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THE SOCIO DEMOGRAPHIC PROFILE AND OTHER CHARACTERISTICS OF ADULT BURNS PATIENTS TREATED AT JOHANNESBURG TERTIARY HOSPITALS

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The research report is submitted to the School of Public Health, Faculty of Health Sciences, University of Witwatersrand, in partial fulfilment of the requirements for the Master of Public Health degree.

Supervisor: Professor Shan Naidoo

Johannesburg

March, 2014

DECLARATION

I, Andiswa Ncedani declare that the research report on **THE SOCIO DEMOGRAPHIC PROFILE AND OTHER CHARACTERISTICS OF ADULT BURNS PATIENTS TREATED AT JOHANNESBURG TERTIARY HOSPITALS** is my own work. It is submitted in partial fulfilment of the degree of Master of Public Health at the University of Witwatersrand, Johannesburg. It has not been submitted for any degree or examination at this or any other University. All sources that I have used are acknowledged by referencing.



28 February 2014

Andiswa Ncedani

In memory of my grandmother

Nokhawulezile Adelaide Sityata

1924 - 2011

Willowvale, Eastern Cape

PRESENTATIONS ARISING FROM THIS STUDY

Andiswa Ncedani (November 2008), The Socio-demographic Profile of Burns Patients Treated at Johannesburg Tertiary Hospitals: preliminary report, Prakash Vallabh Provincial Primary Health Care Conference, Department of Health, Gauteng.

ABSTRACT

Introduction: This is the descriptive study of the socio demographic profile and other characteristics such as the burn injury details and socio economic characteristics of adult burn injury patients treated at Johannesburg Tertiary Hospitals (JTH) during the study period. Relevant stakeholders can use this information in the efforts to reduce preventable burn injuries.

Method: Prospective study where all adult burn patients in the burns unit, trauma/surgical wards during the study period were eligible to participate in the study. The information was extracted from the medical files (such as hospital classification, date of birth (DOB), type of burn, type of management done to date etc), this was followed by an interview done by principal investigator only, using a questionnaire to gather the information on patients' demographic details, socio economic information, income details and burn injury details. Descriptive statistics were used to define the profile of burn patients and other characteristics.

Results: The results revealed the description and the profile of adult burn patients: a male (71%), African (94%), unmarried (70%), mean age of 35.6 years. He was most likely to have a secondary school qualification (62%), full time employed possible (51%) in the industrial sector, stays with 2-5 people in his household. He was likely to be originally from outside the Gauteng Province (58%). He sustained burns injuries of 10-29% TBSA, while at home (94%), from flames (68%). He remembered (92%), his activity prior to the burn incident and thought that the burn could have been prevented (82%).

***Conclusion*:** Burns injuries were reported to be preventable. The burn injury-prevention program should be targeted to males, in the working age groups, residing in one roomed dwelling or informal settlements. Patients with poor judgement, predisposing medical conditions such as epileptics, those that have modified their electricity supply and heat sources should be prioritised for burn injury-prevention programs.

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Definition of Terms

- **Adult -** Anyone above 18 years admitted in adult burn unit or trauma/surgical wards
- **Burn Centre/Burn Unit** – is a specialised area within a teaching hospital that has committed resources, with an independent infrastructure focusing on treating burn .
- **Burn Injury** – burn injury is the destruction of the different layers of the skin and the structures within the skin, such as sweat glands, oil glands, and hair follicles. It can be caused by flame, chemical, electrical, hot fluids etc.
- **Combination burns –** when there is more than one type of burn injury extent e.g. full thickness burns and partial thickness burns in an affected area.
- **Faulty equipment –** modification of electrical equipment to function as a heating device/stove in most cases e.g. a broken urn element, taken off and put on a structure (bricks or enamel tin) to be used as a stove.
- **Flame stove** - is the non-pressure or cotton wick, usually dipped into paraffin or another fuel.
- **Fossil Fuel** – includes paraffin, coal, charcoal, oil and wood.
- **Informal settlement** – residential areas where a group of housing units have been constructed on land that is not planned for those settlements, that is not in compliance with current planning/building regulation (unauthorised housing)
- **Informal connections** – are extensions of electricity supply from one household to another by informal settlements householders (thus electricity is still metered) by Eskom.
- **Illegal connections** – connections comprising of the electrical distribution grid by the households that by-pass metering systems.
- **Johannesburg Tertiary Hospitals –** refers to Chris Hani Baragwanath Academic Hospital (CHBAH) and Charlotte Maxeke Johannesburg Academic Hospital (CMHAH)
- **Other characteristics** - include the socio economic characteristics and burn injury characteristics

- **Socio demographic Profile -** characteristics of the burn patient such as age, sex, race, marital status, residential address, employment, education and the language mostly used at home.
- **Tertiary hospitals** – also known as academic hospitals are referral hospitals rendering specialist & sub-specialist care serving a network of regional hospitals (DoH, 2008). They also serve as platform for training of health workers and research. Most of care provided at this level requires expertise of teams led by specialist.
- **Uniform patient fee schedule (UPFS) -** system used in South African public health sector, where patients are classified into three categories. Fully paying patients are those that are Private/Medical aid/ non-South Africans/H3; these patients pay for the full cost of services provided by the public health institutions. Some patients are fully subsidised and others are partially subsidised depending on their household income:
  - H0 - Patients receive full/maximum subsidy from the government for the health care rendered, usually people on old age grant, disability and unemployed.
  - H1 – Earn less than R36 000 single income or R50 000.00 family income, partial subsidy is received but still pay a small portion for medical services rendered.
  - H2 – Earn from R36 000 to R72 000 single income or R50 000 to R100 000 family income per year. Patients receive the moderate subsidy; also a partial subsidy is received.
  - H3 – Earn more than R72 000 single income or R100 000 family income per year; no subsidy is received by these patients (DoH, 2007)

List of acronyms

CHBAH	Chris Hani Baragwanath Academic Hospital
CMJAH	Charlotte Maxeke Johannesburg Academic Hospital
CoJ	City of Johannesburg / (Johannesburg Metro)
DHIS	District Health Information System
GDoH	Gauteng Department of Health
GDP	Gross Domestic Product
JJABU	Johnson and Johnson Adult Burns Unit
JTH	Johannesburg Tertiary Hospital (CMJAH & CHBAH)
H0	Hospital Patients (Full government subsidy)
H1	Hospital 1 patients (Highest government subsidy)
H2	Hospital 2 patients (Moderate government subsidy)
H3	Hospital 3 patients (Lowest government subsidy)
LMIC	Low Middle Income Countries
PP	Private Patients (No government subsidy)
NDoH	National Department of Health
TBSA	Total Body Surface Area
Soweto	South Western Townships (Johannesburg City)
StatsSA	Statistics South Africa
SES	Socio Economic Status
SOI	Source of Income
UPFS	Uniform Patient Fee Schedule (Hospital Classification)

PREFACE

Various challenges exist in the treatment of burn injuries in South Africa. The epidemiology of burn injuries is not well documented (Van Niekerk, Laubscher, and Laflamme 2009); poor access to dedicated burn units was reported (DOH, 2004); high cost of treating of burn injuries, estimated to be at R154 000.00 for 20% TBSA (Allorto *et al*, 2011) and staff shortages. These challenges will not be easy to resolve in the short term, resulting in inefficient and ineffective holistic burn care management in the South African public health sector.

The above challenges put a severe strain on the country's health resources; this means that efforts to strengthen burn prevention strategies must be increased. In an attempt to investigate prevention strategies, more information on the high risk groups, high risk activities will provide a good starting point. Therefore exploration of the socio demographic profile and other characteristics of an adult burn patient is needed to understand burn injuries in context and to tailor the prevention programs to be more responsive to the needs of the groups or individuals in Gauteng Province

CHAPTER 1: INTRODUCTION

The study on the socio demographic profile and other characteristics of adult burns patients treated at Johannesburg Tertiary Hospitals (JTH) during the study period is introduced. The first chapter of the research report will discuss study context, the problem statement and the justification for this study.

1.2 Study context

1.2.1 Overview of Gauteng Province

Gauteng Province is the smallest and most densely populated province in South Africa (SA) with 12 272 263 residents (23, 7% of SA total population) and 1.4% of the country's total land. (StatsSA, 2011).

The public health care system in Gauteng provides services to 78% of the population and only 22% is on private health insurance; this is in line with the national figures showing that 80% of population in SA only access the public healthcare services (DoH, 2008), putting strain on public health resources. Figure 1 below, shows the geographic distribution of health care facilities in Gauteng province.

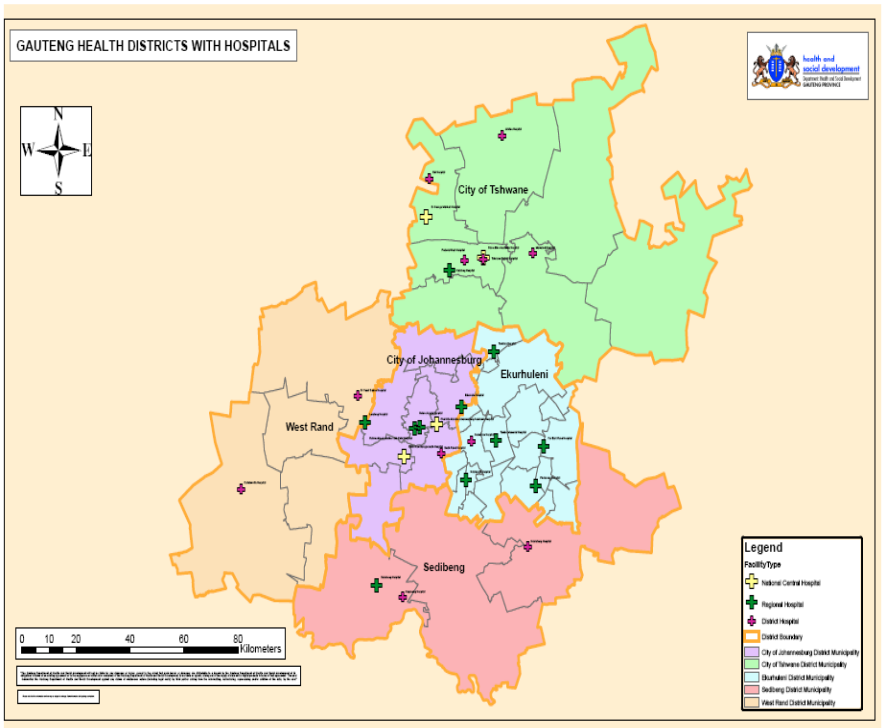


Figure 1: District demarcation of Gauteng Health facilities
DHIS information, November 2011, Gauteng Department of Health,

1.2.2 Study setting

Figure 1 above, shows that there are two tertiary hospitals situated in the City of Johannesburg; the Charlotte Maxeke Johannesburg Academic Hospital (CMJAH) previously referred to as Johannesburg Hospital, situated in Parktown, a suburb north of Johannesburg and the Chris Hani Baragwanath Academic Hospital (CHBAH) positioned south-west of the City of Johannesburg (CoJ), in Soweto Township.

Historically, these hospitals served people from different ends of the apartheid spectrum in South Africa. CMJAH was a previously "white only" institution servicing the fewer privileged citizens in Johannesburg and surrounding areas, while the CHBAH provided its services to the majority of black communities in Johannesburg especially from the greater Soweto townships.

Today, both hospitals are classified at tertiary facilities providing a range of specialised services to all citizens of Gauteng and neighbouring provinces and countries. This makes these hospitals suitable for the study since they tend to represent a "mixture of patients" from varied social and demographic backgrounds. However, CHBAH is the only public institution with its own dedicated burns unit in Gauteng province referred to as Johnson and Johnson Burns Unit (JJABU). The CHBAH Burns Unit is recognised throughout the country due to high level of expertise offered, making it attractive to some private patients.

Table 1: Profile of Johannesburg Tertiary Hospitals (JTH)

	CMJAH	**CHBH**
Location	Parktown, North of JHB	Soweto
Total no of beds	1032	2790
Burn patients treated	Yes	Yes
Dedicated Burn Unit (BU)	No	Yes
Treatment of burn patients	Trauma and Surgical wards	BU and Surgical wards

DHIS information, November 2011, Gauteng Department of Health,

1.3 Problem Statement

If burn prevention is an essential part of any integrated burn management protocol anywhere, focusing on burn prevention in low and middle income countries (LMICs) rather than treatment cannot be over-emphasized; where it remains the major and probably the only way of reducing the current state of morbidity and mortality (Bishara *et al*, 2009). The goal of this study is to increase knowledge of socio demographic burn profile and other characteristics in order to assist in formulating effective burn injury prevention strategies. These strategies must be specific to target groups and must be efficient in reducing the incidence of burn injuries with multi-faceted causes and many potential risk factors (Duggan & Quine, 1995). This will be achieved by carefully analysing the epidemiological features before a sound prevention programme can be planned and implemented (Larajet & France, 1995; Ashraf *et al*, 1997).

Unfortunately, anecdotal evidence suggests that holistic burn care in South Africa is inadequate: various challenges have been cited by local researchers on burn management in the country. These include: poorly documented epidemiology of burn injuries (Van Niekerk, Laubscher, and Laflamme 2009) high magnitude of burn injuries with estimates that 3.2% (1.44 million) of South African population are burned annually (DOH, 2004); the high cost of treating of burn injuries, estimated to be at R154 000.00 for 20% TBSA (Allorto *et al*, 2011) and the poor access to the limited dedicated burn units as well as the lack of dedicated personnel and rehabilitation services (DOH 2004). More studies reported results of local studies showing lack of access to the healthcare services (DoH, 2008); stringent admission criteria to dedicated burns unit resulting in inequity where only 10% of burn patients in South Africa are treated in these units (DOH, 2004). Furthermore, the country is spending enormous amounts on health care expenditure of 8.7% of its Gross Domestic Product (GDP), slightly less than that of 8.9% for Sweden (Lancet, 2009) had been reported. These challenges are just a few, but are very crippling to the burn care in the country.

In the light of a barrage of problems facing in burn injury management in the country; literature suggests several strategies to burn care but the most cost effective one is that of prevention as most burn injuries are preventable (Ganesamoni *et al*, 2010; Outwater, 2013 and Bishara *et al*, 2009). It seems that the burn prevention strategies used in Gauteng do not fully yield the outcome of minimising the incidences of burns in the province. The study will be of benefit as there is a great need to describe the socio demographic profile and other characteristics of adult burn patients treated at Johannesburg Tertiary hospital. The results of this study can thus be used to form basis of more research in this area and for designing and implementing more specific prevention strategies in the province.

If burn injuries (mortality and morbidity) are to be decreased with appropriate interventions, country specific studies need to be tailored to local contexts (Outwater, 2013). An examination of the patterns and causes of burns should allow community specific recommendations for interventions. (Ytterstad *et al*, 1998) but only when the risk factors are known (Kwang-Yi *et al*, 2005; Barradas *et al*, 1995; Mateu and Hernandez, 1999; Ashraf *et al*, 1997 and Larajet & France, 1995) to minimise burns' and its morbidity (Haik *et al*, 1990). This statement and literature point to the fact that efforts should be made to reduce the burn injuries and the focus on the prevention of adult burn injuries in Gauteng should be prioritised. That is why this study seeks to describe the socio demographic profile and other burn characteristics so as to enable new information for further research and provide basis for prevention programs targeting identified risk groups.

It is reported that burn prevention programmes fail to receive the government funding that they deserve due to poor knowledge of epidemiological characteristics and associated risk factors (Bishara *et al*, 2009). This study will assist the public health specialists to effectively focus (content and package) their efforts to targeted high risk groups yielding results. This would encourage the policy makers and decision makers to allocate more funds on prevention of burns in Gauteng province going forward.

1.5 Justification for this study

Burn injuries can be prevented (Ganesamoni *et al*, 2010; Outwater 2013). Sadeghi goes further to say "in preventing burns, it is essential to know how they occur and in which population groups, environments and heating appliances can be targeted for prevention work (Sadeghi *et al*, 2011). This statement and literature point to the fact that efforts should be made to reduce the burn injuries and the focus on the prevention of adult burn patients in Gauteng should be prioritised.

A public health specialist would be interested in this scenario as an area for prevention work of burn injuries (Sadeghi *et al*, 2011). There are various ways that the results of this study will contribute to service delivery in Gauteng Department of Health and its stakeholders: the study will serve as the baseline on which to develop further Public health reports and research on epidemiology of burn data; current studies highlight the need for more burn epidemiology data in the country especially for adults (Van Niekerk, Laubscher, and Laflamme, 2009). The scarcity of burn injuries in Gauteng makes it difficult to focus specific strategies for burn prevention in the province.

Furthermore, availability of burn epidemiology in the province will assist the Department to identify based on the characteristics of adult burn patients; that is who is most likely to burn and target those high risk groups for prevention programs to that area/population. It will also map out the burn injury details, what burns the patients, when are burn injuries most likely to occur and how do burn injury occur – this information is crucial in planning specific intervention programs. Once the research agenda is set for burn injuries in the province, more studies may be done and the data come forth from relevant other studies, will bring about a policy change in the way prevention programs should be implemented. This will then in a long term bring down the statistics of burn treated in Gauteng facilities.

CHAPTER 2: LITERATURE REVIEW

The study will review the literature on burns by looking at the magnitude of burn injuries, the socio demographic profile and other characteristics of adult burns. The initial literature review for this study was done in June 2005, but the newer research reports published after the study has been completed has been included.

2.1 Magnitude of burn injuries

Burn injuries presents as one of the most important public health problems (McLoughlin, 1995; Outwater, 2013) facing both the developing and industrialised countries (Larajet & France, 1995). Burn injury is an overwhelming personal tragedy, a family tragedy, a national tragedy, and ultimately also a world tragedy (Haq, 1990).

The first part of this section will look at the global magnitude of burns, then explore how big the problem is in low and middle income countries (LMIC) with emphasis on an African continent and last the local magnitude in a South African context. To understand the extent of the burn injuries, it is important to identify "who, what, how and when of the injury" to allow planning for prevention of that injury.

2.1.1 Global magnitude of burn injuries

The global context on magnitude will provide basis of how big this problem is worldwide. Burns are the fourth most common type of trauma worldwide, following traffic accidents, falls and interpersonal violence (WHO, 2004). Globally, burns have been reported to be a major public health problem (Outwater, 2013; McLaughlin, 1995). According to World Health Organisation, "322 000 deaths in the world from fire related burns in 2002 and majority occurred in the LMIC" (WHO, 2004).

However, there seems to be variability in severity of burn injuries, making it difficult to identify the number of people who suffer from burns each year (Wasaik *et al,* 2009). A study in Israel revealed that 5% of their hospitals admissions were burn patients (Haik *et al*, 1990). The holistic management of burns even in well-equipped, modern burn units of affluent societies remains demanding and extremely costly (Bishara *et al*, 2009). It is important to remember that "most burn injuries are preventable" (Ytterstad *et al*, 1998, Outwater 2013) and the magnitude of burns can be lessened by effective prevention strategies specific to the given communities and risk factors.

2.1.2 Magnitude from Low Middle Income Countries

Unfortunately over 90% of deaths from fire related burns occur in developing nations (Sachil *et al*, 2013 and Bishara *et al*, 2009), which are least able to provide resources needed for care or the rehabilitation (Peck *et al*, 2002). Burns are extremely common and are a major public health problem in developing countries (Sachil *et al*, 2013)

African studies done in Kenya, also reported findings that burn injuries are a significant cause of hospital admission (Haq, 1990). 85% of the Zimbabweans were cooking using open fire, and a third of those that burned required operations to be performed by general surgeons in Harare (Mzezewa *et al*, 1999).

2.1.3. South African magnitude of burn injuries

There has been significant increases in burn mortality noted over the last 20 years. Burns are among the top ten external causes of death in South Africa. (Maritz *et al*, 2012). Local context estimates that 3.2% of South Africa's population is burnt annually; of these, 50% are younger than 20 years of age; there is also a slight increase in burn patients during the winter season of the year, between the months of June to August (DOH, 2004). This is probably because people use fire more often and stay inside their houses for longer (Barradas, 1995). DOH (2004) reported that the majority (90%) of burns patients are treated by the general practitioners, nurses at local clinics, daycare centres, local and regional hospitals and only

10% are admitted to a Burn Unit. One could attribute the small percentages treated in burns unit to the number of burns units currently operating in the country. He further states that the people that are severely affected by these circumstances are those from low socio-economic backgrounds and only 6% of the burned patients are treated in the private sector (DOH, 2004). One can concur with a study in Cape Town that showed that burn patients treated at public hospitals place a heavy burden on an already overstretched health system (Maritz *et al*, 2012).

2.2 The socio-demographic profile of burn patients

The second part of the literature review will consist of the socio-demographic profile of adult burn patients. Epidemiological studies have identified important socio demographic factors that may increase the risk of burn injuries (Outwater, 2013).The following variables of socio demographic information of burns have been studied: age, sex, origin, the level of education, income and occupations of burns patients, (Darko *et al,* 1986). However in this study, the socio demographic information will also include race, marital status and will be added on.

In South Africa, the literature has highlighted that the majority of burn victims are predominantly black persons from informal settlements (Van Niekerk, 2010). The burden of suffering with fire is distributed predominantly among the poor, in which a large proportion of injuries are related to the nature of domestic appliances that are used for cooking, heating, lighting or all three (Peck *et al*, 2002).

Education and employment status have been identified as one of the critical factors in determining health status of individuals.

2.2.1 Age

The adult burn studies done in various parts of the world showed a wide range of age distribution, with victims in the working age.

The following age distributions of the burn victims were reported. Firstly, studies done in India, Kuwait and Australia showed the lowest age averages between the range of 20-30 year age group (Ganesamoni *et al*, (2010); Sharma *et al,*2005) and Duggan & Quine 1995). Other reports of studies done in Taiwan, China, Iran and Singapore and Ireland reporting averages ages between 29-38 years (Kwang-Yi, 2005 ; Tang *et al*, 2006; Morteza, 2010; Song & Chua, 2005 and Seoighe *et al*, 2011) respectively. The highest age average 40 years age of burn injuries was reported in studies done in Egypt and South Africa by Ashraf *et al*, 1997 and Van Niekerk, Laubscher & Laflamme, 2009) respectively.

Based on the above research work done in various countries; the most likely to burn individuals are those in their economic/productive age. The findings in studies done in Egypt correlate to those of the study done in Cape Town by Van Niekerk, Laubscher & Laflamme, 2009,where the middle-aged men were found to be more at risk of fatal burn; this was further attributed to the socio-economic status, living conditions and life style. Also it revealed that there was high prevalence of burn injuries amongst middle-aged men; this was attributed to detrimental living conditions, life-style and poor socio-economic status (Van Niekerk, Laubscher & Laflamme 2009). Therefore, education needs to focus on the age-groups that are most likely to have burn injuries, for example, amongst productive males as identified by the Cape Town study.

2.2.2 Sex and gender

Burns mechanism and patterns can vary according to gender (Sadeghi-Bazargani & Mohammadi, 2012). Most studies done in various countries showed a greater risk of burn injuries for males to females with a ratio of 2:1 or more (Glasheen *et al*, 1983; Pardo, 1993; Sharma *et al*, 2005; Darko *et al*, 1986; Druery , Brown and Muller, 2005; Duggan & Quine, 1995; Haik *et al*, 2007; Tang *et al*, 2006 and Peck *et al*, 2002, Song & Chua, 2005 and Morteza, 2010) due to males perceived to be twice more likely to sustain a burn injury than their female counterparts from their lifestyle and places of their work. Studies done in Iran,

showed that age distribution is depended to sex and type of burn agent where the females accounted mostly for domestic injuries had ages of 19-22 years and males mostly sustaining electrical burns and lightening injuries had a mean age of 27-31 years (Sadeghi-Bazargani & Mohammadi, 2012).

Contrary to the above, some studies done in India, Egypt and Zimbabwe reported higher ratios of burn between female to male (Mzezewa *et al*, 1999; Sachil *et al*, 2013 and Haq, 1990). The high risk for females associated with open fire cooking or unsafe cooking stoves which can ignite loose clothing. (Sachil *et al*, 2013). It was also highlighted that women stay indoors especially in the kitchen with the children, (Ganesamoni *et al*, 2010) based on their gender roles (Haq, 1990).

However, studies done in Kenya and Egypt did not see any difference in the sex distributions of burn victims (Ashraf *et al*, 1997 and Haq, 1990). These studies found equal chances for both females and males to sustain burn injuries, particularly because most females were burnt in the kitchen (domestic) by fire, while cooking whereas most males were burnt in their areas of work (Ashraf *et al*, 1997 and Haq, 1990).

2.2.3 Marital Status

A study done in Spain, found the incidence of burn injuries to be higher in unmarried males than in married females (Pardo, 1993). Another study done in Egypt showed a statistically significant difference of marital status by sex; where 64% of females were in a married group and 63% of males in the unmarried group were reported to have been burned (Ashraf *et al*, 1997). A study done in Karachi, Pakistan showed 51.8% of females were burned and 56% of these were unmarried (Tirmizi *et al*, 2013) and a study done in Iran showed 53% of burn patients seen in the outpatient burns department were married.

Mortality was significantly associated with TBSA, age, and marital status (Tirmizi *et al*, 2013). This means that the prevention strategies must incorporate the risk factors to burn injuries experienced by specific marital groups too.

2.2.4 Race

Very few studies look at the race as the socio demographic profile variable, however in South Africa it is relevant indicator due to the *apartheid* era where a white person was regarded as superior to any other race especially to African, South Africans. Some studies have identified ethnic groups to have higher risks of burn; where association of these groups to poverty, low education as well as cultural habits of minority and immigrants was reported (Edelman, 2007). In a study done in United States of America by Glasheen *et al (*1983), it was found that the risk of burn was 76% greater for non-whites than the white population. The categories of black and other ethnic origin were over-represented in the burned group (Darko *et al*, 1986).

2.2.5 Employment and Education details

In one of the studies, the majority of burn patients were found not to be employed, of those employed; more than 50% of them were manual workers (Ashraf *et al*, 1997). A study done by Darko (*et al)* 1986 showed there is an inverse relationship between the high risk to burn injury and the low levels of income and education. It is highlighted that education is the important factor in predicting the risk of burn, stating the young and poorly educated are at highest risk of burn while college educated at lower risk. There is also a high likelihood that persons with less education are more likely to be engaged in those occupations that have been identified to have a higher risk of burn injury (Darko *et al*, 1986)

2.2.6 Residency and place of origin of a burn injury victim

A study done in Kuwait showed that 69% of burn patients were non-Kuwaitis, with males having a higher predisposition to burns injuries (Sharma *et al*, 2005). The ratio of non-Jewish population in the burned group was 1.5 higher than the general population with a $p < 0.0001$. (Haik *et al*, 2007). Both these studies suggests than immigrants have a higher risk to burn injuries than natives. This could be attributed to the living arrangements that the immigrants may have in the non-native country.

2.3 Other characteristics of a burn injury

Lastly, the other characteristics which are also important to fully define the profile of adult burn patients will be discussed. This section will discuss other characteristics to burn injury that is, the socio economic characteristics and the characteristics of a burn injury itself.

2.3.1 Burn injury characteristics

This sub-section will discuss burn injury characteristics for example the cause of a burn injury, the severity of a burn injury, the place of burn injury, the management of burn injury as well the factors surrounding the prevention and whether patients remembered the burn incident.

There is huge number of studies on the epidemiology, aetiology and demography of burn injuries that have been reported (Darko *et al,* 1986; Pardo L, 1993; Schembri, Cacciottolo & Swain *et al*, 1994 and Ganesamoni et al, 2010, *et al*, 2010) in other countries; however, very few studies have been reported in South Africa (Van Niekerk, Laubscher & Laflamme 2009). The knowledge of burns epidemiology is desirable for its application to burn prevention (Mateu & Hernandez, 1999; Sadeghi, 2011) and for medical audit as well as planning purposes. It is therefore important to carefully analyse the epidemiological features before a sound prevention programme can be planned and implemented (Larajet & France, 1995; Ashraf *et al*, 1997).

2.3.1.1 Cause of a burn injury

By far the most serious agent of domestic burns are flames (Ashraf *et al*, 1997; Schembri, Cacciottolo & Swain *et al,* 1994; Pardo, 1993 and Duggan & Quine, 1995; Mzezewe *et al* 1999; Outwater, 2013; Ganesamoni *et al*, 2010; Sadeghi-Bazargani & Mohammadi, 2012;) accounting for more than 60% (Sachil *et al,* 2013) and tend to affect more females than males. The incidence of burn injuries is largely associated with the use of stoves, lamps; from kerosene or petroleum as well as liquid petroleum, petrol, candles, gas and alcohol. (Peck *et al*, 2002 and Outwater, 2013). Kerosene stoves are the more common source (Ashraf *et al*, 1997) and most severe burns were reported between ages of 18-32 years from flame related injuries (Sadeghi *et al*, 2011).

However, other literature, in Taiwan, China, India, United States of America Israel, Iran and Singapore reported scalds as the common cause of burn injuries (Kwang-Yi, 2005; Yuan *et al*, 2011; Ganesamoni *et al.*, 2010, Tiara *et al*, 2010; Haik *et al*, 2007; Morteza, 2010 and Song & Chua, 2005).

While Sadeghi-Bazargani & Mohammadi (2012) reported that flame-burns and scalds as the most common type of burn injuries, except in those studies conducted for specific types of burns.

2.3.1.2 Severity of a burn:

The severity of burn injuries vary from very minor requiring no treatment to extremely severe when the highest levels of intensive care and surgery are indicated (Wasaik *et al,* 2009). The severity of the burn injury is dependent on the following factors:

- Total Body Surface Area (TBSA),
- The depth of the burn injury,
- The location of a burn area,
- The patients' age and the
- The presence of associated injuries and diseases (DOH, 2004).

The TBSA of full thickness burns was more than one third greater in patients with high blood alcohol levels due to the hypothetical causal relationship between the depth and the known analgesic effect of alcohol. Moreover, intoxicated patients also had a significantly higher fatality rate (Haum *et al,* 1995*)*. In a study done in Singapore between from 1997 to 2003, 70% of the patients presented with burn size of TBSA of 10% (Song & Chua, 2005). Burns of 50% TBSA were reported in studies done in India as the cause of mortality (Sachil *et al*, 2013). Also untreated epilepsy was the major risk factor to burn in many developing countries (WHO, 2004), including South Africa (Allorto et al, 2009 and Scheven, Barker & Govindasamy, 2012)

The severity of burn injuries is reported differently in various studies. The more severe the burn injury is, the more morbidity and/or mortality that may arise. It is especially more debilitating when hands and feet are burnt, this is usually/understandably a severe blow onto a person's economic viability (Keswani *et al*, 2000). In addition, severe deformity, disfigurement and disability to victims of serious burns; the lack of adequate healthcare and rehabilitative resources, the long hospital stay and the access to workplace are

some of the significant issues that have negative implications to the burn victim, his family as well as the country.

2.3.1.4 Place of burn occurrence

Various studies reported adult burns to occur mostly at home (Sadeghi *et al*, 2011; Morteza *et al* , 2010; Sedeghi-Bazargani & Mohammadi, 2012 and Sachil *et al* , 2013;) with kitchen reported to be the commonest area of burn occurrence especially for females (Outwater, 2013). These findings concur with the studies done in Cape Town, where domestic burns from cooking accidents (Peck *et al,* 2002) and women especially housewives were more at risk of these burns (Morteza *et al*, 2010).

For males, most of the serious burn injuries occur at their areas of work (Sachil *et al*, 2013), especially at the workplaces of welders, electricians, plumbers and painters (Glasheen *et al*, 1983).

2.3.1.5 Are burn injuries preventable?

Injuries and their health implications have demanded attention of decision makers worldwide and injury policy must be firmly placed in the public health arena (Edelman, 2007). Burn injuries are mostly preventable (Song & Chua 2005; Outwater, 2013 and Maritz *et al*, 2012). However, "an approach to burn prevention, to be effective in a particular area, should be based in the sound knowledge of etiological patterns of burn injuries and must take into account the geographical variation and socioeconomic differences in burn epidemiology" (Sadeghi-Bazargani & Mohammadi, 2012).

Burn injuries in LMIC still remain a significant health problem, even though numbers of burn injuries in high income countries have decreased showing that such events are not "accidents" but are usually preventable (Outwater, 2013). Evidence shows that prevention strategies can work (Mateu & Hernandez, 1999; Sadeghi *et al*, 2011 and Outwater, 2013); however they need to be tailored to specific

environments taking into account local risk factors and available resources. An examination of the patterns and causes of burns should allow site specific recommendations for interventions.

With multi-faceted causes, there are many potential risk factors, which are often interrelated (Duggan & Quine, 1995). This means that to effectively prevent the burns both active (education, awareness etc) and passive (for example regulation or legislation) approaches must be implemented (Bishara *et al,* 2009). Burn injury campaigns are of fundamental importance as they evoke awareness of dangers and educate the public on how they should act in certain situations. They form a basis of an ongoing behavioural change modification program/s as we all know that prevention needs time, consistence and patients to effect change in behavior.

2.3.2 The Socio economic characteristics of a burn injury

Profiles of high-risk persons together with high-risk environmental factors must be identified in order to provide a solid basis for planning an effective burn prevention program (Duggan & Quine, 1995). Some of the socio economic characteristics of a burn would look at type of housing and living conditions, household income and its source of income, number of dependents, and the type of fuel used at home.

2.3.2.1 Type of housing and living conditions

The myriad of socio economic status (SES) factors related to type of residence and living conditions associated with burn injury risk have been described where substandard housing and poor living conditions have been associated with increased risk of a burn injury (Edelman, 2007). The physical spaces where burn injuries usually occur are typically in homes that comprise one or two rooms, with further temporary internal divisions made of curtains or tall boards. These rooms are utilised for various functions, depending on the times of day (Van Niekerk, 2010). Informal settlements were described as overcrowded, built of structures not fit for human habitation and easily susceptible to rapidly spreading

fires (Peck *et al*, 2002). There is a clear relationship between overcrowding, thermal burn injuries as well as the small dwelling spaces. A study done in Zimbabwe reported that lodgers lived in one room where 42% of burn injury death occurred with high percentage of females (Mzezewa *et al*, 1999). Because of lack of space, cooking is often done on the floor, amidst of women and children (Maritz *et al*, 2012)

2.3.2.2 No of people in a household

Limited literature reporting on the number of people in one household: In Harare, the median number of a household in Harare was 4 (range of 1-8) amongst lodgers (Mzezewa *et al*, 1999). A study done at CHBAH, paediatric burns unit in Soweto, Gauteng showed that the mean number of occupants per household was 5 and most subjects were living in informal settlements (Weedon and Potterton, 2011).

CHAPTER 3: STUDY AIMS AND OBJECTIVES

This study was carried out to provide an insight into the socio demographic profile and other characteristics of adult burn patients treated at Johannesburg tertiary hospitals (JTH) with the intention of tailoring the burn prevention programs to ensure maximum benefit of such health promotion initiatives. The aims, objectives and research questions are outlined as follows:

3.1 Aim

The aim of this study was to describe the socio demographic profile and other characteristics of adult burn patients treated at Charlotte Maxeke Johannesburg Academic Hospital (CMJAH) and Chris Hani Baragwanath Academic Hospital (CHBAH) during the study period (February-August 2006).

3.2 Specific Objectives

1. To study the socio-demographic profile of adult burns patients treated at Johannesburg Tertiary Hospitals (JTH) during the study period.
2. To describe the other characteristics of a burn injury sustained by adult burns patients treated at JTH during the study period.
3. To ascertain whether the burn patients believe that their burn injuries could have been prevented.

3.3 Research questions

1. What is the socio-demographic profile of burn patients treated at JTH?
2. What is the major cause of the burn injuries sustained by adult patients treated at JTH?
3. Where does a burn injury occur among the adult burn patients treated at JTH?
4. What are the factors perceived to be contributing to burn injuries in adult patients treated at JTH?
5. To identify whether the adult patients believe that their burn injuries could have been prevented?

CHAPTER 4: TOOLS AND METHODOLOGY

4.1 Research design

This was a descriptive study. Descriptive studies are often the first step of epidemiological investigation; they may examine the patterns by age, sex, ethnicity etc during specified periods or in various settings. (Beaglehole *et al*, 1993). A cross-sectional study is an observational ; it measures prevalence and is often referred to as prevalence studies and are relatively useful for investigating exposures that have fixed characteristics of individuals such as socioeconomic status, blood groups etc. (Beaglehole *et al*, 1993). This means that researcher recorded information from the patients' files and interviews about participants without influencing the study environment. The study investigated the socio demographic profile and other characteristics of adult burns patients treated at Charlotte Maxeke Johannesburg Academic Hospital (CMJAH) and Chris Hani Baragwanath Academic Hospital Chris (CHABH) during a seven month study period, from February-August 2006.

Based on the above paragraph, descriptive studies were chosen to describe the socio demographic and other characteristics during a study period (current situation) at a point in time (cross sectional).

4.2 Research Methodology

Method is a style of conducting a research work which is determined by the nature of the problem, it was observed that different techniques can be used in the same research method. Survey, is concerned with the present and attempts to determine the status of the burn injuries at JTH. For example, the study presented here is a cross-sectional study. The study investigated the socio demographic profile and other characteristics of adult burns patients treated at Charlotte Maxeke Johannesburg Academic Hospital (CMJAH) and Chris Hani Baragwanath Academic Hospital Chris (CHABH) during a seven month study period, from February-August 2006. This study will investigate the observations using the interview and questionnaire survey methods.

When the research was commissioned to commence; the principal investigator did a pilot study; reviewed the data collection tools and started with the study in February 2006. From the participating JTH, the principal investigator traced the patients from the admission and OPD registers; located the patients in the respective wards and the JJABU where applicable. Ability to participate in the study was ascertained: that is they were not critically ill, not mechanically ventilated and were fully orientated to participate. The informed consent was explained to the burn patients and their permission to participate in the study was approved. Prior to conducting the interviews, information from the patients' files was captured in the data management tool as well as data from the structured interviews conducted.

On identification of a patient who was not ready to be included in the study, his/her name would be captured on a separate sheet and kept so that his/her medical status can be assessed in the next visit. On the next visit, if found to be able to participate, the process of informing the burn patient about the study, getting informed consent and conducting an interview will be done. It was observed that when returning to the JTH, the patients previously checked but were not ready to participate in the study would be reported to have died, left the facility or discharged. A lot of patients initially tracked would be lost this way.

4.3 Study population

The study population included all the adult burn patients treated at JTH during the study period (February – August 2006). Patients assessed at JTH and immediately referred elsewhere were excluded e.g. a minor burn injury patients seen at JTH then referred to the nearest district/smaller health facility for management as outpatients in that facility. Also major burn injuries presenting at JTH emergency unit, requiring hospital admission for the treatment who could not secure a bed at JTH; these patients were then referred somewhere else (possible to a regional or district hospitals) were also excluded in this study.

Therefore, the study population consisted of patients only at JTH during the time of study; patients down referred to other facilities were excluded.

4.4 Sample size

A convenient sampling method was used, where all available patients (excluding patients that were critically ill, mechanically ventilated and not fully orientated patients) were approached to give consent to participate in the study from both hospitals and were interviewed during the study period. The sample size (100) was determined by the total number of eligible patients available for participation at JTH during this period. Only patients that were treated in JTH were included; those that were admitted to JTH and immediately referred to other health facilities for further management were not included in the study.

A total of one hundred patients from both hospitals were interviewed over the seven month study period, the end of August considered the end of the winter season, with notably decline in new admissions over the study period. A similar study on the socio economic and clinical factors predictive of paediatric quality of life post burn, done at CHBAH burn unit (paediatrics) had a sample size of 70 subjects due to high number of children lost due to follow up (Weedon and Potterton, 2011). In this study, a sample size was determined by the number of new patients available at the JJABU at CHBAH; the number of patients at the CMJAH and CHBAH trauma and surgical. It was observed that patients admitted in other wards (trauma and surgical) would stay for a short period, and then transferred out of the hospital, this phenomenon was reported in Australia where half of the burn patients experienced inter-hospital transfer (Belinda *et al*, 2011). At JTH, this was done, however it posed a challenge as most of the patients previously not seen due to their medical condition, but were traced would not be available for participation in the next visit. This is another reason that has affected the size of sample size over the seven month study period resulting in a smaller sample size.

The patients' recruitment to participate in the study was done soon after tracing them using the trauma and OPD admission registers. All patients that were eligible to participate in the study that were

approached to form part then recruited and they all agreed to participate. The only patients that did not form part of the sample at JTH were those that were initially excluded in the criteria above.

4.5 Data collection tools

A quantitative researcher needs to construct an instrument to be administered in standardised manner according to predetermined procedures (Golafshani, 2003). The socio demographic profile and other characteristics of adult burns patients treated at Charlotte Maxeke Johannesburg Academic Hospital and Chris Hani Baragwanath Academic Hospital from February-August 2006 study was investigated using the following data collection tools:

- Admission registers from the hospitals' trauma departments provided the information needed to identify and locate the burn patients who are admitted.
- Appointment records from OPD containing scheduled patients' visits were used to identify the patients that were discharged and have not participated in the study as inpatients
- The confidential patient list was kept by the investigator to capture all the names of the patients already participated in the study to avoid double counting/ missing out patients.
- Patients consent forms was used for patients to give their permission to participate in the study, it was signed by all participants prior commencing.
- Structured interview form (Questionnaire - attached in Annexure 1) was used to gather the relevant information not found in records. The questionnaire consisted of the following sections:
    - *Information from the patients file*:

    Section 1: Information from the patients file - (such as hospital classification, date of birth (DOB), type of burn, type of management done to date, date of admission This information was extracted directly from the patient's medical records prior the interview commenced. Some patients would not have been able to remember this information to give it in the interview; hence it was gathered from the files.

    - *Information gathered during interview*

Section 2: Looks at the demographic information such as age, gender, marital status, economic profile, citizenship, language, place of stay, nature of dwelling.

Section 3: Perception of the social risk factors to burn injuries as reported by patients: such as type of fuel used at home, burn incident history, cause of burn, and whether the burn injury could have been prevented, if they remember and what can they do to prevent it in future.

4.6 Validity and Reliability

Joppe (2000) defines reliability as: The extent to which results are consistent over time and an accurate representation of the total population under study is referred to as reliability and if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable, quoted in Golofshani (2003). Embodied in this citation is the idea of replicability or repeatability of results or observations (Golofshani, 2003). The data instrument can be used for another similar research over and over again and similar results could be achieved within applicable contexts. The researcher's data collection instruments were submitted to Post-graduate committee, after which the pilot study on the instrument was done at CMJAH prior commencing the study. It was confirmed that the research instrument produced results that were repeatable and consistent; it is for these reasons that the researcher thinks the instrument is reliable.

Coming to validity; Joppe (2000) provides the following explanation of what validity is in quantitative research: Validity determines whether the research truly measures that which it was intended to measure or how truthful the research results are. In other words, does the research instrument allow you to hit "the bull's eye" of your research object? The study investigated the socio demographic profile and other characteristics of adult burns patients treated at JTH during a seven month study period, from February-August 2006. The results of the study do answer the research question at hand. Researchers generally determine validity by asking a series of questions, and will often look for the answers in the research of others, quoted in Golofshani (2003). However, the study may have had some challenges of validity if this

was not identified earlier and addressed prior data collection, where the patients reported not to be working, yet reporting that they are the bread winners in their household. In this sense, the involvement of the researchers in the research process would greatly reduce the validity of a test (Golofshani (2003); the investigator was much aware of this during interviews.

4.7 Data analysis

Data extracted from patient's completed questionnaires was captured using the MS Excel 2007 program by the principal investigator as soon as possible after the interviews; this was the raw data for analysis. On completion, when all the 100 questionnaires were entered in MS Excel, the data was cleaned – checking against the questionnaires to ensure that all the raw data captured is a full representation of the interview process and data from patients' medical files; this meant that the questionnaire responses were checked for completeness, consistency and accuracy.

A data analyst was employed to assist with analysis using the STATA program. It was guided by the need to address the research questions: to describe the socio-demographic profile characteristics, the other burn injury characteristics and factors contributing to burn injuries in adult patients treated at Johannesburg Tertiary Hospitals (JTH).

The appropriateness of which descriptive measure to use depends on the data type and the research questions. There four broad categories of measuring scales: nominal scales, ordinal scales, interval scales and ratio scales and data can be presented in various forms like histogram, frequency tables, cross tabulations and pie charts (Beaglehole, 1993). In this study measures of central tendencies were used e.g. range, median and mode.

4.8 Data Management

Only the principal investigator collected data from interviews using the attached questionnaire, (annexure). The first part of the data collection sheet needed information from medical files, it was necessary to extract this information this was as the patients may not have remembered it. The information was extracted before the interview as soon as the consent was signed. At the end of data collection, all questionnaires sheets were checked for completeness in order to identify any possible missing data due to failure of answering specific questions. These were investigated, corrected where possible and noted before analysis so that there was no missing data in the questionnaire. All questionnaires were completed appropriately and all the answers filled in correctly.

Inconsistencies were noted when patients were asked whether they work, they would report that they do not work but also report to be the main bread winners in their households. They would cite that they are getting money somehow as they have to provide for their families.

4.9 Ethical Considerations

- *Ethical approval*: approval of the Human Research Ethics Committee (Medical) of the University of the Witwatersrand was granted before commencing the study. The Ethics number is **R14/49Ncedani** approved on the 28 October 2005.

- *Confidentiality:* The principal investigator interviewed all the patients; information obtained from the patients files and the interview was treated with the utmost confidentiality. No names of participants appeared on the data collection sheet. Patient coding was used to identify each record and was accessible to the researcher only.

- *Ethical measures taken included*: the informed consent was signed by patients prior participation to the study; the right to withdraw from the study at anytime was explained to the

patients prior participation and confidentiality and anonymity were maintained throughout the study.

- *Privacy and the dissemination of the final results*: no names were used in the data collection sheets. The final report is the tool for the dissemination of the study; only collective responses were reported upon. The participants were informed that the copy of the findings will be made available to the CHBAH Burns Unit, the CMJAH trauma and the Public Health Directorate in the Gauteng Department of Health (GDoH)

4.10 Study limitations

- This study had a small sample size of only 100 participants over seven months (February – August) study period; the small sample size could affect the representivity of the sample to the greater population, thereby affecting the applicability of the study to greater population. This was due to the fact that JTH would assess the burn patients and immediately refer them to other facilities depending on the severity of the burn injury d due to availability of a bed. Also the exclusion criteria (critically ill patients, mechanically ventilated and patients with decreased level of consciousness) further decreased the sample size. It was noted that the CHBAH had a slower turnaround of patients in the Johnson and Johnson Adult Burns Unit (JJABU) and CMJAH trauma wards would transfer patients out as soon as they are stable resulting in loss of follow up. Despite all the challenges relating to small sample size, it must be noted that the results of the study addresses the research questions adequately and can be used as the baseline study for further similar studies.

- The study was only a descriptive study where only the socio demographic profile of adult burn injuries and other characteristics of adult burn patients at JTH were was studied and descriptive studies have limitations of sometimes not able to provide adequate details to enable formulation of a preventative strategy (Beaglehole *et al*, 1993).

- The quality of the data kept in the trauma admission registers determined the pace and success of locating the patients for participation during the study period. Patients admitted in surgical wards would be transferred within the hospital and the admission register would not be updated. This caused delays in tracing the burned patients within the hospital. Sometimes patients names would not be entered correctly resulting in further delays in tracing them to surgical wards for participation.

- The challenge of language barriers posed a major threat to the quality of the data collected. In a case where the participant does not understand English – the researcher had tried to interpret the questions into a language more accessible to the patient.

- Both hospitals are public sector entities. Patients admitted here may have a similar characteristics and patients in private sector would have provided a different profile and thus affecting the applicability of this study to that setting.

- The study focused only on adult burns patients treated at JTH and most literature has revealed that children are more prone to burn injuries.

- Lastly, both hospitals are situated in Johannesburg Metro (CoJ); this may give skew presentation of demographics of patients especially in relation to places of residence especially if the referral pathways are not effective as CHBAH JJABU is the only burns unit in Gauteng Province.

CHAPTER 5: RESULTS

The analysis will focus on the burn injuries and characteristics of adult burn patients treated at the JTH study; it will be divided as follows:

- *Section 1*: The socio demographic profile of adult burn patients
- *Section 2*: Other characteristics of adult burn patients (the socio economic and burn injury characteristics)

5.1 The Socio demographic profile of adult burn patients

Data analysis focused on the socio demographic profile of burn patients: information such as age, gender, race, marital status, language spoken at home, level of education and income details of burn victims as well residency details.

5.1.1 Age, gender, race, marital status and language distribution

The results showed that males accounted for 71% (n=71) while females accounted for 29% (n=29) of all burn patients. The median age was 31.5 years with a range of 18-86 years. The age variable was further stratified into: 18-24, 25-39, 40-64 and >65 years age groups. Results showed that 49% (35 males and 14 females) of burns occurred in the 25-39 year old age group; followed by 30% (18 males and 12 females) in the 40-64 year old age group; then 18% (17 males and 1 female) presented in the 18-24 year old age group and 3% (1 male and 2 females) over 65 year old age group, see table 3 below.

The results on racial characteristics showed that the majority of burn patients were Black/African with 94% (n=94); followed by Coloured with 4% (n=4) and Indian and White with 1% (n=1) each.

On the other hand, the marital status of burn patients showed that 70% (n=70) of burn patients were single; 22% (n=22) were married; 6% (n=6) were widowed and 2% (n=2) were divorced, see table 2, below)

Table 2: Distribution of age, gender, race, language and marital status

Sex/ Gender distribution	No	Percentage
Males	29	29%
Females	71	71%
Age distribution		
18-24	18	18%
25-39	49	49%
40-60	30	30%
Greater than 60 years	3	3%
Race presentation		
Black / African	94	94%
Coloured	4	4%
Indian	1	1%
White	1	1%
Marital status		
Single	70	70%
Married	22	22%
Divorced	6	6%
Widowed	2	2%
Languages mostly used at home		
South African vernacular	85	85%
English	1	1%
Afrikaans	4	4%
Non South African Language (Other)	10	10%

The language mostly used at home by the burn patients was stratified into each of the South African (eleven official) languages and other non-South African languages (for example French, ChiShona). On analysis, it was observed that 85% (n=85) of the participants spoke mostly one/two of the nine vernacular languages at home [IsiZulu, IsiXhosa and Southern Sesotho languages were mostly spoken by 32% (n=32), 17% (n=17) and 15% (n=15) of the participants respectively], followed by 4% (n=4) of participants who spoke mostly Afrikaans and 1% (n=1) spoke mostly English at home. The “other” languages e.g. Swahili, ChiShona and other non-South African languages were spoken by the 10% (n=10) of the burn patients at their homes, see table 2 above.

5.2.3 Education and employment details of burn patients

The educational status of the burn patients was as follows: 2% (n=2) had no formal education; 27% (n=27) had primary school education; 62% (n=62) had secondary education and 9% (n=9) had tertiary or post-matric education.

Table 3: Education, employment and income details of adult burn patients

Education	**No**	**Percentage**
No formal education	2	2%
Primary school education	27	27%
Secondary School education	62	62%
Post Matric / Tertiary education	9	9%
Employment details		
FT employed	51	51%
Casual employed	22	22%
Unemployed	27	27%
Type of work		
Administration	7	7%
Domestic	13	13%
Self-sustaining (not employed)	25	25%
Industrial	55	55%
Source of Income		
SOI (not main breadwinner)	50	50
Breadwinner	47	47
No income	3	3

Self sustaining jobs were not regarded as employment by respondents.

The following is the presentation of employment status: 51% (n=51) had full time employment; 22% (n=22) were casual employees and 27% (n=27) were unemployed. Of those that were employed, these patients worked in the following environments: 13%, (n=10) were doing domestic work; 7%, (n=5) were in an administration environment; 55%, (n=40) were in the industrial sector; 25%, (n=18) were doing self-sustaining jobs (for example *Spaza* shops - selling a packet of cigarettes or doing tricks on streets).

5.2.3 Residential status, residency and place of origin of burn patients

The summary of the residence status showed that 97% were South Africans, of these89%, (n=89) were citizens and 8%, (n=8) permanent residents. 3% non-South Africans, where 2%, (n=2) were legal immigrants and 1% (n=1) was an illegal immigrant.

The place of origin of patients prior to the burn incident, presented with the following results: 47%, (n=47) of patients were from outside Gauteng Province but within South Africa, where 15% (n=15) of them were coming from the Eastern Cape and KwaZulu-Natal. 42%, (n=42) of burn patients were Gauteng Province residents and 11%, (n=11) were from outside the borders of South Africa (non-South Africans).

The residential distribution of burn patients in the province across the five districts (see figure 1, page 1) was as follows: 87%, (n=87) resided in the City of Johannesburg; 10%, (n=10) stayed at the Ekurhuleni & Sedibeng districts and 3% (n=3) came from the Tshwane & Metsweding districts.

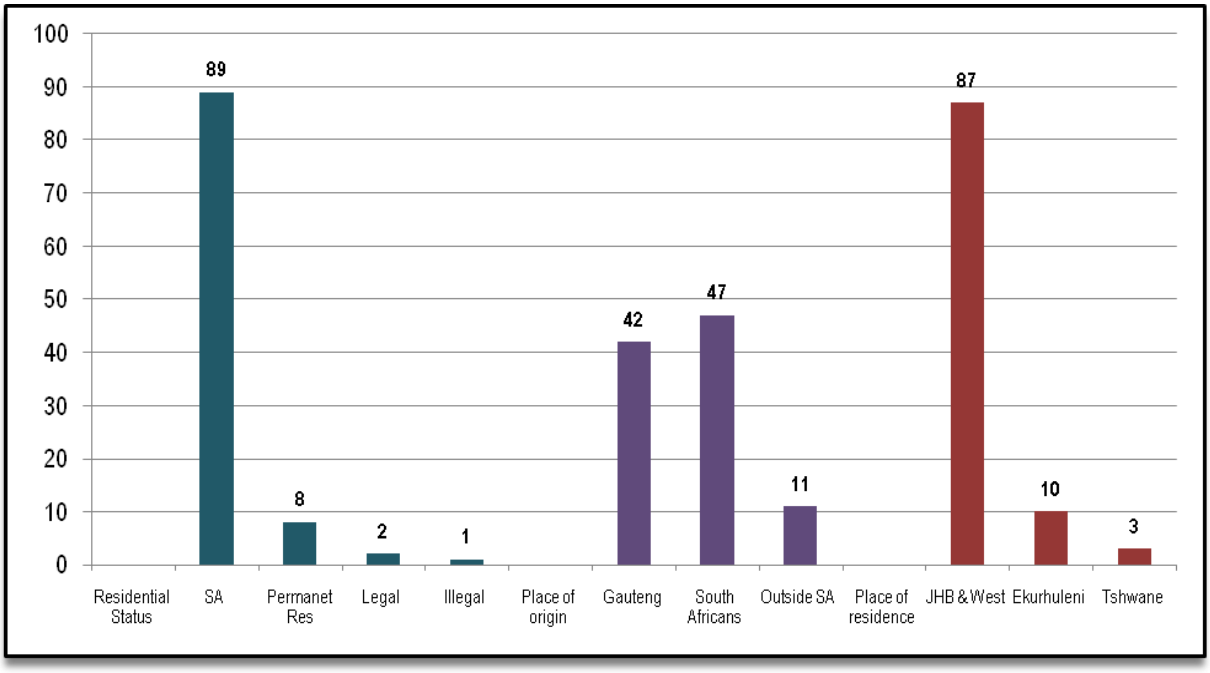


Figure 2: Residential status, Place of origin and place of residence

5.2 The Other characteristics of adult burn patients

The other characteristics of burn patients are the socio economic and the burn injury details.

5.2.1 Socio economic characteristics.

The following socio economic characteristics of burns will be presented: residential and dwelling details and income details will be presented in this section.

5.2.1.1 Residential and dwelling details

The sub-section will report on how long patients have stayed, number of people in the household, number of rooms and the fuel used mostly at home.

The number of rooms patients stayed indicated that 44% (n=44) of burn patients stayed in one-roomed apartments and 56% stayed in more than one-roomed dwellings.

The length of stay responses indicated that 26% (n=26) of patients stayed less than two years, 37%, (n=37) of patients stayed for a period of 3-10 years and longer than ten years each in their years in their residential suburbs

The range of people staying in one household was 1- 30: 18% (n=18) of patients stayed alone, 59% (n=59) of patients stayed with two to five people and 23% (n=23) stayed with more than five people, see figure 3 below

Fuel used mostly at home was electricity with 53% (n=53); 21%; followed by fossil fuel in 21% (n=21); 16%, (n=16) patients used a combination of fossil and electricity. 10% (n=10) of patients had illegal electrical wiring in their homes.

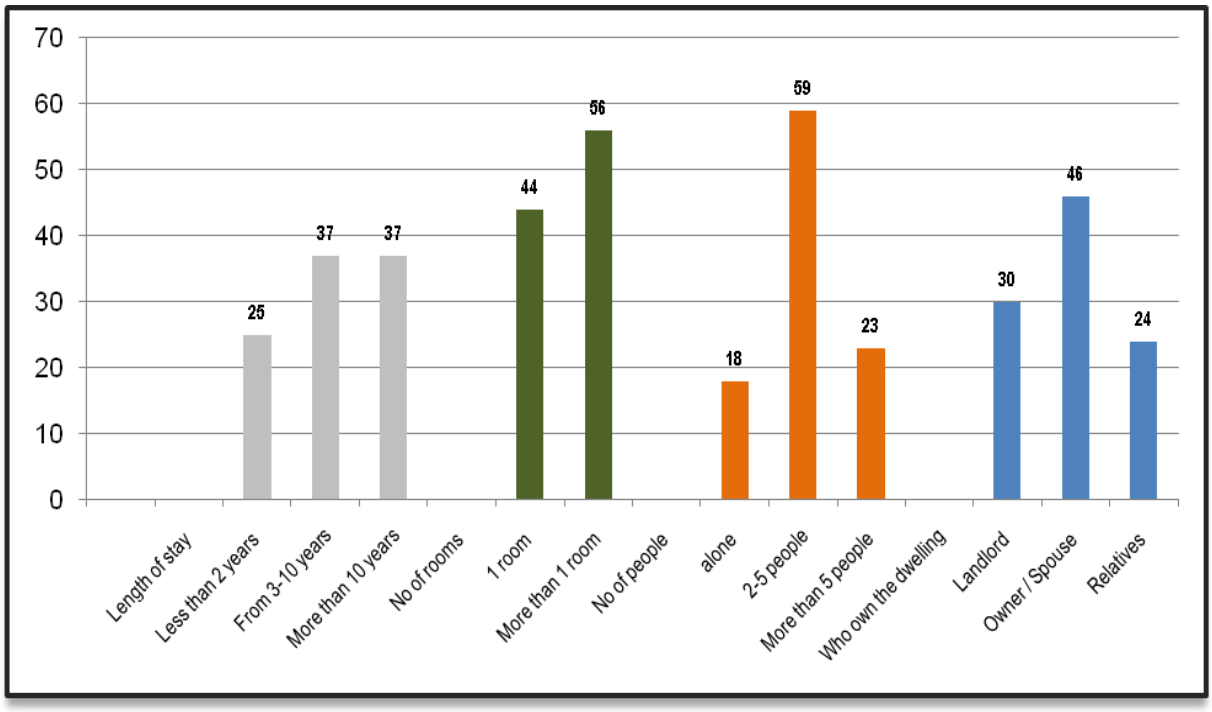


Figure 3: Residential and dwelling details of burn patients

5.2.1.2 Household income details

Household income reported include hospital classification of burn patients, sources of income and the breadwinner at home, number of dependents, home ownership, car ownership, estimated cost of the patients homes .

Sources of income reported were as follows:

- 56% (n=56) patients were providing their own income
- 31% (n=31) patients reported another person providing income to their household
- 2% (n=2) patients reported no income at all
- 13% (n=13) patients reported to receive child support grant/old age grant
- 11 (n=11) patients received a combination of income

Some patients reported they received the income and a form of grant together, combination income represents those individuals with two or more incomes in their households see table 4 below.

The number of dependents that relied on the burn patients' income was as followed:

- 57% of patients supported 0-3 dependents,
- 36% patients supported between 4-6 dependents,
- 7% of patients supported more than six dependents

Ownership of dwelling indicated that 30% (n=30) of the patients stayed in rented properties, 46% (n=46) owned their property or were staying with spouse or lifetime partner and 24% (n=24) stayed with relatives, see figure 3 above.

Ownership of the motor vehicle was reported to 9% (n=9) of respondents and 91% (n=91) did not have any vehicles. Of those that owned motor cars, 5% (n=5) were below the cost of R20 000.00 and 4% (n=4) were between R20 000.00 – R50 000.00.

The estimated value of the household properties was reported as: 51% (n=51) of properties were estimated below R20 000.00, followed by 27% (n=27) of properties estimated between R20 000.00 to R100 000.00, 15% (n=15) of properties were reported to be above R100 000.00 but exact value not known and 7% (n=7) of patients did not know the estimated value of their residence/ properties.

Breadwinner contribution to households was 47% (n=47) of the adult burn patients' income supported dependents as breadwinners. 50% (n=50) patients were not breadwinners, were thus providing some source of income (SOI) for their households and 3% (n=3) of patients did not have any income at all.

Burn patients reported that their household is in need of major repairs (91%, n=91) and minor repairs (9%, n=9); where major repairs indicate defective plumbing, cracking on wall/ceiling and floors and minor repairs include broken windows, loose tiles etc.

Hospital classification (Uniform Patient Fee Structure -UPFS) is an income based payment method utilised in the public sector, South Africa. Departmental UPFS means 93% (n=93) are H1 classification, 3% (n=30) are H0 and H2 each and only 1% (n=1) was a private patient. Hospital classification is and

Table 4: Household income details

Admission after burn injury	**No**	**Percentage**
With 24 hours	88	88%
Within 48 hours	10	10%
After 48 hours	2	2%
Hospital Classification	**No**	
H1	93	93%
H0	3	3%
H2	3	3%
PP	1	1%
Number of dependents		
0-3	57	57%
4-6	36	36%
More than 6	7	7%
Breadwinners		
Main breadwinner at home	47	47%
Provided some income (SOI)	50	50%
No income	3	3%
Estimated value of their home		
Less than R20 000.00	51	51%
R20 000.00 – R100 000.00	27	27%
More than R100 000.00	15	15%
Unknown	7	7%
Ownership of a motor vehicle		
No motor vehicle owned	91	91%
Motor vehicle owned (<R50 000.00)	4	4%
Motor vehicle owned (<R20 000.00)	5	5%
Household repairs needed		
Major repairs	91	91%
Minor repairs	9	9%

5.2.2 Burn injury details

This is the last section of results section; it will be divided into the characteristics of a burn injury itself and burn prevention details.

5.2.2.1 Burn injury characteristics

Burn injury characteristics, which include the type of burn, severity of the burn injury, place of occurrence of a burn injury, presentation to hospital after burn, treatment of burn will be presented.

The most common type /agent of burn injuries was flames with 68%, (n=68); followed by 24%, (n=24) due to hot liquids/scalds and then 6% (n=6) electricity and 2% (n=2) sustained due to chemical burns, see table 6 below.

94%, (n=94) of the burn incidents occurred at home and 6%, (n=6) at the place of work.

Patients presented to hospital within the first 24 hours after the burn incident accounted for (88%, n=88), followed by 10% (n=10) presenting in emergency rooms within the first 48 hours and 2% (n=2) presenting after 48 hours.

The treatment of burn patients varied according to the severity of the burn injury, where 78% of burn injuries were surgically treated and 22% had conservative management. (see table 5, below)

The severity of burn injuries sustained is divided into the extent (surface area) and grade (depth) of burn injuries which is presented as follows:

- Extent of a burn (surface area): 15% (n=15) of the patients had burns covering less than 9% of the TBSA; 11% (n=11) of patients had major burns of more than 30% TBSA and 74% (n=74) of patients had burns of 10-29%TBSA.
- Grade of a burn (depth): 5% (n=5) of patients had previous/older burns; 11% (n=11) of patients had superficial burns; 18% (n=18) of patients had full thickness burns; 31% (n=31) had combination burns and 35% (n=35) had partial thickness burns.

Table 5: Characteristics of a burn injury

Extent of a burn	No	percentage
<9% TBSA	15	15%
10-29% TBSA	74	74%
>30% TBSA	11	11%
Degree of a burn		
Superficial	11	11%
Partial	35	35%
Full	18	18%
Combination	31	31%
Older burns	5	5%
Treatment of burns		
Surgical	78	78%
Conservative	22	22%
Type of burn		
Flame	68	68%
Scalds	24	24%
Electrical	6	6%
Chemical	2	2%
Presentation to hospital		
Within 24 hours	88	88%
24-48 hours	10	10%
More than 48 hours	2	2%

5.2.2.2 Burn injury prevention

Burn injury prevention reported on the following: what happened; if the patients could remember the incident; can the incident be prevented if so, how?

The majority of the patients, 92%, (n=92) remembered what events led to their burn incidents and 8%, (n=8) of patients did not remember their burn incident at all.

Patients were requested to explain what happened during their burn incident: 51%, (n=51) of patients believed that their burns were a result of an accident. 16 %, (n=16) of patients had burned because of medical reasons (e.g. seizures) and poor judgement. The burn injuries from violence, faulty electrical equipment and traditional practises (e.g. traditional herbal/*muti* steam) contributed to 8% (n=8), 12% (n=12) and 13% (n=13) respectively.

Despite the events leading to their burn incident, 81%, (n=81) thought that their burn injury could have been prevented and 17% patients did not think that their burn incidents could have been prevented, with 2% of patients not knowing if their burn could have been prevented or not.

When patients were asked how could their burns incident be prevented, they reported: 74%, (n=74) of patients believed if they would change their behaviour, citing proper electrical tubing in their homes, taking prescription medicine well (medical problems like seizures), being more careful around the heat sources and their modification thereof, being more careful when using traditional medical /*muti,* more precautious when operating the stove/hot surface when cooking/heating/steaming as well as if they could reduce the alcohol or related substance intake that impair judgement.

10% of patients believed their burn injuries were accidental and do not know how they could have been prevented them and lastly, 16% believed their burn injuries could not have been prevented at all, this

group associated their burn injuries to witchcraft and non-preventable reasons leading to their burn incident, see figure 4 below. This is a group that may be difficult to change its behaviour to prevent their burn injuries in the future.

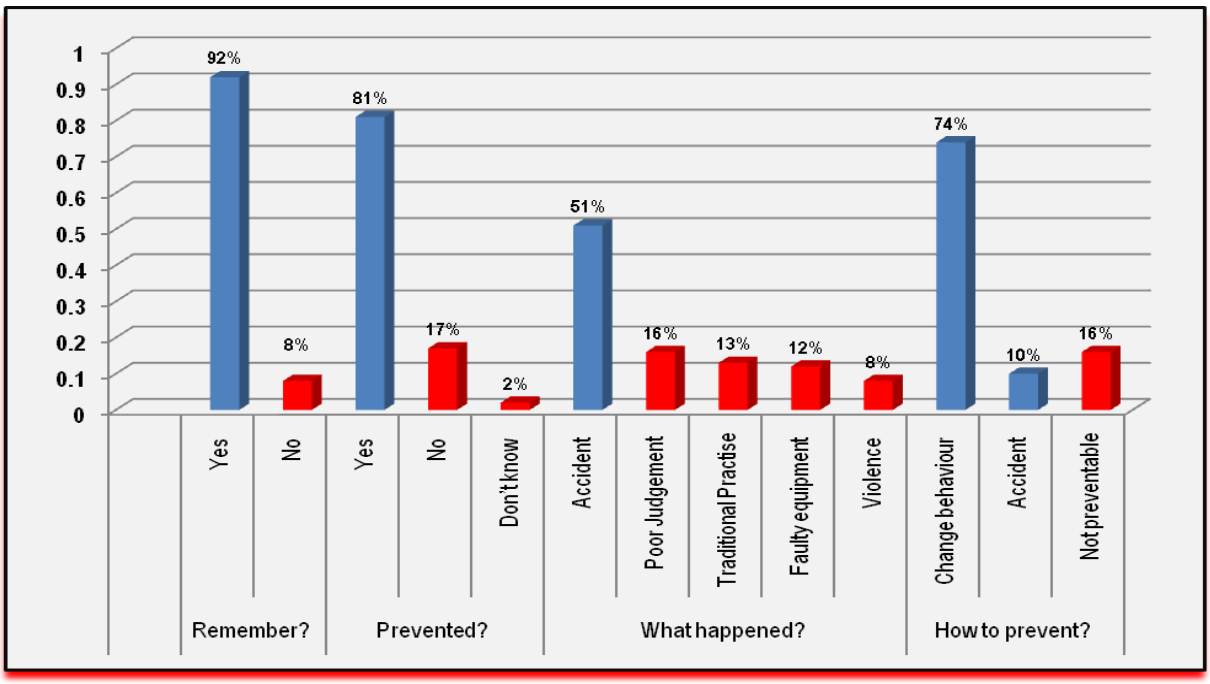


Figure 4: Burn injury prevention

CHAPTER 6: DISCUSSION

This study described the socio demographic profile and other characteristics of adult burns patients treated at Johannesburg tertiary hospitals (JTH) during the study period (February–August 2006). The researcher will use the following discussion areas:

- The socio demographic profile of adult burn patients
- Other characteristics of burn patients
- Can a burn injury be prevented?

6.1 Summary of research findings

In summarizing the research findings, it is important to look at the research questions to see if the research has managed to answer these questions and whether there are any gaps that will be discussed at a later stage, see table 6 below.

Table 6: research questions and summary of research findings

Research question	Research finding relating to the question
1) What is the socio-demographic profile of burn patients treated at JTH?	71% male, between ages 18-86 years, mean age of 35.6 years. Likely to be African (94%), single (70%), speaking one of 9 vernacular languages (85%), with secondary school education (62%), residing in CoJ (87%).
2. What is the major cause of the burn injuries sustained by adult patients treated at JTH?	Flames (68%).
3. Where does a burn injury occur among the adult burn patients treated at JTH?	At home (94%).
4. What are the factors that led to the burn injuries in adult patients treated at JTH?	Accident (51%) Medical conditions/ poor judgement (16%) Faulty equipment/Modified electrical sources (12%) Traditional practices (13%) Violence (8%)
5. To identify whether the adult patients believe that their burn injuries could have been prevented?	Remembered (92%).Burn prevention (81%), if behaviour can change (74%).

6.2 The socio demographic profile of adult burn patients

The critical finding of the study is the description of the socio demographic profile of the adult burns at JTH during this study period. The socio demographic profile of adult burns patients was consistent with literature where flames were reported as the major cause of burns in adults male population (Sadeghi-Barzargani & Mohammadi, 2012), within an average age of working age group (Allorto,2009; Belinda *et al,* 2011) amongst the African patients (Weedon and Potterton,2011). The following discussions will be focused on the analysis of the socio demographic profile of adult burn patients: age, gender, race, marital status, language mostly spoken at home, the level of education and the income details of burn victims as well residency details will be discussed below.

6.2.1 Age and sex/gender

Age and sex are the important determinants of injuries, including burns (Ashraf *et al*, 1997). Higher ratios of burns between males and females have been reported to be around the world at 2:1 (Tang *et al*, 2006; Yuan *et al*, 2011; Haik et al, 2007; Larajet & France, 1995; Pardo, 1993 and Song & Chua, 2005), this is in line with this study, where males (71%, n=71) were reported to have been burned in this study. This is due to males being perceived to be more at risk of burn injury than females due to reasons to exposure at work (Ashraf *et al*, 1997) and predisposed to higher risk behaviors (Song & Chua, 2005) making them more prone to burn injuries. Even though only 10% of burns are treated in hospitals, in South Africa, patients must fulfill specific burn admission criteria (DOH 2004); males are still having a higher rate of hospital admission than in females (Josaik *et al*. 2001). They are also reported to have higher incidences of mortality due to fire related burns with TBSA of greater than 30% (Yuan *et al*, 2011). This finding is consistent with other studies done in similar environments and was anticipated due to the current studies reporting them as high risk group to burn.

However, some studies done in East Asia and some African countries reported that females are more predisposed to burn injury, those results are especially reported where women spend a lot of time

confined to domestic origin of the burns, possibly in the kitchen wearing loose clothing (Sachil *et al,* 2013 and Mzezewa *et al*, 1999). Although women are reported in this study (29%), this finding is contrary to the other African studies done in East Asia to cultural difference; African women in urban area do not wear loose clothing in Gauteng over the winter season although they may spend their time indoors. However, Iran studies showed the use of traditional of samovar (traditional stove) where housewives are at greatest risk (Morteza *et al*, 2010); this could mean that the use of modified heat sources reported in this study to be used in this study could endanger women to have a burn injury and is a major concern for prevention.

When looking at the age, numerous studies done in South Africa and other countries revealed that age of the burn victim is a main determinant of a burn injury (DOH, 2004; Van Niekerk, 2010 and Van Niekerk, Laubscher & Laflamme, 2009). The age distribution range in this study was 18-86 years, with a mean of 35.6 years; one could argue that this is the productive age, and it may add a socio-economic burden to patients, employers and government, as these patients are supposed to be working during this time of their burn and after the burn incident. This finding on age bears economic implications as South Africa has the unemployment rate of 25.2% and 60.2% job seekers do not have matric in (Stats SA, 2011). More studies on outcome of a burn injury, its impact to return to work amongst the working age groups are desired to fully understand the economic and psychological impact of burns is desired.

6.2.2 Education and employment details

Education is the important factor in predicting the risk of burn indicating that the young and poorly educated are at higher risk and the college-educated at lower risk than expected (Darko *et al*, 1986). This concurs with the finding of this study where most adult burn patients had secondary school education (62%, n=62) and patients with post-matric qualification had only 9% (n=9). The results were expected in this province and are similar to results to Gauteng Province literacy and education information where most of Gauteng's' residents were reported to have progressed beyond primary

school: 34% have secondary schooling, 28% have matric education and 12.6% have post-matric qualification (Stats SA, 2011).

In terms of employment, there is a high likelihood that patients with less education level engage with those occupations with higher risks (Darko *et al*, 1986). In this study; 51% (n=51) of patients were working fulltime 22% (n=22) of patients were working as casual and 27% unemployed. Of those that were working (73%, n=73): 13%, (n=10) were doing domestic work; 7%, (n=5) were in administration environment; 55%, (n=40) were in the industrial sector and 25%, (n=18) were doing self-sustaining jobs. Self sustaining jobs were not regarded as employment by most participants, these included *Spaza* shops in informal settlements, circus tricks in taxi ranks, some not disclosing what they really do etc. Even though not considered as work by participants, they earned some income that allowed them to see their basic needs.

The working population is more likely to suffer a burn incident particularly in the 16-55 year age groups (Yaun et al, 2011); this represents a substantial socio-economic burden owing to the total numbers of man-hours lost from work (Schembrik *et al*, 1994) and could result in burn victims experiencing difficulties in returning to work (Soman *et al*, 2009) due to significant impairment of physical function (Sliwa *et al*, 2005). Factors that have been correlated with the prognosis of a burn injury are: gender, older age, aetiology, body site and severity of burns where major burns are a poor prognostic indicator of functional outcome (Druery *et al*, 2005). One could argue that burn patients reported working as the full-time and casual employees, in unskilled labour fields, in this study, may not have their jobs when they are ready to return back to work. Furthermore, those that are able to return to work might also have challenges related to their ability to perform the labour intensive tasks that are needed in their job situation after their burn injury. It is documented that when persons' hands are burnt, it is a severe blow on the persons' economic activity (Keswani *et al.,* 2000) with critical challenges in the rehabilitation for the long-term functional outcome of the burn patient (Sliwa *et al*, 2005).

With low education levels reported in this study and similar studies in the country; rising unemployment in South Africa (StatsSA, 2011); decreased functional abilities due to the result of burns and associated long hospital stay from burn injuries; some of these patients may find themselves unable to return to work or secure a similar job. This study was not able to look at the specific outcomes of burn injuries and return to work, this was not in the scope of this research. However, it would be of great interest to know how this relationship and hence a suggestion of a study looking at these factors.

6.2.3 Race, marital status and language mostly used at home

These finding of burn distribution amongst Africans (94%, n=94), concurs with most literature. In other studies, the victims were predominantly black (Hiettiaratcy, 2004 and Darko *et al*, 1986) reflecting social inequalities in uneven patterns of energy distribution (Tang *et al*, 2006). If 94% of Africans has sustained a burn injury, the finding of language mostly used language at home (vernacular languages accounting for 85%, n=85) supports this results. Vernacular language is spoken by the Black Africans in South Africa; it is inclusive of all the native languages with the exception of English and Afrikaans which are also part of the 11 official languages of the country. This information is important for tailoring the burn prevention programs in the future for effective client acceptance and relevancy. The finding of this study was expected as Gauteng Province is an in-migration province, where most people from the neighbouring provinces and countries come in search for better job and education opportunities.

It was noted that most studies do not report on marital status on the demographics of burn patients; however some Egyptian and Spanish studies did find the majority of males burned were not married (Ashraf *et al*,1997 and Pardo, 1993). In an Irish study, majority of single and separated people were reported to have had a burn injury; however the study found an association between these marital status and unemployment (Seoighe *et al*, 2011). The marital status of burned patients also concurs with the previous reported findings on this study where 70% (n=70) were not married. In a South African context,

cohabiting is recognised as a status in relationships, but it was not included as a marital status option for this study and some patients may be cohabiting.

Furthermore, the issue of migration labour into Gauteng Province has been associated with husbands leaving their wives in their homelands and countries; one can argue that those that reported to be married may still be staying alone in their households. Even though there is a high percentage (70%, n-70) of an unmarried people reported in this study; an association could not be made between marital status and the burn injury occurrence. More studies in the future should explore this relationship.

6.2.2 Residential status, residency and place of origin

Burn injury incidence and outcomes differ based on age and country (Soman *et al*, 2009). In the USA, Darko *et al* (1986) found that the majority of patients came from areas of highest housing density. The results of that study would be consistent with the findings of this study as the City of Johannesburg is the mostly densely populated area in Gauteng Province presented with findings of (87%, n=87). This district (CoJ) is one of the five districts, but has the two JTH where the study took place (see Figure 1 on page 1). I could argue that the huge variation in numbers per district is expected due to geographic proximity of both JTH to the CoJ. However; the JJABU situated in Chris Hani Baragwanath Academic Hospital is the only dedicated burns unit in the Gauteng Provincial Government with the but its patient residential details are not representative of Gauteng citizens but mainly that of the CoJ. This could also be dealt with more effectively by an effective referral system to the Burns Unit.

The place of origin of burn patients in this study showed that the patients migrated from other provinces within South Africa (SA) and from neighboring countries outside SA to the Gauteng Province. This is indicated by the patients' distribution where only 48%, (n=42) from Gauteng Province. Due to migration into the province one can also argue that the majority of patients (52%, (n=47) from other provinces are highly likely to reside in informal or communal living areas as demonstrated in this study, where a range

of number of people ranging from 1-30 per household. Statistics South Africa, 2011, showed that migration is the important demographic process in shaping age structure and distribution of provincial population and there is a steady increase of immigration to Gauteng Province over the last 10 years with a steady increase from 21.26% in 2001 to 22.39 in 2011 (StatsSA, 2011). A study done in Ireland showed (95%) Irish residence with only few people from other countries, (Seoighe *et al*, 2011) were burned; this is contrary to the findings of this study, where majority (58%, n=58) of the burn injuries were people from outside the Gauteng Province and South Africa – one could argue that the difference is due to socio-economic status of both countries. The migration patterns of burn patients were outside the scope of this study and more studies could be done in this area. From this study we found that most people migrate to Gauteng Province.

6.3 Other characteristics of adult burn patients

The other characteristics of burn patients are the socio economic and the burn injury details.

6.3.1 Socio economic characteristics.

Burn patients household income details

Burn patients that were bread winners at home (50%, n=50) and 47% (n=47) provided some source of income (SOI). Only 3% of patients did not provide the SOI or were not breadwinners at home. This finding in this research could be easily be confusing as it was reported in the previous section that unemployed burn patients constituted 27% (n=27). This finding (27%) concur with reports that 7 million young people do not have jobs in South Africa and the country has been experiencing high unemployment rate, in the last few years (Stats SA, 2011).

Information on who provides the income to the burn patients household reported was 56 %, (n=56) patients were providing their own income; followed 31% (n=31) of patients households received other

income. While 13%, (n=13) patients reported receiving child support grant/old age grant and 11% (n=11) of patients received a combination of income (from more than one source).

It is important to note that the above findings can be confusing, where burn patients previously reported not to work contribute to their household source of income and are breadwinners. There was an impression amongst the burn patients that those that are doing self sustaining work are not working. This is due to them not earning salary; these jobs include informal Spaza shops, doing circus tricks on taxi ranks, planting a patch of land and selling produce to neighbours etc. It was noted that some patients were not too eager to report on their income sources, but continued stating they support their families; this could be from a fear of disclosing what work they do as well as conflicting their statements made on submission for their hospital classification. The public sector in South Africa uses a hospital classification method to determine how much payment is due to patient and how much subsidy can be granted based on the persons income. In this study, 93%, (n=93) were on H1 (highest government subsidy level) for payment for hospital services received. A separate study with specific focus on the socio economic factors affecting burn injuries may give more information on this subject.

Hospital classification of burn patients

This study showed that 93 % (n=93) of patients were classified as H1, where H1 classification indicating the highest level of subsidy from the government for patients with single income of less than R36 000.00 or family income of less than R50 000.00 per annum (DoH, 2008). On admission patients are asked for the relevant information like identity documents, proof of address and proof of income for the hospital cashiers to do the assessment well. There are two factors that may be at play here, the first one is the patients' failure to disclose their ability to earn income, with the worry that if they do they may be charged more for services. The second factor may be the patients' medical condition on admission. Both these factors can result in patients being not accurately classified. There was only a single (n=1) patient on medical aid in this study; this is contrary to the reports by DoH (2008) where it was reported that 22% of

Gauteng population is on private health care insurance or medical aids (DOH, 2008). This could because this study was only done in JTH (both facilities are public sector facilities); different results on medical aid may have been reported if private health facilities were included in this study. As indicated in the limitations, a bigger study in both private and public sector is needed to fully understand the socio economic factors of burn patients.

The results on the presentation to hospital revealed that 88% (n=88) of burn patients presented to hospitals within the first 24 hours after a burn injury. The geographic proximity of the majority of patients (87%, n=87) to the two tertiary hospitals may have contributed positively to them seeking medical assistance within the first 24 hours after the burn incident. Whereas, 10%, n=10, of patients presented within the first 48 hours and only 2%, (n=2) presented 48 hours after their burn incident. Some patients reported to have consulted the traditional healer, for opinion prior coming to hospital as they have perceived some evil spirits regarding the circumstances around their burn and hence there was a delay in admission. A study done in Kwa-Zulu rural setting showed a median delay to the Ngwelezana Burns unit by 6 days whilst those that were closer to the hospitals delayed by 3-20 hours (Scheven, Barker and Govindasamy, 2012) . As both hospitals are within the CoJ, the finding is suggesting shorter time that most patients prior seeking medical assistance at the JTH.

Household condition and ownership of a motor vehicle by burn patients

When patients were asked about things they owned in their household, the results were as follows: car ownership was reported by 9% (n=9) with a value of less than R50 000.00 [5% (n=5) were below the cost of R20 000.00 and 4% (n=4) were between R20 000.00 – R50 000.00].

Burn patients reported that their household is in need of major repairs (91%, n=91) and minor repairs (9%, n=9); where major repairs indicate defective plumbing, cracking on wall/ceiling and floors and minor repairs include broken windows, loose tiles etc. Local study on burns reported that the burn injuries tend

to affect the urban poor living in informal settlements (Allorto *et al*, 2009), this study concurs with those findings.

Fuel mostly used at home

Multi-energy use is a characteristic of low-income households in South Africa, where electricity and kerosene are used interchangeable for lighting, cooking and heating (Peck *et al*, 2002). This study concurs with those findings where it showed that burn patients' used various forms of energy to heat, cook and light their homes with electricity reported by (53%, n=53) of the participants, followed by fossil fuel (21%, n=21), then combination (16%, n=16) and illegally or informally wiring their electricity either from nearby street pole or electrified source or township (10%, n=10).

However, studies done in Cape Town showed that the lack of electrification is a risk factor for burns (Peck *et al*, 2002). This is contrary to the current study where there is 53%, n=53 who had access to electricity and only 10%, n=10 had illegally or informally wired their electricity in their households putting themselves more at risk. This practice is usually done by the backroom dwellers, informal settlements with no electricity supply and those avoiding paying the electricity bills. The study done by Noble (2006) suggested that patients who suffered severe electrical burns may have poor quality of life during rehabilitation and beyond.

6.3.2 Burn injury details

Burn injury details will be discussed by looking at the burn injury characteristics and the patients' perceptions of whether their burn injury could have been prevented.

Severity and treatment of burn injuries

There is a general acceptance that injuries with high component of full thickness burn are a poor prognostic indicator of functional outcome ($p<0.03$) (Druery *et al*, 2005). This study reported 49% (n=49)

[31%, n=31) and 18%, n=18)] of patients having full thickness and combination burn respectively. In terms of the total burn area, 74% (n=74) had burns of 10-29% TBSA and 11 %, (n=11) of patients had major burns of >30% TBSA.

The severity of burns was found to be a significant predictor of quality of life which is to be expected and lengths of stay in hospital (Weedon and Potterton, 2011). Full thickness burns are severe form of injury depth usually requiring surgical procedures and rehabilitation. Physical rehabilitation of burn survivors allows them to resume a meaningful existence and is a key component in achieving a high quality of life (Soman *et al* 2009) and return to work. The management of burn injury to 78% of the burn patients was surgically, this means that patients had gone to theatre once or twice for debridement, skin grafting and related procedures. Only 22% of the patients had not been operated upon or gone to theatre during the time of the interviews. It is important to note that the 22% reported not to have undergone any form of surgical intervention may not have been just been admitted at the JTH. One could argue that patients will need rehabilitation during their treatment but this study was not investigating treatment of burns injuries.

Where did the burn occur?

The study showed that 94%, (n=94) of all the burn injuries occurred at home. Further exploration of home circumstances revealed that 30% (n=30) of the patients stayed in rented properties and 24% (n=24) stayed with relatives. Another finding of the study reported patients occupancy ranged from 1-30 people per household with patients staying in one roomed apartment amounting to (44%, n=46) and 56%, (n=56) stayed in apartments with more than one room. All of these factors point to overcrowding in these households. These findings are similar to studies done in Cape Town where a clear relationship between thermal burn injury and overcrowding as well as the small dwelling spaces was established. One of the factors associated with overcrowding is the issue of rural to urban migration has led to the mushrooming of informal settlements with no sustainable infrastructure to support their inhabitants

(Maritz *et al*, 2012). Because of lack of space, cooking is often done on the floor, amidst of women and children. In Cape Town the major place reported by patients admitted in Tygerberg Hospital, was domestic burns from cooking accidents (Peck *et al,* 2002).

Another interesting finding in this study is that 91% (n=91) of patients household need major repairs, major repairs being classified as structural repairs like defective plumbing, cracking walls/ceiling and roof. This concurs with a finding, stating informal settlements building structures are easily susceptible to rapidly spreading fires (Peck *et al,* 2002 and Allorto *et al*, 2009) resulting in injuries due to shack fires and fuel stoves (Maritz *et al,* 2012). The physical spaces where burn injuries usually occur are typically in homes that comprise one or two rooms, with further temporary internal divisions made of curtains or tall boards. These rooms are utilised for various functions, depending on the times of day (Van Niekerk, 2010).

What caused the burn injury?

The results of this study showed that flames were the most common cause of burns with 68%, (n=68), This is in line with the other studies, where flames were reported to be the most common agent of burn (Ashraf *et a*l, 1997; Schrembi *et al*, 1994 and Dugg & Quine, 1995) especially in studies done in the developing world during the colder months of the year from June to August, (Barradas, 1995). This is when people use fire more often, for warming, cooking and lighting and this is when people mostly stay indoors. The study did not go further to look at what the patients were using the fire for at the time of burn, however most patients reported that they were heating and cooking during the time they caught fire.

Scalds were the second most agent of burn accounting to 24%, (n=24). Contrary to this finding, some other studies reported scalds as the most common agent of burn (Kingu *et al*, 2011; Yuan *et al*, 2011; Schembri, Cacciottolo & Swain, 1994) and are the major cause of hospital admission. Those studies

further cited that scalds mostly occur in children, this study was on adults and hence the difference in the results. The other important aspect of scalds was that they can be caused by hot water or steam; this study did not differentiate between hot water scalds and steam scalds. It however noted that patients that had sustained scalds were reported more in the group of people that were using *muti* to steam, it would be interesting to know if steaming is associated with steam scalds.

Electrical burns accounted for (6%) n=6, this is consistent with small proportion of burns reported in a study done in New South Wales (Aggarwal *et al*, 2011, 2011). The reason cited by burn patients in this study was that of self modification of the heat source as well as illegal tubing from the nearby electrical power supply, where 10%, (n=10) of the patients reported to have illegal or informal connections of electricity in their households. However this study was not meant to explore if the relationship between illegal/informal electrical tubing and the burn injuries exist and hence we cannot make association between the two. Also the number of patients where the burn and modification of power supply occurred in this study is so small: 6%, n=6 and 10%, n=10. A bigger study to ascertain this relationship will be recommended.

6.3.2 Can an adult burn injury be prevented?

Patients were requested to explain what happened: 51%, (n=51) of patients believed that their burns were a result of an accident. 16 %, (n=16) of patients burned because of medical reasons (e.g. seizures) and poor judgement. The burn injuries from violence, faulty electrical equipment and traditional practises e.g. traditional herbal/*muti* steam contributed to 8% (n=8), 12% (n=12) and 13% (n=13) respectively.

Despite the events leading to their burn incident, 81%, (n=81) thought that their burn injury could have been prevented and 17% patients did not think that their burn incidents could have been prevented, with 2% of patients not knowing if their burn could have been prevented or not.

When patients were asked how their burns incident could be prevented: 74%, (n=74) of patients believed if they would change their behaviour. Despite the majority of the patients reported to be mostly using electricity at their homes 53% (n=53), 10% (n=10) had illegal connections at their homes. This question revealed that a lot of patients had some degree of altered judgement during the time of a burn. Then patients would come home in the evening, feeling cold and intoxicated put the heat source (modified stove or heater) closer to them (couch/bed) and then fall asleep; this was a very common mechanism of a burn reported by males. Even though this study did not explore the relationship between alcohol consumption and burns; a study done in Cape Town reported alcohol intoxication was reported for the majority of the fatal burn amongst middle aged men, the researcher believed that over representation was a reflection of detrimental living condition, poor socio economic status and life-style (Van Niekerk, Laubscher & Laflamme, 2009). The group that burned from medical related reasons reported that they did not take their medicine as prescribed or have stopped taking the medicine; they believed their behaviour could change if they could take anti-epileptic medicine in the future. They reported to have an epileptic seizure while alone at home and operating a heat source, they then suggested operating such devices with more caution. Studies done in Kwa-Zulu Natal province had found that epileptic patients sustained their burn during a seizure (Allorto *et al*, 2009 & Scheven, Barker and Govindasamy,2012). This finding is much more than reported on this study, there may be under reporting of epilepsy amongst burn patients.

Another interesting finding was the number people burned around modified heat sources as well as people that burned while tampering with electricity tubing (6%, n=6). This number is small, but electrical burns have been associated with severe burns and Noble 2006 reported “patients suffering severe electrical burns may have poor quality of life during rehabilitation and beyond” (Noble, 2006). Prevention for this group needs to be focused on the relationship between electrical burns and illegal electrical tubing.

On the other hand, the study revealed groups of patients that may be associated with argument that say "burns are not preventable". 10% of patients believed their burn injuries were accidental and do not know how they could have been prevented and another group of 16% believed their burn injuries could not have been prevented at all; the later associating their burn injuries to witchcraft. The non-preventable reasons leading to their burn incident, accounted for 26% (n=26) of burn patients in this study, see figure 6 above. As a public health practitioner, this is very concerning as this group may be present challenges with behaviour modification to prevent burns. The arguments on the burn prevention focus on education and legislation, not a lot of work done on the attitude of burn patients on burn prevention. Also many health authorities, authorities, agencies, corporations and even medical personnel in LMIC consider injury prevention to have a much lower priority than disease prevention and consequently burn prevention programmes fail to receive government funding they deserve (Bishara *et al*, 2009). The competing priorities in South African healthcare, accounting for huge expenditures may pose similar threat of not allocating much resources required for burn prevention and this group 26% may not be reachable.

The mechanism of burn injuries and attitudes to burn prevention were outside the scope of this study, it will also be of great interest to study this further as the burn epidemiology may have changed. Previous studies on the cause of burn have reported that flame burns to be most prevalent cause; one could argue that this is changing, more information on the on the cause and mechanism of burn injury is desirable. Also studies on attitude of burn patients towards prevention are lacking, many reports focus on burns are preventable, which is true but only when the respondents are willing to implement those changes to alter their behaviours around agents of burns.

.4 The results – the socio demographic profile of adult burn patients

The findings of the study on burn injury characteristics of adult burn patients treated at JTH, is as follows:

- Male,
- Aged between 25-39 years ,
- An African (Black) of origin,
- Most likely to be SA citizen,
- Experienced a combination burns, with TBSA between 10-29% TBSA,
- Likely to be single or unmarried,
- Most possibly employed in industrial sector,
- With highest educational qualification of secondary education,
- Possibly staying in a dwelling not owned by him (rented and relatives)
- Staying with 2-5 people in the household,
- His household in need of major repairs,
- Most likely to owns radio, fridge and a cell phone,
- Remembering the activity prior the burn incident,
- Thinking that the burn could have been prevented if they change in behaviour.

7. CONCLUSION

The value of the socio demographic profile and other characteristics revealed the knowledge of the adult epidemiological factors, socio economic factors and prevention of burn injuries is important; as burn prevention is associated with modifiable behaviour. This study contributes to filling a knowledge gap by providing a socio-demographic profile and other characteristics of adult burn patients in Johannesburg, Gauteng Province. The study has shown that most burns are caused by flames, where modifiable factors are the main contributors such as poor judgement, inadequate heating surfaces, medical condition requiring effective medicine administration and non-compliance when taking traditional medicine with a small percentage of burn injuries from violence related incidence.

8. RECOMMENDATIONS

Additional research is recommended to develop more prevention strategies needed by the public health practitioners. The research findings are limited due to a small sample size used in this study.

Based on the number of people that think that their burn injuries could have prevented, (74%), it is clear that the prevention strategies should be maximised by the Department of Health and its stakeholders to ensure that most of these burns are prevented. Prevention efforts of the burns are the only logical solution, especially in the months before the colder season (winter). Education seems to be the key element of the identified prevention strategy in this study followed by use of safe electricity supply.

The patterns of injury for each age group suggest the use of age-focused educational prevention strategies:

- For young working adults, education should focus on :
    - The use of intoxicating substances (alcohol and drugs),
    - The right use of electrical equipment and the dangers of electrical product modifications.
    - Use of flammable liquids in risky work environments e.g. circus stunts
    - Precautions to fire when having a medical condition and poor judgement.

- For middle-aged adults and the elderly population, the education strategies should focus on:
    - Traditional medical practises, the right way of steaming with *Muti*
    - Proximity of stoves to the beds, cloths and any flammable materials.
    - Safety at work when working with electricity or dangerous materials.

The use of the appropriate language in the prevention material is critical. More studies should be done to determine the attitude of burn injury patients to burn injury prevention and mechanism of burn injuries to effectively tailor prevention programmes.

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10. ANNEXURES

10.1 ANNEXURE 1: DATA COLLECTION SHEET

Information from the patient file

(This following information will be gathered from participant's medical records)

Date of Review: ……	Patient code: ……
Date of a burn incident ……..	Date of admission at this hospital ……
Grade of a burn (A/B):……	Extent of a burn: ……
Hospital Classification ……..….	Treatment received …… ☐Surgery ☐Conservative

Section 1: Demographic information

The next few questions are about you.

1. Age at last birthday: ……Years
2. Gender ____ 1 =Male 2 = Female
3. Marital Status _____ 1 =Single 2 = Married 3 = Divorced 4 =Widowed
4. Population Group ____ 1 =Black 2 = Coloured 3 =Asian 4 =White
5. What language is mostly used at home? 1 Xhosa 2 English 3 Afrikaans 4 Tswana 5 IsiZulu 6 Tshivenda 7 Tsonga 8 Ndebele 9 Northern Sotho 11 Swazi 10 Southern Sotho 12 Other ----------(Please Specify)

6. Are you a South African citizen?

1 Yes 2 No

7. Province of origin?

1 EC 2 WP 3 FS 4 NC 5 NW 6 MP 7 KZN 8 LIMP 9 GAUT

8. Which suburb are you currently living in? ……

9. How long have you resided in the above suburb? ……Years

Section 2: Social information

The next questions are about you and your household.

10. What is the nature of your dwelling place? _____

1 = Hostel [school, adult hostels]

2 = Informal Settlement

3 = Brick house

4 = Street/ No fixed abode

5 = Place of safety [Old age home, frail care, prison, shelter home, children's home]

11. How many rooms are in your dwelling place?

Please include kitchen, bedrooms, outside rooms

Exclude unfinished rooms/buildings, toilets, bathrooms, verandah and passage/s _____Rooms.

12. Number of persons in your household.

Please include domestic workers living in, renting occupants and children who are usually at this dwelling place

_____ People

13. Who owns your dwelling place?

1 = Spouse or a lifetime partner

2 = Landlord

3 = Relative

4 = A friend

5 = Government /Organisation property

6 = Parent/ grandparents

14.

(a) What type of fuel is used in your home (E.g. for cooking, lights etc.)? _____

1 = Electricity

2 = Fossil fuel

3 = Both

(b) If the answer for 14 (a) is 2 or 3, please specify which fossil fuel is mostly used.

1 = Coal

2 = Wood

3 = Paraffin/petrol

4 = Organic waste materials (cow dung, dry grass, debris etc.)

5 = Candle

15. Is your dwelling in need of any repairs?

(Do not include desirable remodeling/additions or regular maintenance)

1 =Yes

2 =No

16. If the answer to 17 is yes, does it require:

1 = Major repairs (these include defective plumbing, cracking walls/ceilings/floors)

2 = Minor repairs (these include broken windows, loose tiles, defective steps)

Section 3: Income details

The next questions relate to your personal income from all sources.

17. What is/are your household source/s of income?

1 =Own

2 =Parent/s or Guardian

3 =Grant/Pension

4 =Spouse

5 =Other (Specify): ……..

20. Who is the breadwinner at home?

1 =Participant

2 =Spouse

4 =Other _____(Please Specify)

21. Do you have a motor vehicle at home?

1 =Yes

2 =No

If yes, what make and model? _____

22. At home, which of the following do you own? (Can tick more than one)

1 =A Refrigerator

2 =A television set

3 =A Home theatre or a HI- FI system

4 =A battery operated radio/wireless

5 = A motor vehicle

6 = Cellular Telephone

7 = A computer/laptop

8 =Other (Specify) ……

23. (a) How many dependents are at home _____

(b) How many of them rely on your household income _____

24. In your opinion, how much is the value of your house?

1 =Less than R20, 000

2 =From R20, 001 – R50, 000

3 =From R50, 001 –R100, 000

4 = More than R100,000

26. What kind of work do you do?

1 = Domestic

2 = Administration (teaching, banking, clerical etc)

3 = Industrial (farming, transportation, engineering etc)

4 = Self sustaining (selling small things, home based business, etc)

Section 4: Burn history

The next few questions relate to your burn accident

27. Where Did The Incident Occur?

1 = Domestic/At home

2 =Occupational/ At work

3 =Road/Street

4 = Recreational

28. What is the cause of the burn?

1 =Hot Water

2 =Chemical

3 =Electrical

4 =Flames

5 =Other (Specify). ……

29. Do you remember the actual incident?

1 =Yes

2 =No

30. In your opinion, do you think the burn incident could have been prevented?

1 =Yes 2 =No

If you answer yes, please explain.

……...

……

……..……

……..……

……..……

……..……

……..

10.2 ANNEXURE 2: PATIENT INFORMATION SHEET

10.2.1 Patient's Information Sheet

Good day.....

Hello, my name is Andiswa Ncedani and I am part of the study team from the school of Public Health at the University of the Witwatersrand, Johannesburg, South Africa. We would be grateful if you could participate in our study to determine the socio-economic profile of adult burns patients treated at the Johannesburg Tertiary Hospitals.

Why are we doing this?

Research on socio-economic profiles of burns patients is minimal in our country. We are trying to understand and identify the vulnerable groups, as the well as most common causes of burns amongst patients treated during the study period. The results of this study will be made available to all burn interest groups including the Gauteng Department of Health. This information may be used in future to prevent burn injuries.

What do we expect from the participants in this study?

All participants will be interviewed by the principal researcher. The interview sheet will take between 30-45 minutes. Each participant will only be interviewed once.

What about confidentiality?

Confidentiality will be maintained by the use of codes instead of your names. Whatever answers you will give will not be discussed with the staff of this hospital or any other person, and neither your name nor address will appear on the questionnaire. Only general information will be passed on.

Are there any benefits?

We hope that this research will provide valuable information that will be useful in curbing the burns in the affected communities and in the future burn prevention programmes.

May I withdraw from the study?

We are interviewing anyone above the age of 18 years in this hospital. The procedure involves two stages: your consent, and your response to a questionnaire. Your participation is voluntary; you may withdraw at any time of the study and there will be no negative consequences on you and your subsequent treatment in this hospital or any other hospital in South Africa. You may decline to answer questions at any time.

Questionnaires will be identified only with codes and no names will appear.

This procedure will take between 30-45 minutes of your time

Enquiries:

If you wish to talk to anyone about the study on issues not clear to you, please call the Secretary; Human Research Ethics Committee (Medical), University of the Witwatersrand, Johannesburg Tel: 011 717 1234 fax 011 339 5708; or the principal investigator (see details below)

Do you wish to participate in the study Yes/No (*Mark √*)

{If not thank the patient and leave}

Date interviewed:_____ Interviewer Signature: _____

We will continue with interviews only if this is signed.

10.2.2 Patient's Informed Consent

(Mark √for chosen option)

Do you understand the purpose of the study, and what will be required of you if you agree to take part?

Yes/ No

Have your questions concerning this study been answered? Yes/No

If no, what further questions do you wish to ask?

Do you understand that at any time you may withdraw from this study without giving a reason? Yes / No

Do you understand that answers that you give will not `be in any way detrimental to the care that you receive at this facility? Yes /No

Do you agree to take part in this study? Yes / No

If you wish to talk to anyone about the study on issues not clear to you, please call the Secretary; Human Research Ethics Committee (Medical), University of the Witwatersrand, Johannesburg Tel: 011 717 1234 fax 011 339 5708; or the principal investigator (see details below)

If you are happy to participate in the study but do not wish to sign, it is fine.

_____ _____

Signature of Respondent Date

Thank you for your time.

……

Ms. Andiswa Ncedani.

10.3 ANNEXURE 3: DATA CAPTURE SHEET

Data Capture sheet

This will be used for record keeping and quality control purposes only. This will prevent the duplication of patient interviewed. All the interviewed patients will be recorded. No other person except the principal investigator will have an access to this form. It will be left in a locked cupboard in researcher office.

Patients Hospital Number	Hospital	Date Interviewed	Questionnaire code
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
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10.4 ANNEXURE 4: POST-GRADUATE APPLICATION

10.4.1 Letter to Postgraduate Committee

Flat 106
Magaliesburg Residence
Johannesburg Hospital
Parktown
07 September 2004

The Assessor Committee
Postgraduate Office
Faculty of Health Sciences
University of the Witwatersrand
Johannesburg

Sir/Madam

RE: Protocol: The Socio-demographic profile of adult burns patients treated at Johannesburg Tertiary Hospitals.

Please find attached copy of my research protocol.

Looking forward to your approval.

Thanking you.

Yours Sincerely

……
Ms. Andiswa Ncedani.
Chief Physiotherapist,
Trauma Unit, Johannesburg Hospital
Bleep number LR 22463 Mobile: 073 260 1033
E-mail: masko426@yahoo.com

10.4.2 Post-Graduate Committee cover page

CANDIDATE'S SURNAME: [Please print]	Ncedani	**FIRST NAME/S:**	Andiswa	**STUDENT NUMBER:**	031 7067H
CURRENT QUALIFICATIONS: Bachelor of Science (Physiotherapy) Degree					
TEL:	**CELL:** 073 260 1022	**E-MAIL:** masko426@yahoo.com		**FAX:** (011) 488 4341	
DEGREE FOR WHICH PROTOCOL IS BEING SUBMITTED: Master of Public Health (MPH)					
PART-TIME OR FULL-TIME: Full-time					
FIRST REGISTERED FOR THIS DEGREE:		**TERM:** 1st		**YEAR:** 2003	
DEPARTMENT: School of Public Health, Wits University, Johannesburg					
TITLE OF PROPOSED RESEARCH: The Socio-demographic profile of adult burns patients treated at Johannesburg Tertiary Hospitals.					
CANDIDATE'S SIGNATURE:				**DATE:**	
SUPERVISOR'S NAME: Dr. Shan Naidoo					
SUPERVISOR'S QUALIFICATIONS: MBBch, DPH, DHSM, DOH, DTM&H, Mmed**.**					
SUPERVISOR'S DEPARTMENT: School of Public Health, University of Witwatersrand.					
CO-SUPERVISOR'S NAME:	NA				
CO-SUPERVISOR'S QUALIFICATIONS:	NA				
CO-SUPERVISOR'S DEPARTMENT	NA				
CO-SUPERVISOR'S ADDRESS / TEL / E-MAIL:	NA				

***SYNOPSIS OF RESEARCH*:**
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Burn injuries represent one of the most important public health problems facing both developing and industrialised countries. It is known that many Burns that occur in South Africa could have been prevented. Although Johannesburg tertiary Hospitals treat burn patients, no study has been carried out on the socio-demographic profile of these patients. This study attempts to identify the socio-demographic factors that predispose the patients to higher risk of burn injuries and determine how factors such as behavioural patterns, intent of burns, severity of burn and treatment outcome relate to socio- economic status with the view to recommending prevention measures and treatment outcomes of burns.

ETHICS PENDING: Ψ **ETHICS APPROVED:** Y **(circle appropriate symbol)**		**IF Y SUPPLY ETHICS CLEARANCE No:**
SIGNATURE OF SUPERVISOR/S:		

Study Objectives:

1) To identify the socio-demographic characteristics of adult burns patients treated at Johannesburg tertiary hospitals (CMJAH & CHBAH) from February – August 2006.

2) To identify the factors contributing to burn injuries of adult burns patients treated at Johannesburg tertiary hospitals (CMJAH & CHBAH) during the study period

Study design:

Cross sectional study of adult burn patients treated at Johannesburg Tertiary Hospitals.

Method:

Consent will be obtained from all adult patients. All adult patients treated during the study period will be possible participants for the study. A standardised questionnaire attached in Annexure 1 will be used to extract all the useful information needed for this research purpose. Information collected using the data collection sheet will then be entered into more appropriate statistical program for analysis

Data Analysis:

Data will be coded and converted into any one of Ms Excel and STATA will be used for analysis. The analysis will aim at showing the socio-demographic profile characteristics.

Outcome measure:

The study will be concluded on the following outcome: An assessment of patient socio-demographic profile:

- Age,
- Sex
- Gender
- Educational status,
- Area of residency,
- Type of housing and fuel used,
- Income sources,
- Employment status.

10.4.3 Ethics Clearance Certificate