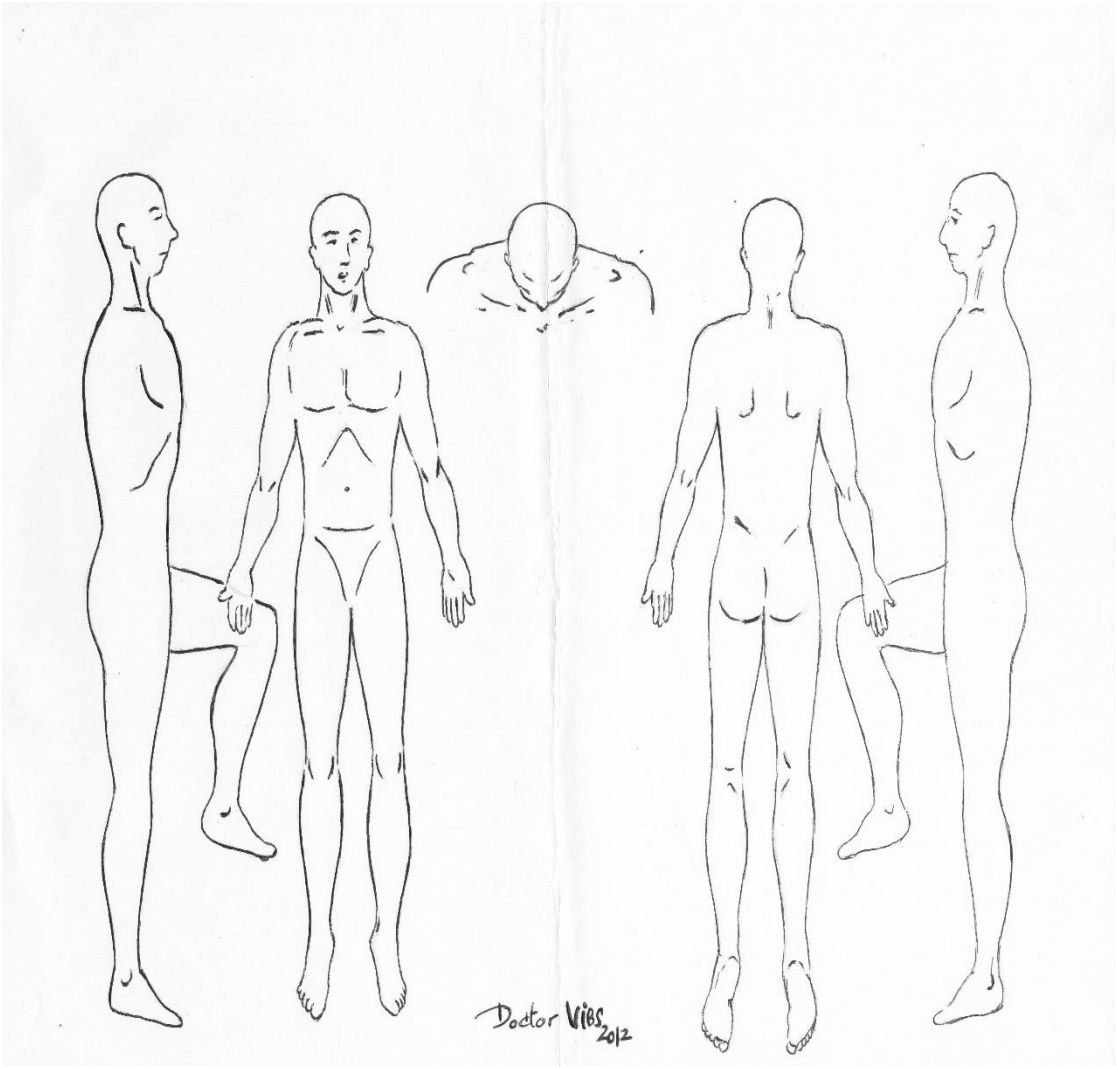
Admission in ward		
Admission in ICU		
Transferred		
Deceased		

5. Number of glass injury

Single injury	
Multiple injuries	

6. Characteristics of injury

	1st injury				2nd injury			
Site	Length	Width	Depth	Complication	Length	Width	Depth	Complica
Scalp								
Face								
Neck								
Chest								
Abdomen								
Arm								
Forearm								
Hand								
Tight								
Leg								
Foot								


Doctor Vibs 2012