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TRENDS IN SURGICAL ADMISSIONS AT PHOLOSONG HOSPITAL, GAUTENG, FOR THE PERIOD 2006 TO 2008

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A Research Report submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the Degree of Master of Public Health in the field of Hospital Management

September 2013

DECLARATION

I, Conrad S. Modise, declare that this research report is my own work. It is being submitted in partial fulfilment of the requirements for the Degree of Master of Public Health at the University of the Witwatersrand, Johannesburg. It has not been submitted before, for degree or examination at this or any other University.

Signature: 

Date: 2013/09/30

At: Johannesburg

DEDICATION

This study is dedicated to my late parents who never lived for me to know, my eldest sister for the wonderful role she played as my parent, my brother Phanuel for his role in putting the education light in front and my family (wife Thandekile and children Obakeng and Kgotso).

ABSTRACT

Introduction: Injuries contribute significantly to South Africa's quadruple burden of disease. In keeping with these national trends, there is a considerable demand for surgical admissions at the Pholosong Hospital. The reasons for this utilization have not been well documented. The assumption is that trauma related conditions are the major contributing factors. Prioritization of emergency surgical conditions over the non-emergency surgical conditions are seen as a result with the latter having the possibility of developing into emergencies at a later stage. There has not been any systematic evaluation or research of surgical hospital admission information so as to make informed decisions around better planning and resource allocation. Most local surveys have focused mainly on medical ward admissions. The hospital management of Pholosong Hospital was particularly concerned with the number of surgical admissions overwhelmed by emergencies and urgent cases to the detriment of non-urgent or cold surgical cases. This study is based at the Pholosong Hospital and is aimed at providing an understanding with regards to the impact of the workload in surgical admissions. This information will be useful to management as well as other potential users such as regional planers, resource allocators and other researchers.

Methods: the study analysed the admissions trends at all the adult surgical wards at the Pholosong Hospital, a regional hospital in Gauteng, over a three year period. This was a retrospective analysis of data from admission ward registers. Information obtained included age, gender, length of stay, clinical outcomes and disease profile. The study population comprised of all patients admitted to the adult surgical wards at Pholosong Hospital from 1 January 2006 to 31 December 2008.

Results: The number of surgical admissions was 12% to the total admissions during the three years reviewed, with a 6% decrease in 2007 compared to 2006 and a 7% decrease in 2008 compared to 2007. The male surgical admissions were higher than the female admissions over the study period. The average length of stay was lower than the set norm of four days. The younger age groups (15-34 years of age) accounted for the majority of admissions. Based on the ICD 10 coding, injury related diagnoses accounted for the majority of the admissions followed by the diagnosis referred to as "Other surgical diagnosis" and patients with medical conditions who were in the surgical unit due to the high intake in the medical unit that could not accommodate all

their admissions. Injury related conditions became the most frequent diagnoses and was prevalent in the younger age groups followed by "Other surgical diagnoses". Cancer and hernia were common diagnoses in the older age groups (55 years and older). As was expected the majority of patients (86.6%) were discharged home but a considerable number of patients were transferred (10.4%) to the next level of care at other institutions. Importantly only 3% of admissions died.

Conclusions: The three year review found that a high number of injury related admissions occur in patients of a younger age. There was a decrease in the average length of stay year on year and a importantly a low mortality rate was also noted during the study period. Differences between the percentages of male and female admitted and with differing disease profiles were also observed. The challenges and recommendations together with the results identified by the study will provide valid information that would be meaningful to the hospital management as well as provincial and national managers for future planning.

ACKNOWLEDGEMENT

This is an opportunity for me to show my gratitude to all who have in any way been of assistance to me in the course of completing this research report.

A special thank you goes to the following people:

- My supervisor, Professor Shan Naidoo who provided expert guidance and encouragement throughout my study and has always been available when needed.
- The Acting Chief Executive Officer (Dr G.S.Maseko) at Pholosong Hospital for granting me permission to conduct the study at the Hospital.
- Mrs Lee Ann Doorasamy and Mrs Mirriam Mkhabela for assisting with the retrieval of patient records.
- Mr T. Chirwa, for his assistance with the statistical analysis.
- Mrs Daleen Debeer and Ms Erica Du Plooy for their assistance in putting the raw data together for analysis.
- Dr. Ronel Kellerman (The Ekurhuleni Public Health Specialist) for expert advice.
- My wife Thandekile and children Obakeng and Kgotso for giving me support space and time to focus on my studies.
- Mr Levy Molefi Mosenogi (Ekurhuleni District Health Chief Director) for his support and time given to me to complete the report.
- Dr Leena Thomas for her never ending coaching and proof reading of the report.

TABLE OF CONTENTS

DECLARATION ii
DEDICATION iii
ABSTRACT iv
ACKNOWLEDGEMENT vi
LIST OF TABLES ix
LISTS OF FIGURES x
GLOSSARY OF TERMS xi
LIST OF ABBREVIATIONS xii
CHAPTER 1 13
INTRODUCTION 13
1.1 BACKGROUND 13
1.2 MOTIVATION FOR THE STUDY 13
1.3 JUSTIFICATION FOR STUDY 14
1.4 RESEARCH QUESTION 14
CHAPTER 2 15
LITERATURE REVIEW 15
2.1 BURDEN OF INJURIES 15
2.2 REGIONAL HOSPITALS 15
2.3 MONITORING PERFORMANCE OF REGIONAL HOSPITALS 16
CHAPTER 3 19
STUDY METHODS AND MATERIALS 19
3.1 STUDY DESIGN 19
3.2 STUDY SETTING 19
3.3 STUDY PERIOD 19
3.4 STUDY POPULATION 19
3.5 SAMPLING 19
3.6 MEASUREMENT TOOL 20
3.7 DATA COLLECTION 21
3.8 DATA PROCESSING AND DATA ANALYSIS 21
3.9 PILOT STUDY 22
3.10 ETHICS 22
CHAPTER 4 23
RESULTS OF THE STUDY 23
4.1 TRENDS FOR ADULT SURGICAL ADMISSIONS 23
4.2 DEMOGRAPHIC PROFILES 23
4.3 CLINICAL PROFILES 27
CHAPTER 5 46
DISCUSSION 46
5.1 INTRODUCTION 46
5.2 DATA MANAGEMENT 46

5.3 COMPARISON OF SURGICAL ADMISSIONS FROM 2006 TO 2008 47
5.4 DEMOGRAPHIC PROFILES 47
5.5 CLINICAL PROFILES 48
5.6 DISEASE PROFILE 50
5.7 LIMITATIONS 53
CHAPTER 6 53
CONCLUSION **54**
6.1 THE TREND OF SURGICAL ADMISSIONS IN THE PHOLOSONG HOSPITAL OVER A THREE YEAR THE PERIOD 54
6.2 THE DEMOGRAPHIC PROFILE OF SURGICAL PATIENTS ADMITTED DURING THE STUDY PERIOD 54
6.3 THE CLINICAL PROFILE OF SURGICAL PATIENTS ADMITTED DURING THE STUDY PERIOD 54
RECOMMENDATIONS **54**
FUTURE RESEARCH **55**
REFERENCES 56
APPENDICES 59
APPENDIX A: ETHICS CLEARENCE CERTIFICATE AND LETTERS OF APPROVAL **59**
APPENDIX B: PERMISSION FROM GAUTENG HEALTH DEPARTMENT **60**
APPENDIX C: DATA COLLECTION TOOLS **61**

LIST OF TABLES

TABLE 2.2.1 REGIONAL HOSPITAL SERVICES 16
TABLE 3.6.1 LIST OF VARIABLES USED IN THE STUDY 21
TABLE 3.7.1 STUDY POPULATION AND SAMPLE NUMBER PER STUDY PERIOD 21
TABLE 4.1.1 ADULT SURGICAL ADMISSIONS COMPARED WITH TOTAL ADULT ADMISSIONS 23
TABLE 4.2.1 SURGICAL ADMISSIONS PER AGE GROUP 25
TABLE 4.2.2 BREAKDOWN OF AGE AND GENDER BETWEEN THE STUDY GROUPS 26
TABLE 4.3.1 LENGTH OF STAY IN DAYS ACROSS THE STUDY PERIOD 27
TABLE 4.3.2 OUTCOME AT TIME OF SEPARATION 28
TABLE 4.3.3 COMPARISON OF DIAGNOSES ACROSS THE STUDY PERIOD 30
TABLE 4.3.4 INJURY RELATED DIAGNOSES DURING THE STUDY PERIOD 31
TABLE 4.3.5 DIAGNOSIS OF STABBINGS PER AGE GROUP ACROSS STUDY PERIOD 38
TABLE 4.3.6 DIAGNOSIS OF GUNSHOTS PER AGE GROUPS ACROSS THE STUDY PERIOD 39
TABLE 4.3.7 DIAGNOSES OF ASSAULT PER AGE GROUP ACROSS STUDY PERIOD 39
TABLE 4.3.8 DIAGNOSIS OF BURNS PER AGE GROUP ACROSS STUDY PERIOD 40
TABLE 4.3.9 DIAGNOSIS OF FRACTURES PER AGE GROUP ACROSS STUDY PERIOD 41
TABLE 4.3.10 DIAGNOSES OF HEAD INJURIES PER AGE GROUP ACROSS STUDY PERIOD 42
TABLE 4.3.11 DIAGNOSES OF ABSCESS PER AGE GROUP ACROSS STUDY PERIOD 42
TABLE 4.3.12 DIAGNOSES OF HERNIA PER AGE GROUP ACROSS STUDY PERIOD 43
TABLE 4.3.13 DIAGNOSIS OF CANCER PER AGE GROUP ACROSS STUDY PERIOD 43
TABLE 4.3.14 DIAGNOSES OF CELLULITIS PER AGE GROUP ACROSS STUDY PERIOD 44
TABLE 4.3.15 OTHER SURGICAL DIAGNOSES PER AGE GROUP ACROSS STUDY PERIOD 44
TABLE 4.3.17 AVERAGE LENGTH OF STAY FOR INJURY RELATED DIAGNOSES DURING THE STUDY PERIOD 45

LISTS OF FIGURES

FIGURE 4.2.1 GENDER DISTRIBUTION 24
FIGURE 4.2.2 ADMISSION PER AGE GROUP 25
FIGURE 4.3.1 COMPARISON OF FINAL OUTCOMES 28
FIGURE 4.3.2 PERCENTAGE COMPARISON OF DIAGNOSES ACROSS THE STUDY PERIOD 30
FIGURE 4.3.3 FINAL DIAGNOSES DURING 2006 32
FIGURE 4.3.4 FINAL DIAGNOSES DURING 2007 32
FIGURE 4.3.5 FINAL DIAGNOSES DURING 2008 33
FIGURE 4.3.6 INJURY RELATED DIAGNOSES DURING 2006 34
FIGURE 4.3.7 INJURY RELATED DIAGNOSIS DURING 2007 34
FIGURE 4.3.8 INJURY RELATED DIAGNOSES DURING 2008 35
FIGURE 4.3.9 FINAL DIAGNOSES AND DIFFERENT AGE GROUP IN 2006 35
FIGURE 4.3.10 FINAL DIAGNOSES AND DIFFERENT AGE GROUP IN 2007 36
FIGURE 4.3.11 FINAL DIAGNOSES AND DIFFERENT AGE GROUP IN 2008 36
FIGURE 4.3.12 INJURY RELATED DIAGNOSES AND DIFFERENT AGE GROUPS IN 2006 37
FIGURE 4.3.13 INJURY RELATED DIAGNOSES AND DIFFERENT AGE GROUPS IN 2007 37
FIGURE 4.3.14 INJURY RELATED DIAGNOSES AND DIFFERENT AGE GROUPS IN 2008 37
FIGURE 4.3.15 AVERAGE LENGTH OF STAY DURING THREE YEARS OF STUDY 45

GLOSSARY OF TERMS

Admission Date is the day of Admission to the adult Surgical Ward and is regarded as day 1

Separation Date is the day of discharge, or transfer to other Institutions, or leaving the Hospital without completion of Treatment, or Death

Clinical Diagnosis is the Diagnosis at the time of Separation

Length of stay (LOS) is the number of Days from the date of Admission to the date of Separation

Outcomes are categorised as discharged Home, transferred out, refused Treatment, absconded or died

LIST OF ABBREVIATIONS

ALOS	Average Length of Stay
BOR	Bed Occupancy Rate
CI	Confidence Interval
LOS	Length of Stay
PDE	Patient Day Equivalent
RHT	Refusing Hospital Treatment

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

South Africa has a quadruple burden of diseases namely poverty-related conditions, emerging chronic diseases, injuries and AIDS (http://www.mrc.ac.za/bod/bod.htm). Although HIV/AIDS has received increasing attention from policy makers, managers and researchers, other conditions have not been as highly profiled. Recently, chronic diseases have started getting more attention as a result of the UN summit in September 2011 www.c3health.org/.../**Taking-up-the-challenge**. However, injuries and their contribution to the burden of disease in South Africa merits further acknowledgement.

The most common of the injuries are trauma cases which are caused by violence, motor vehicle accidents, gun shots and assaults. However, studies of the trends in surgical admissions to hospitals in South Africa are few and often inadequate. There is therefore a need to review surgical admissions so as to ensure better planning and resource allocation. Pholosong Hospital, one of the five regional hospitals located in the Ekurhuleni Metro District of the Gauteng Province in South Africa, will be the setting of this study.

1.2 MOTIVATION FOR THE STUDY

Injuries contribute significantly to South Africa's quadruple burden of disease. In keeping with the current trends nationally, there is a considerable demand for surgical admissions at Pholosong Hospital, a regional hospital situated in the Ekurhuleni District in the Gauteng Province. The reasons for this are not well documented. The assumption is that trauma related conditions are the major contributing factors. Prioritization of emergency surgical conditions over the non-emergency surgical conditions are seen as a result with the latter having the possibility of developing into emergencies at a later stage.

This study would seek to provide descriptive information of the Hospital surgical admissions, which is expected to assist the management of the hospital to make informed decisions on policies and plans for future services.

1.3 JUSTIFICATION FOR STUDY

There has not been any systematic evaluation or research of hospital admission information at Pholosong Hospital so as to make informed decisions around better planning and resource allocation. Most local studies have also mainly focused on medical ward admissions. The Pholosong Hospital management was particularly concerned with the number of surgical admission overwhelmed by emergency and urgent cases to the detriment of non-urgent or cold surgical cases. This study was based at the Pholosong Hospital and was aimed at providing an understanding with regards to surgical admissions that will be useful to management as well as other potential users such as national and provincial hospital planners, resource allocators and other researchers in the same or similar field.

1.4 RESEARCH QUESTION

What is the trend of surgical admissions in the Pholosong Hospital over the three year period 1 January 2006 to December 2008 and what are the factors influencing that trend?

1.4.1 MAIN AIM

To determine the trend of patients admitted in the surgical wards of Pholosong Hospital over a three year period from 1 January 2006 to December 2008 and the factors influencing that trend.

1.4.2 SPECIFIC OBJECTIVES

- To describe the trend of surgical admissions in the Pholosong Hospital for a three year period from 1 January 2006 to December 2008
- To describe the demographic profile (Age and Gender) of surgical patients admitted during the study period
- To determine the clinical profile (length of stay and final outcome) of these patients

CHAPTER 2
LITERATURE REVIEW

In this chapter, relevant studies and policies on the burden of disease in South Africa, local referral systems, factors influencing resource utilization and admission trends in local hospitals are discussed.

2.1 BURDEN OF INJURIES

A large proportion of deaths in South Africa include to a certain extent diseases of a surgical nature most of which are injuries. Although the study conducted by Bradshaw et al. (2004) was during a period of significant HIV/AIDS related deaths, they found that injuries were among the highest causes of deaths in South Africa. With 51% homicide related deaths for males and 30% for females in 1999, it can be presumed that hospitals in South Africa may still be burdened by patients with surgical problems mostly caused by injury. It is hoped that the study at Pholosong Hospital will indicate whether the results are the same or different to this. The study by Bradshaw et al. (2004) also showed that the younger age group especially young male adults are more prone to violence related deaths.

Surgical patients are mostly admitted for violence related conditions which often require emergency attention such as closing of open wounds, stabilising fractures, and attending to patients with blunt trauma injuries, sharp object penetrations and gunshots. Other conditions are cold surgical cases which may receive less attention if the surgical unit of the hospital becomes overwhelmed by urgent injury cases. The injury related surgical admissions are mostly emergencies and require skilled manpower with often the use of expensive equipment and is difficult to plan because of its unpredictable nature. This is described below in the various literature reviewed.

2.2 REGIONAL HOSPITALS

The health care delivery system in South Africa is provided by both public and private sectors, with public sector hospitals organized according to level of care as central (quaternary care), tertiary (tertiary), regional (secondary), district (Primary care) and specialised hospitals. Regional hospitals are expected to have 400 to 800 beds. They are expected to render services in basic specialities listed below, receive referrals from district hospitals and provide specialist

services to a number of district hospitals (Department of Health, 2011a). These hospitals are expected to provide the following services on a 24 hour basis (Table 2.2.1). A regional hospital is expected to receive outreach and support from tertiary hospitals (Department of Health, 2011b).

Table 2.2.1 Regional hospital services

(a) health services in the fields of internal medicine, paediatrics, obstetrics and gynaecology, and general surgery and;
(b) health services in at least one of the following specialties–
  (i) orthopaedic surgery;
  (ii) psychiatry;
  (iii) anaesthetics;
  (iv) diagnostic radiology;
(c) trauma and emergency services;
(d) short term ventilation in a critical care unit; and
(e) services to a defined, regional drainage population, limited to provincial boundaries and receives referrals from several district hospitals.

Department of Health, 2011b. Categorisation of hospitals. Pretoria: Department of Health.

General surgery and Orthopaedics therefore form key components of Regional hospital services.

Viapiano and Ward (2000) indicated that 52% of all hospital admissions accounted were for deferrable surgery procedures. They also consume a significant proportion of hospital budgets. Gupta (2007) found surgical suites' operations consume 10% of a hospital's budget in the USA.

There are not many studies documenting the cost of managing surgical wards. This indicates the importance of this study as it will assist in providing some preliminary evidence regarding the trends in surgical admissions and related cost drivers such as length of stay and clinical diagnosis in a hospital setting which could assist with future costing studies.

2.3 MONITORING PERFORMANCE OF REGIONAL HOSPITALS

Monitoring performance of a hospital on a regular basis is one of the best management tools that can assist any hospital management to understand the efficiency, quality and financial position the institution is in. Burn and Shongwe (2004) confirmed this in comparing the performance of hospitals in South Africa, at provincial level, where they showed how each

hospital or province performed over a period of three years.

Watts et al. (2000) suggested that performance of hospitals especially with regards to efficiency and costing could provide information on policy development at institutional level for benchmarking and at clinical and unit levels which assist in analysing the effectiveness of the services.

The Hospital Strategy Project for hospital management defined indicators such as average length of stay (ALOS), bed occupancy rate (BOR) and Patient Day Equivalent (PDE) as cited by Burn and Shongwe (2004).

The length of stay in hospitals is one of the factors that contribute to the cost of a hospital (Demir, 2007). Among other causes, clinical and demographic factors contribute to the increase in the number of days patients can spend in the hospital. In their study of the association of postoperative complications with hospital costs and length of stay in tertiary care centres, Khan et al (2006) concluded that postoperative complications consume considerable health care resources. They indicated in their study that postoperative complications of surgical patients, which occurred in 6.9% of patients, could be associated with a substantial increase in total hospital cost and length of stay. This increase according to them can contribute to any amount from 41% to 112% of the hospital costs.

In respect of case load in surgical wards, there are a number of variables which contribute to the increase of service such as the number of patients and complex disease conditions. Eriksen et al. (1999) studied the cost of inappropriate admissions and found that 12% of the costs were incurred through inappropriate admissions. Although their concluding analysis is that there was no significant benefit in denying care for inappropriate admissions the lesson can be that diagnosing patients properly and referring them to appropriate levels of service can put the 12% to better use.

Resource utilisation is one of the key areas of concern in every hospital. Expenditure on personnel, material resource and facility maintenance are main points to be observed when an evaluation is done. In most of South African public service hospitals as was observed by Kane-Berman and Taylor (1990), 60% of the budget was spent on human resource payments where as the remaining amount was for consumables, equipment and operating expenses. They suggest that in order to achieve proper management of resources it was important that

information and accounting systems be developed to support and improve management of such resources. By describing some of the possible cost drivers in the surgical unit at Pholosong Hospital, the hospital management may be able to develop such a system at unit level rather than hospital level as is currently practised now. This may also help them to adopt a cost centre management approach, which would hopefully improve financial accountability at a unit level.

CHAPTER 3
STUDY METHODS AND MATERIALS

3.1 STUDY DESIGN

The study design used was a descriptive retrospective analysis of records of adult patients admitted to the surgical unit at Pholosong Hospital over a three year period. All quantified data relevant to the study was extracted from the surgical admission registers covering the study period.

3.2 STUDY SETTING

The study was conducted in the adult surgical admission wards at Pholosong Hospital, a regional hospital in the Ekurhuleni Metro District of the Gauteng Province. This Hospital is situated in Tsakane Township, one of the poor communities in Ekurhuleni Metro District. It is a relatively small hospital compared to other regional hospitals in the District such as Tembisa, Natal-Spruit and Tambo Memorial Hospitals, which have bed capacities in excess of 800 beds. The Hospital is utilising 400 beds whereas it has a capacity for 570 beds. These beds (400) are all fully utilised currently and are not sufficient to keep up with service demands. Sixty (60) beds are allocated for adult surgical admissions.

3.3 STUDY PERIOD

The study period was three years from 1 January 2006 to 31 December 2008.

3.4 STUDY POPULATION

The study population included records of all patients that were admitted through the surgical admissions to the adult surgical wards at the Pholosong Hospital during the study period. Only patients from 15 years and older were included. Patients younger than 15 years are admitted to the Paediatric wards and were therefore excluded.

3.5 SAMPLING

The average annual number of surgical admissions for the periods to be covered was approximately 19,000. The sample was based on the assumption that 50% of surgical patients admitted were assault related and if a 5% error at 95% confidence interval was required, therefore a sample size of 385 medical records per year was needed.

The plan was to use a sample of 385 patient records for every year of study (2006 to 2008). This was then increased to 400 to adjust for incomplete records. The data was collected from the files of the patients. Information from the files was extracted in compliance with ethical requirements. The number of files provided by the hospital records was not enough to provide the number required for each year of the study. This meant that patient files alone would not be able to provide the required sample for the study.

The admission register which was provided to assist in tracing the files showed that there were more patients than the files provided who were treated in the surgical unit during the selected study period (2006 to 2008). On reviewing the register it was realised that it had enough information in terms of selected variables for the study and that it could then be used to select the required sample. It was then compiled as a copy on a year to year basis. The register was then used as a source to select the research sample.

A systematic random sampling of one in every five records provided the required sample. The starting point was determined by selecting the first number at the top of a list of patient file numbers and the fifth number would be the next selection and then next fifth would follow until the required sample for the respective years was reached.

All files were included only if the records were complete. Records were defined as complete if they include the following information:

- Patient demographic details (age and gender)
- Diagnoses at the time of separation
- Date of admission and date of separation
- Outcomes

If the information in the record could not provide the required data, the record was considered incomplete and was not used. For replacement, the next name in the list would be chosen. This was done up to the third name and then the fifth from the third attempt would be selected going forward.

3.6 MEASUREMENT TOOL

The measurement tool for the data collection was the data capture sheets as described in Annexure A. The following variables were included in the data capture sheets (Table 3.6.1).

Table 3.6.1 List of variables used in the study

• Age • Gender • Date of admission • Date of separation	• Length of stay • Clinical diagnosis at time of separation • Outcome

3.7 DATA COLLECTION

Data was collected for three years (2006, 2007 and 2008). The sample size of 400 patient records per year, as listed in the admission register, could not be attained in 2006, 2007 or 2008, mainly due to incomplete patient records and information in the register. As shown in Table 3.7.1 the sample for 2006 and 2007 was 305 patient records (76% of required sample number) and 309 (77%) respectively. The sample for 2008 was 386(97% of required number). Even though there were fewer surgical admissions in 2008 compared to 2007 and 2006, it was still possible to include more patient records in the study in 2008 as more records were complete in this year.

As mentioned in the methodology a sample size of 400 patient records for surgical admission per year was needed. Using the systematic random sampling method, with the surgical admission register as the sampling frame, identified records for analysis were 76% of the required number for 2006, 77% for 2007 and 97% for 2008. Overall 83% of the required number of records was used in this study. The following table (Table 3.7.1) demonstrated the number of patient records used across each year of study surveyed.

Table 3.7.1 Study population and sample number per study period

Year	Study population per year	Sample number of patient records per year	Number of complete records used	
			n	%
2006	2596	400	305	76
2007	2376	400	309	77
2008	1773	400	386	97
Total	**6745**	**1200**	**1000**	**83**

3.8 DATA PROCESSING AND DATA ANALYSIS

The principal researcher extracted the data from the sample of surgical records retrieved from the archives and personally captured the data on the data capture sheets. The data was captured on Excel version 5, 2007 where it was "cleaned" and then exported to Epi-Info version 3.5.1.

Analysis of the clean data was performed using Epi-Info version 3.5.1. The data were further validated for miscoding and inconsistencies by running frequencies and cross tabulations. The fields which were a source of inconsistencies and miscoding were identified and corrected accordingly.

Variables were categorised as numerical and categorical. Descriptive analyses were carried out with continuous variables being summarised using measures of central tendency (mean). Categorical variables were summarised using frequencies and percentages.

3.9 PILOT STUDY

A pilot study was carried out on a random review of first five pages of surgical admission registers. The pilot helped the researcher to validate the measurement tool and reveal possible limitations to the study.

3.10 ETHICS

The protocol was submitted to the Human Research Ethics Committee (Medical) of the University of the Witwatersrand for consideration and was approved (Ethics number: M090948). (Appendix A)

Permission to conduct the study and access to surgical records at Pholosong Hospital was obtained from the Pholosong Hospital Management and Gauteng Department of Health prior to commencement of the study (Appendix B)

CHAPTER 4

RESULTS OF THE STUDY

In this chapter the results of the study are outlined. The chapter attempts to provide answers to the specific objectives of the study, as outlined in the methodology. The results will cover the demographic characteristics (age and gender), clinical outcomes and the length of stay. The study results also include the disease profile of the admissions reviewed.

4.1 TRENDS FOR ADULT SURGICAL ADMISSIONS

The admission of all adult surgical patients was 11% of the number of all admissions across all the years of study in the hospital (Table 4.1.1). The 12% of all adult admissions in 2006 and 2007, and 10% in 2008 were surgical admissions.

Table 4.1.1 Adult surgical admissions compared with total adult admissions

Year	Total Adult Admissions	Surgical Admissions	
		n	(% Admissions /year)
2006	20,971	2596	(12%)
2007	19,641	2376	(12%)
2008	18,221	1773	(10%)
Mean	**19,611**	**2248**	**(11%)**

The admissions for 2008 present lowered figures both for total adult and surgical admissions compared to the previous two years. It is not clear why this is so. In 2007 there was a public service strike, lower admission figures would have been logical then. Also in 2008 the hospital increased its capacity in terms of skills and number of doctors, which presumably should have demonstrated an increase in the number of patients.

4.2 DEMOGRAPHIC PROFILES

The admission of surgical patients was compared across the period of study in terms of age and gender. It showed the percentage differences in terms of admission of male adults compared to female admissions. The differences with regard to age groups were also shown in the results.

4.2.1 GENDER

Admissions of patients in terms of gender distribution illustrated more males in the surgical unit. This was evident across the study period as 73% of admissions were males while 27% were female admissions.

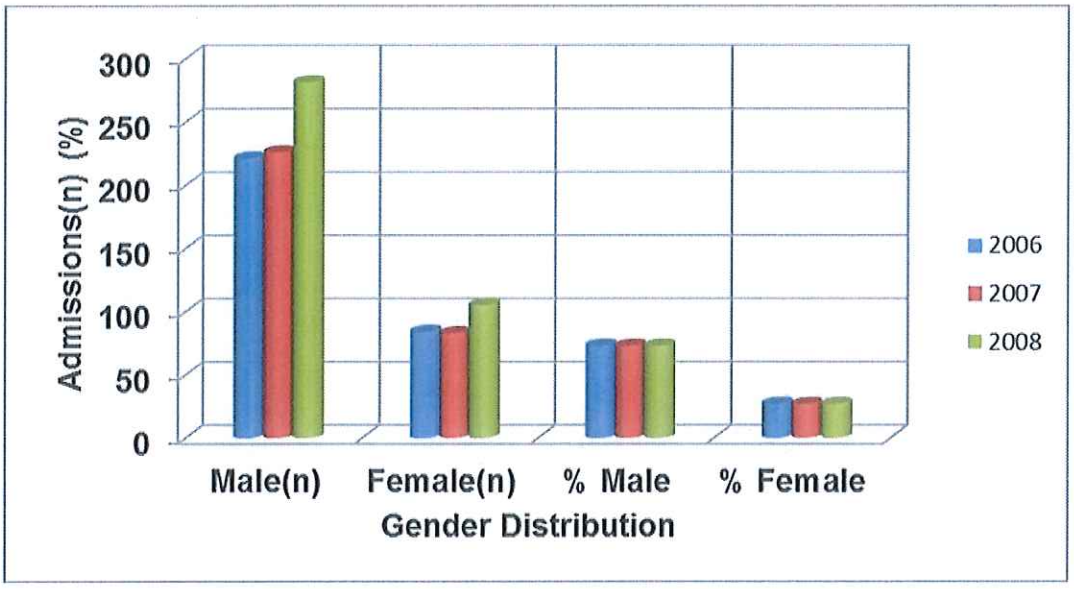


Figure 4.2.1 Gender distribution

As shown in Figure 4.2.1 above, 254 (74%) males were admitted in 2006 as compared to 91(26%) females from the sampled records in the same year. From the 2007 sampled admissions, 260 (72%) were recorded as being male and, 102 (28%) were female surgical admissions. In 2008 there were 319 (72%) males and 122 (28%) females.

4.2.2 AGE DISTRIBUTION ACROSS THE STUDY GROUP

The study showed a high number of admissions in the younger age groups and fewer in the older age groups. As shown in table 4.2.1 below, admissions in the age group 15 - 24 years (n=262) were higher than all the other age groups across all the three years of the study. The second highest of the groups at 251 admissions was the age group (25-34 years). This was followed by the age group (35 – 44 years) with 184 admissions. The older age groups (55 – 64 years) and (≥65 years) illustrated lower admissions. Age appeared to be inversely related to the number of admissions. The younger the age group of patient the higher the number of patients were admitted.

The percentage comparison showed that admissions were higher in younger age groups and that this went down as the groups became older. The age group (25-34 years) was at the highest percentage (26%) followed by the younger group (15-24 years) at 25%.

Table 4.2.1 Surgical Admissions per age group							
Year	Total	Age group(years)					
		15 -24 n	25-34 n	35-44 n	45-54 n	55-64 n	≥65 n
2006	305	82	69	64	47	17	26
2007	309	82	80	53	38	27	29
2008	386	98	102	67	55	37	27
Total	**1000**	**262**	**251**	**184**	**140**	**81**	**82**
n = Number of surgical Admissions							

The next group at 18% admission rate was (35-44 years) which was followed by the age group (45-54) at an average of 14%. With regards to the oldest age group (≥65) although still low in general, it differed slightly in that it had a higher admission rate (9.7%) than for age group (55-64 years) at 8%.

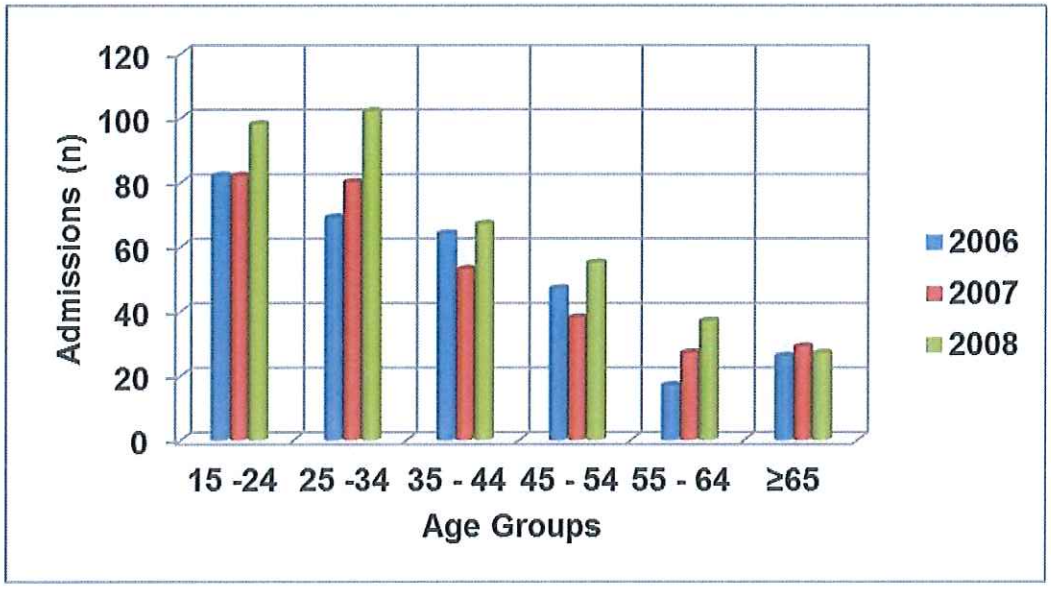


Figure 4.2.2 Admission per age group

In terms of the years of study a varying trend in age of admissions was demonstrated. For the age groups 15-24 years and 25-34 years there was an increasing number of surgical admissions over the three years. In the other age groups more admissions were also shown for 2008. For the age group (≥65) the admission rate became slightly higher than for age group (55- 64) in 2006 and 2007 with 2008 having the lowest admission rate.

4.2.3 GENDER AND AGE DISTRIBUTIONS ACROSS THE STUDY PERIOD

More young persons were admitted than older persons (Table 4.2.2) among both male and females surgical admissions. The male admissions across most of the age groups were more compared to females over the study period. On average the males in the 15-24 year age group showed an admission rate of 29% with females showing an average of 19%. This looked the same for the 25- 34 year age group although the female admissions showed a higher percentage (31%) as indicated on table 4.3 for the study year 2008.

The situation for 2007 showed a difference of 3% in favour of males, with 2008 showing 4% difference for the same age group per gender distribution. The age group 45-54 year presented a different trend where the female admissions were at a higher percentage than males across the study period (table 4.2.2). In the age group 45 – 54 years for 2006, 18% of female patients were admitted as compared to 15% males, the same trend was seen in 2007 (15% female admission compared to 11% males), and in 2008 (17% female and 13% males).

Table 4.2.2 Breakdown of age and gender between the study groups

Year	Gender			Age group											
				15-24		25-34		35-44		45-54		55-64		≥65	
		n	%	n	%	n	%	n	%	n	%	n	%	n	%
2006	Male	221	73	63	28	53	24	46	21	32	15	11	5	16	7
	Female	84	27	19	23	16	19	18	21	15	18	6	7	10	12
2007	Male	226	73	68	30	60	27	40	18	26	11	15	6	17	8
	Female	83	27	14	17	20	24	13	16	12	15	12	15	12	14
2008	Male	281	73	81	29	69	25	50	18	37	13	29	10	15	5
	Female	105	27	17	16	33	31	17	16	18	17	8	8	12	11
Total		**1000**	**100**	**262**	**25**	**251**	**26**	**184**	**19**	**140**	**14**	**81**	**8**	**82**	**8.5**

% in the 3rd collum represent the percentage of admisions per gender to the total admissions per year of study

% in all the colums under age group represent the percentage of admissions per age group within the same gender per year

The last two age groups presented a different picture. While the general trend in the admission rate was lower for 55-64 years and ≥65 years age groups, female patients seemed to increase or level off in these age groups. In 2006, in the age group of 55-64 years group male admissions were at 5% with the females at 7%. For the same study period the ≥65 year age group presented 12% females to 7% males respectively. For 2007 the female admissions were at 14% compared to 8% for male admissions in the ≥65 age group.

The study period 2008 presented a different picture compared to the other periods. This was for the same age groups i.e. 55-64 years and ≥65 age groups. For the age groups 55-64 years, male admissions were higher at 10% compared to 8% of the female admission. The older age group (≥65) showed the earlier trend with fewer males admitted at 5% and more females admitted at 12%.

The trends as indicated above showed that the older age groups were admitted less frequently than the younger age groups. The admissions seemed to change with gender as increasing age showed more females being admitted although in lesser percentages compared to the younger age groups.

4.3 CLINICAL PROFILES

4.3.1 LENGTH OF STAY

The length of stay (LOS) for regional hospitals as part of Gauteng Department of Health plan was set at an average of 4 days (Gauteng Department of Health). The range of the LOS in the study group based on the three years of study, in 2006 is from 0 to 42 days, in 2007 from 0 to 52 days and in 2008 from 0 to 31 days. The mean of the LOS was 3.1 days for 2006, 2.7 days for 2007 and 3.6 days for 2008 (Table 4.3.1).

Table 4.3.1 Length of Stay in days across the study period

Year	2006	2007	2008
Mean (days)	3.1	2.7	3.6

4.3.2 FINAL OUTCOME

The majority of patients were separated from the hospital by discharging to go home. About 867 (87%) patients in the study groups across the period of study were discharged. For 2006 and 2007 the discharges were 276 (90%) and 262 (85%) respectively, whereas for the 2008 study period 329 (85%) of the admitted patients were discharged (Table 4.3.2 and Figure 4.3.1).

Table 4.3.2 Outcome at time of separation											
Year	Total	Discharged		Transferred		Died		RHT		Absconded	
	n	n	%	n	%	n	%	n	%	n	%
2006	305	276	90	23	8	6	2	0	0	0	0
2007	309	262	85	36	12	11	4	0	0	0	0
2008	386	329	85	46	12	11	3	0	0	0	0
Total	**1000**	**867**	**87**	**105**	**10**	**28**	**3**	**0**	**0**	**0**	**0**

The results showed transfers of 8% patients in 2006, 12% in 2007 and 12% in 2008. With regards to death, 3% of patients were separated through dying in 2006, with 4% recorded for 2007 and 3% for 2008 (Table 4.3.2). For the entire period of study (2006 to 2008) there was no evidence of patients who separated through refusing hospital treatment (RHT) and abscondment.

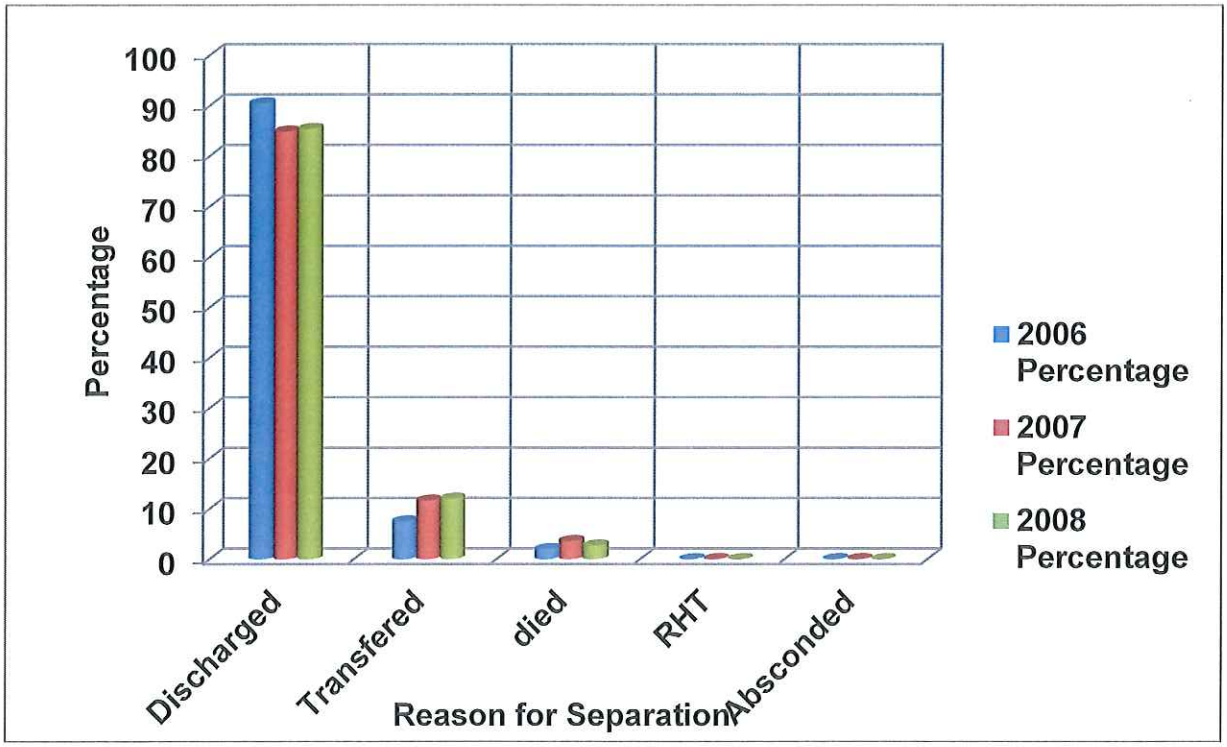


Figure 4.3.1 Comparison of final outcomes

4.4 DISEASE PROFILE

The diseases were grouped through the use of the ICD10 coding system and also grouped based on the closeness of the diseases to each other. The latter was done to expedite the analysis in getting all the variables used to compare and observe the distribution across the study period. The grouping on the basis of closeness enabled the analysis using spread sheets and conclusive comparisons were faster than through the use of the ICD 10 coding alone. To have a clear

understanding of the trends in admissions, the group with the most number of diagnoses (Injuries S00 – S99) was broken down to specific diagnosis in order to understand the impact of each disease on the admission trends in the surgical unit. The results below was used to provide the analysis on the disease profile in the surgical unit through the use of variables across the study priod such as length of stay (LOS), gender and age distrbution.

4.4.1 DIAGNOSES DURING THE STUDY PERIOD

The distribution of the surgical diagnoses across the study period, showed a high number and percentage of injury related (S00- S99) conditions. Most of these admissions over the three year period were higher in 2008 (39%). Most of the remaining surgical admissions were referred to as other surgical conditions (I80 – K38 & K50 – L97) as shown on Table 4.3.3 below.

The latter category represented the second highest cause of surgical admissions and includes effusion, appendicitis, obstruction, gangrene, gallstones and others (Tonsillitis, Circumcision removal of cysts). This is the category of diagnosis which did not include causes of admissions such as injuries and specific diagnosis (cellulitis, hernia, types of cancer and abscesses). Over the years reviewed results showed 27% for other surgical diagnosis in 2006 followed by 31% in 2007 and 42% in 2008. The results also showed that the diagnosis where the condition of the disease developed an abscess of a surgical nature came third with an average of 13.5% across the study period. The year 2006 showed the highest rate of abscesses at 37%, 2007 at 28% and 2008 at 35%. Other diagnosis such as hernia and cellulitis showed some fluctuation of figures across the years of study. In 2007 there were no admissions for hernia in the sample of records reviewed. Cellulitis(L03) showed an increased trend over the three year period with the highest rate in 2007 (47%).

Table 4.3.3 Comparison of Diagnoses across the study period

		Total		2006		2007		2008	
		N	%	n	%	n	%	n	%
S00 to S99	Injuries	416	41.6	123	30	129	31	164	39
	Abscess	135	13.5	50	37	38	28	47	35
K40 to K46	Hernia	21	2	17	81	0	0	4	19
D00 to D09	Cancer	69	6.9	19	28	24	34	26	38
L03	Cellulitis	55	5.5	13	23	25	46	17	31
I80-K38 & K50-L97	Other surgical conditions	304	30.5	83	27	93	31	128	42
Total		**1000**	**100**	**305**	**38**	**309**	**28**	**386**	**34**

% in the 4th' columrepresent the percentage of admissions per diagnosis(3rd'colum) to the total admissions through study period

All other colums represent % of admissions of the study period to the total diagnosis per year of study

As indicated in the figure above (Figure 4.3.2), injury related diagnoses showed a very high percentage compared to all diagnoses as a reason for admission of patients across all the years of study.

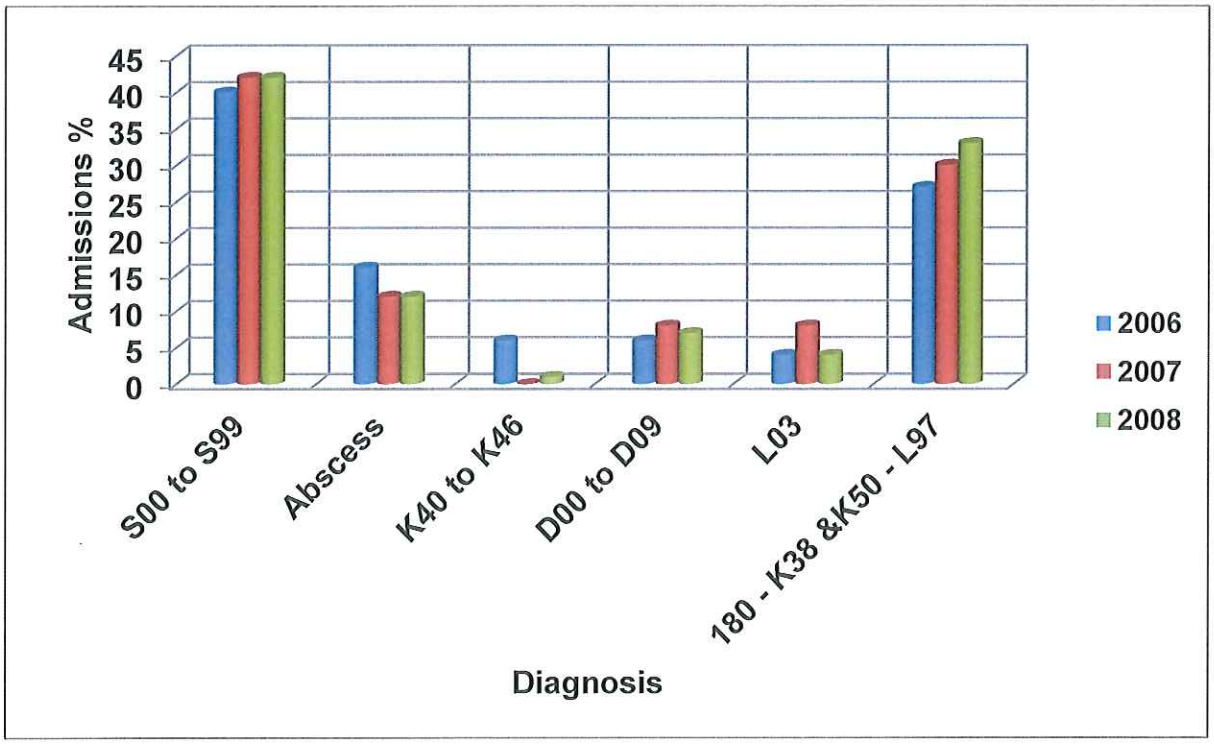


Figure 4.3.2 Percentage Comparison of Diagnoses across the study Period

These conditions cut across all kinds of injuries but were found to be dominated by violence related conditions such as gunshots, stabbings, assault and other kinds of violence including shambock lashings. Also noted were motor vehicle accidents (MVA) injuries as well as burns which were fewer in numbers.

4.4.2 TYPES OF INJURY RELATED ADMISSIONS (S00 – S99)

Most of the injuries which were found as major causes for admission included stabbings, gunshots, assaults, burns, various fractures and head injuries. There were slight differences on the trend of admissions (Table 4.3.4) during the period of study. The percentage admissions for injuries in 2006 was recorded at 32%, which was 2% higher than the year 2007 at 30%. The year of study with the highest percentage of injuries was 2008 at 38%. For the period of study there was a high proportion of admissions for assault (23%) followed by fractures(20%) and head injuries at 19%. Stabbings and burns were next at 17% and 12% respectively, with gunshots coming in lowest for the period of study at 9%. In 2007, Assault (37%) contributed to the highest proportion of admissions, followed by Head injuries (21%) and Stabbings (20%). In 2008, a different trend was noticed with Burns taking the lead at 24% followed by head injuries at 23% and fractures at 22%.

Table 4.3.4 Injury related diagnoses during the study period

Diagnosis	**Total**		**2006**		**2007**		**2008**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Stabbing	72	17	21	29	26	36	25	35
Gunshot	38	9	20	53	7	18	11	29
Assault	96	23	25	26	35	36.5	36	37.5
Burns	50	12	19	38	17	34	14	28
Fractures	82	20	24	29	17	21	41	50
Head Injuries	78	19	14	27	27	34	37	47
Total	**416**	**100**	**123**	**30**	**129**	**31**	**164**	**39**

% in the 2nd, colum represent the percentage of admissions due to the type of injury to the total injuries for thenstudy period

% in the last three colums represent the percentage of adomissions due to diagnosis in the same row for the study year

4.4.3 FINAL DIAGNOSES AND GENDER

As shown above more male patients were admitted in surgical wards than female patients during the study period. This is further illustrated in the figures below (Figure 4.3.3 and Figure 4.3.4). The findings showed a generally high admission across all the diseases, with injury related conditions most seen in males than females.

During 2006 (Figure 4.3.3) the most number of admissions were injury related, followed by other surgical conditions (I80 – K38 & k50 – L97) among the male patients. A similar picture was shown in the study period 2007 (Figure 4.3.4). The third most common diagnoses that was dominated by the male gender in both years is cancer related. Both periods showed a percentage of around 60% for males with the female diagnoses registering a percentge of 40%. A relatively similar picture is shown in the year 2006 for the Abscess related diagnosis. The

male (60%) diagnoses was again shown as being higher than the female (40%).

A different picture was shown in the year 2006, where diagnosis for cellulitis related disease was more common among female patients (53%) than male patients (47%). A similar picture was found in 2007, where abscess related diagnoses were high in percentage among females (53%) compared to men (47%).

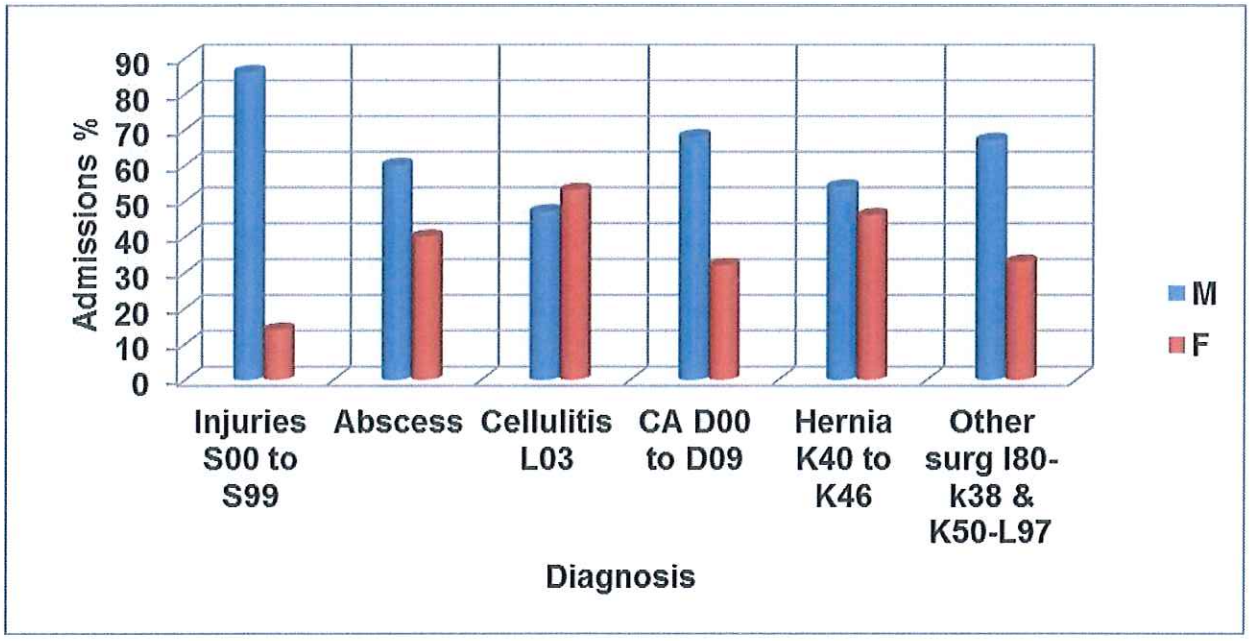


Figure 4.3.3 Final diagnoses per Gender during 2006

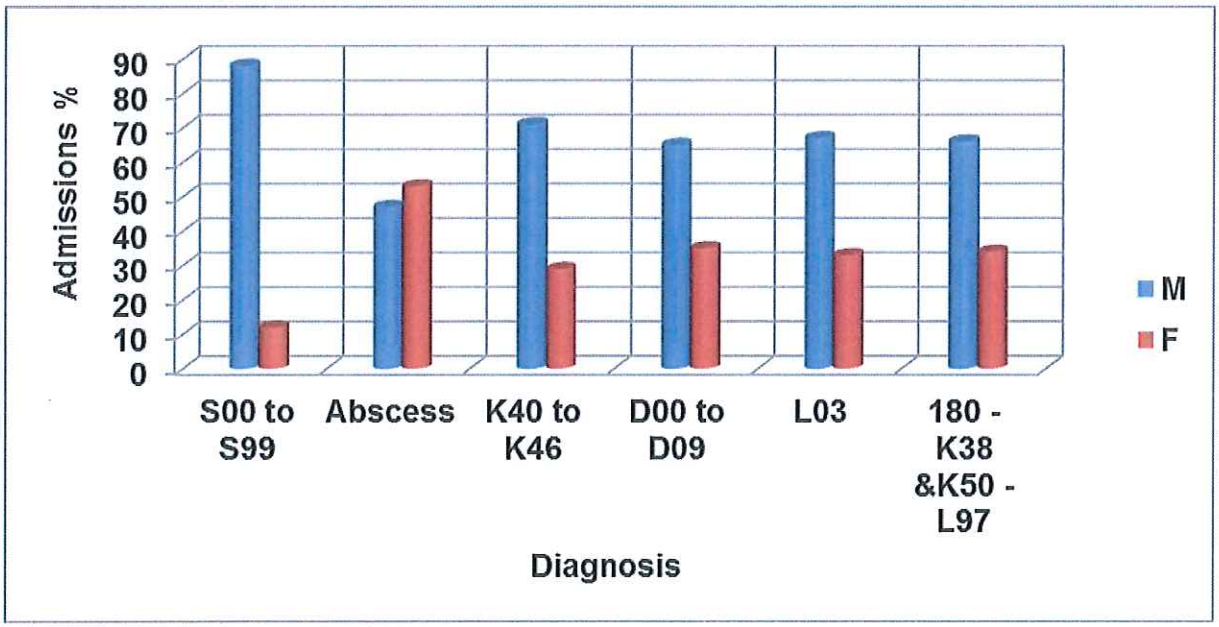


Figure 4.3.4 Final diagnoses per Gender during 2007

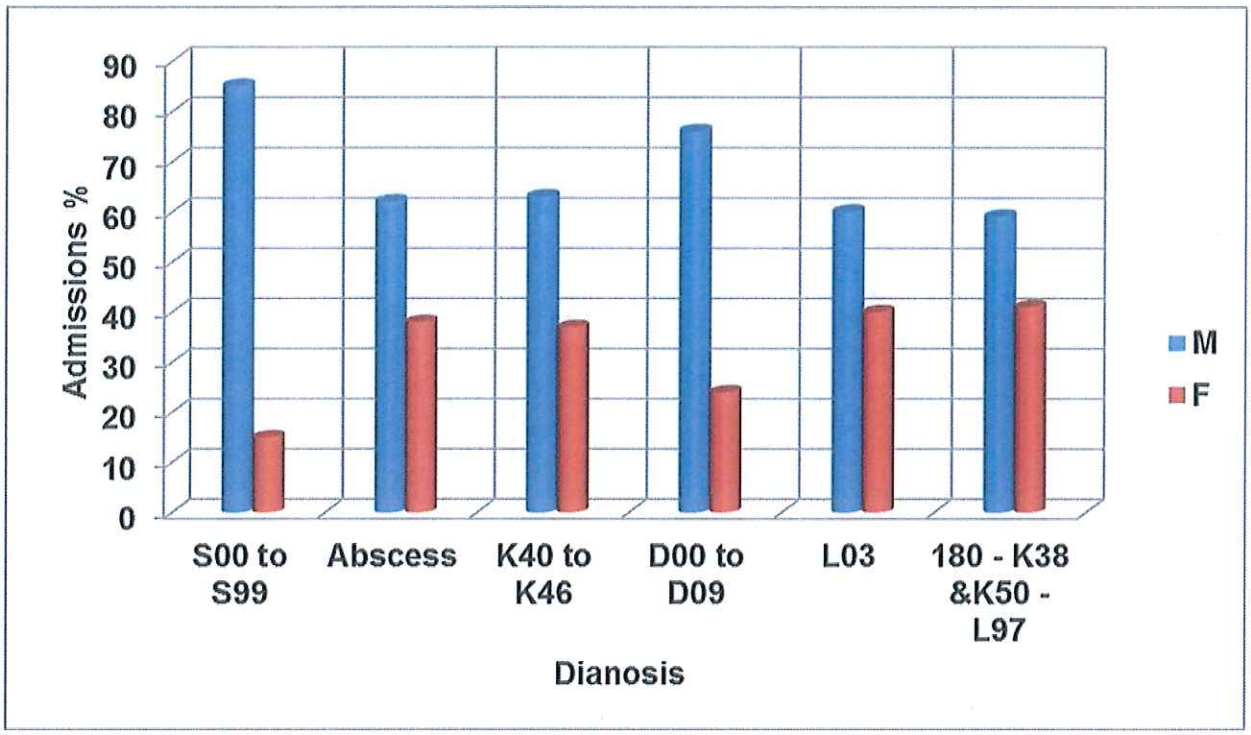


Figure 4.3.5 Final diagnoses during 2008

Except for the above difference, the results clearly demonstrated that surgical admissions in Pholosong Hospital were dominated by male patients. The number of patients admitted for other surgical conditions were similar between males and females (Figures 4.3.3, 4.3.4 and 4.3.5).

4.4.4 INJURY RELATED DIAGNOSES AND GENDER

Because injury is a risk based condition which can also be influenced by the violent behaviour a person is subjected to, it was not surprising that gender came in as such a big variable in injury related admissions. During this period, 80% of patients admitted at the hospital for injury related conditions were male (Figure 4.3.6, 4.3.7 and 4.3.8).

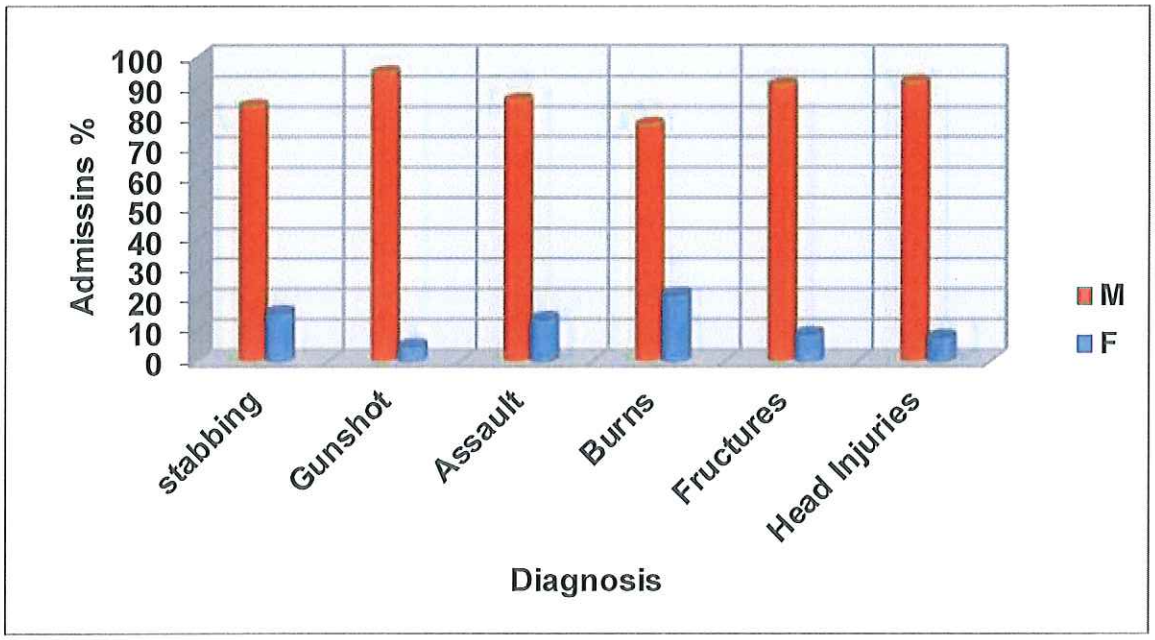


Figure 4.3.6 Injury related diagnoses during 2006

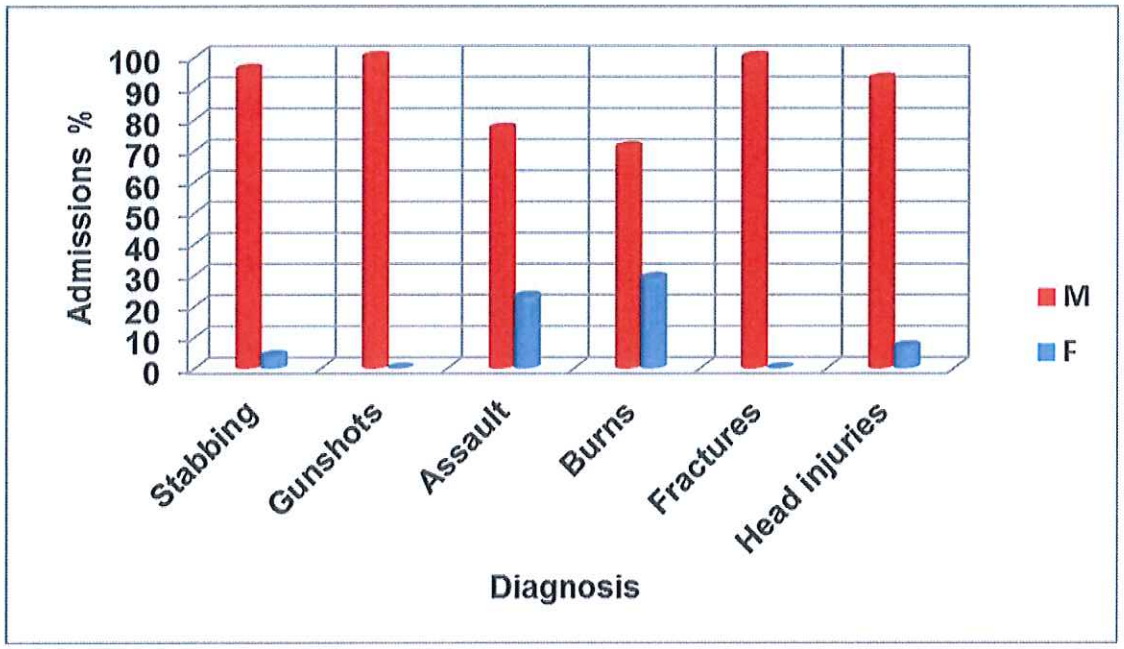


Figure 4.3.7 Injury related diagnosis during 2007

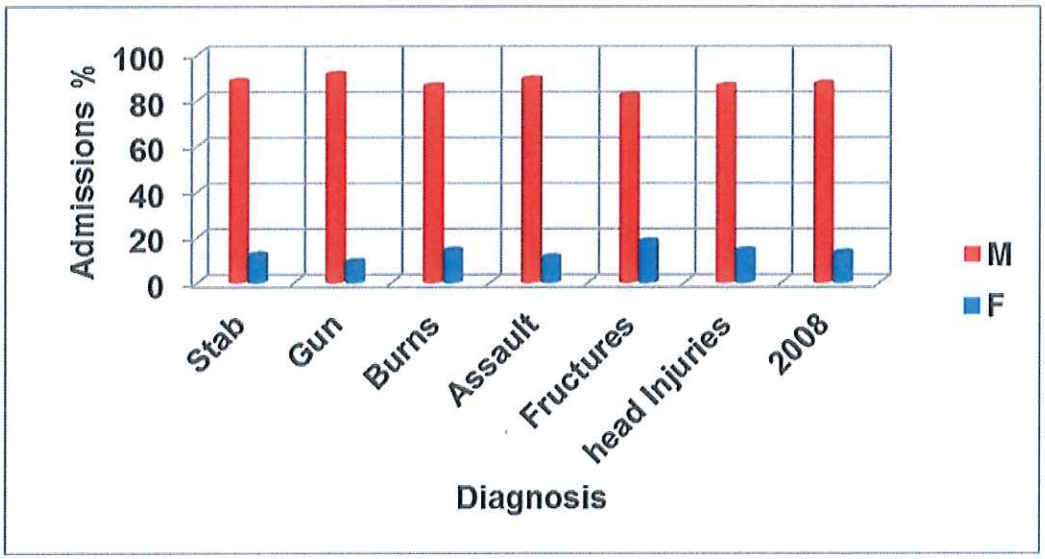


Figure 4.3.8 Injury related diagnoses during 2008

4.4.5 FINAL DIAGNOSES AND AGE GROUP

It is evident that the injury related diagnosis and surgical condition of other nature were high in the younger age groups (15-24 years and 25-34 years) across all three years of the study (Figures 4.3.9, 4.3.10 and 4.3.11). Cancer related diagnoses which registered a low percentage in the younger group showed an increase in older groups. This increase went up from the age group 25-34 years with a slight increase compared to the age group (15 – 24 years). It was interesting to note that the age group 55-64 years had a relatively low percentage of cancer related conditions, similar to the younger age group of 25 -34 years.

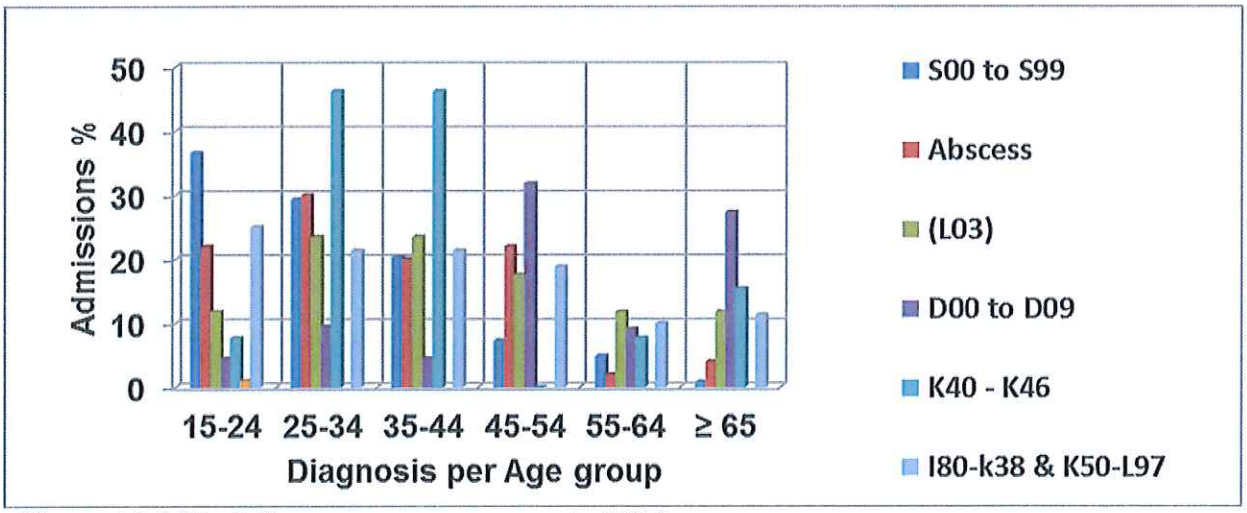


Figure 4.3.9 Final diagnoses per age group in 2006

However in 2007, slightly more cancer cases were seen in the 55-64 year age group as compared to those over 65 years. The proportion of injury related diagnoses was less in other age groups compared to 2006, but still predominent in the 15-24 year age group. A similar pattern was found in 2008 for injury related diagnoses.

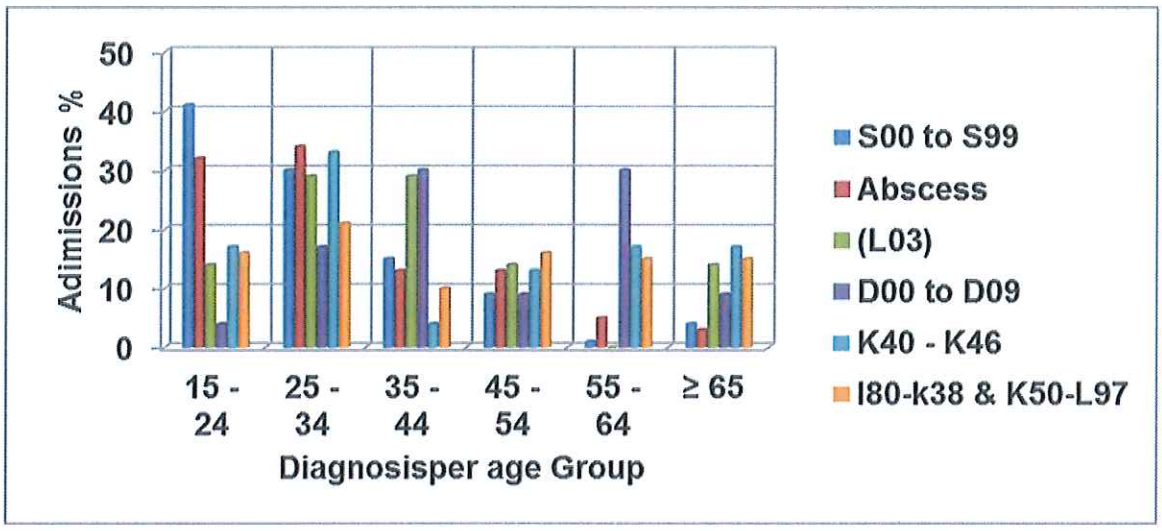


Figure 4.3.10 Final diagnoses per age group in 2007

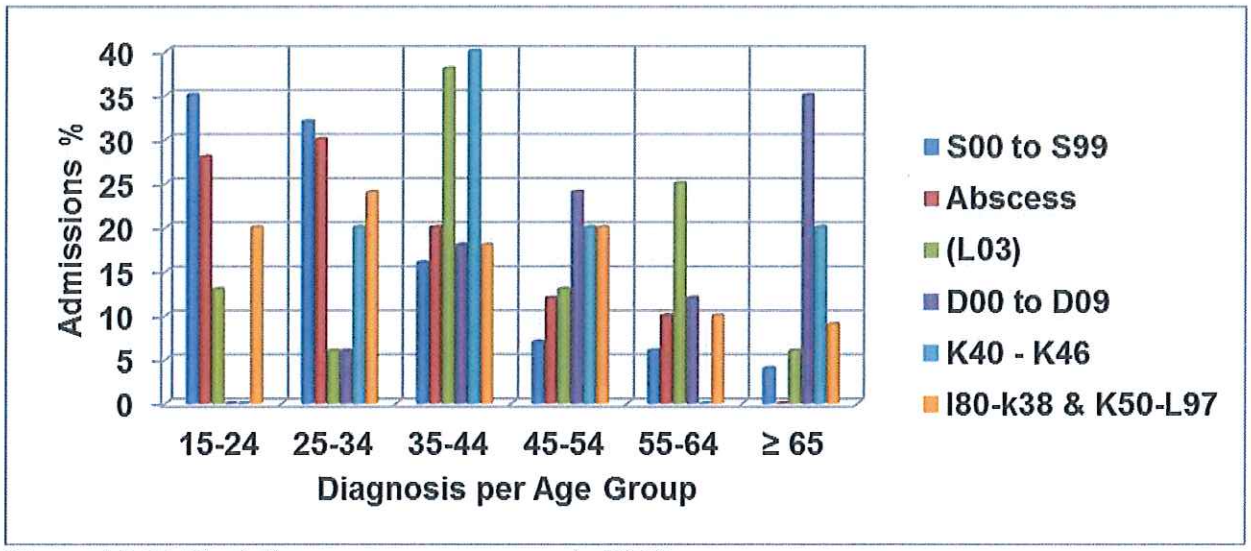


Figure 4.3.11 Final diagnoses per age group in 2008

4.4.6 INJURY RELATED DIAGNOSES PER AGE GROUP

The expectation was that the younger age group will influence more admissions and this was confirmed by the findings. In the 2006 study period (Figures 4.3.12), there were more admissions due to injuries in the first two age groups (15-24 and 25-34 years). Of all the years of study the younger age group as indicated above was high in all the injury based diagnoses with no obvious difference across the study period. Stabbings, gunshot and assault came top of the list of injury related conditions across the study period.

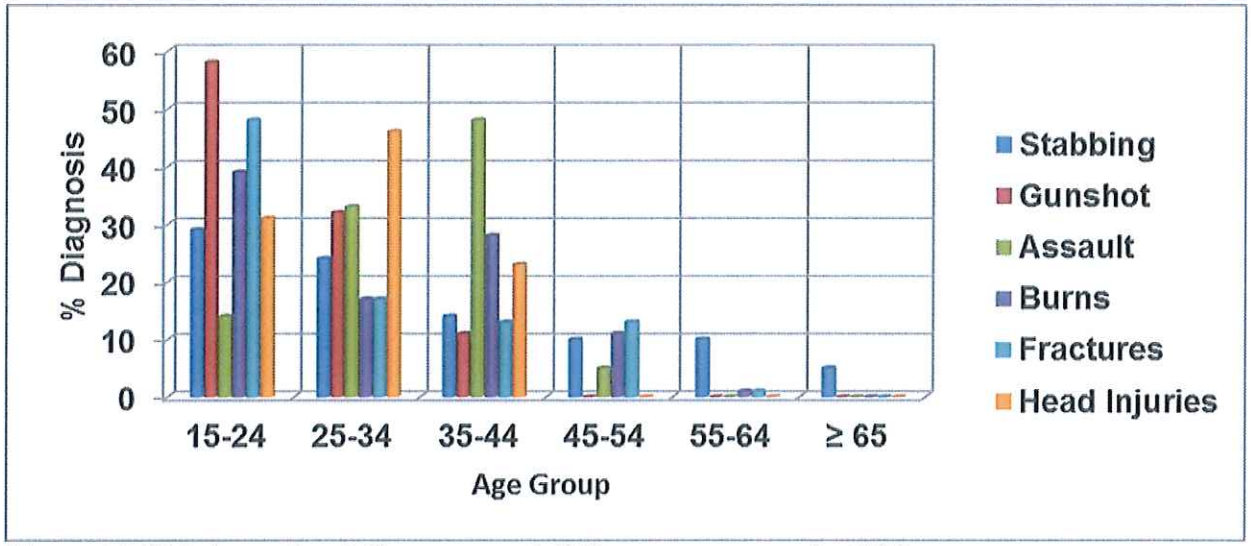


Figure 4.3.12 Injury related diagnoses and different age groups in 2006

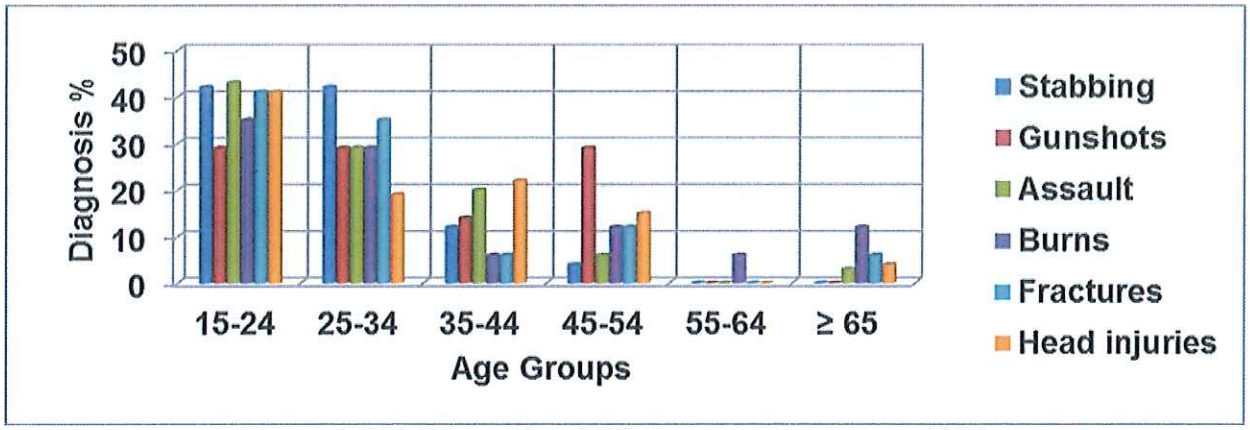


Figure 4.3.13 Injury related Diagnoses per age group 2007

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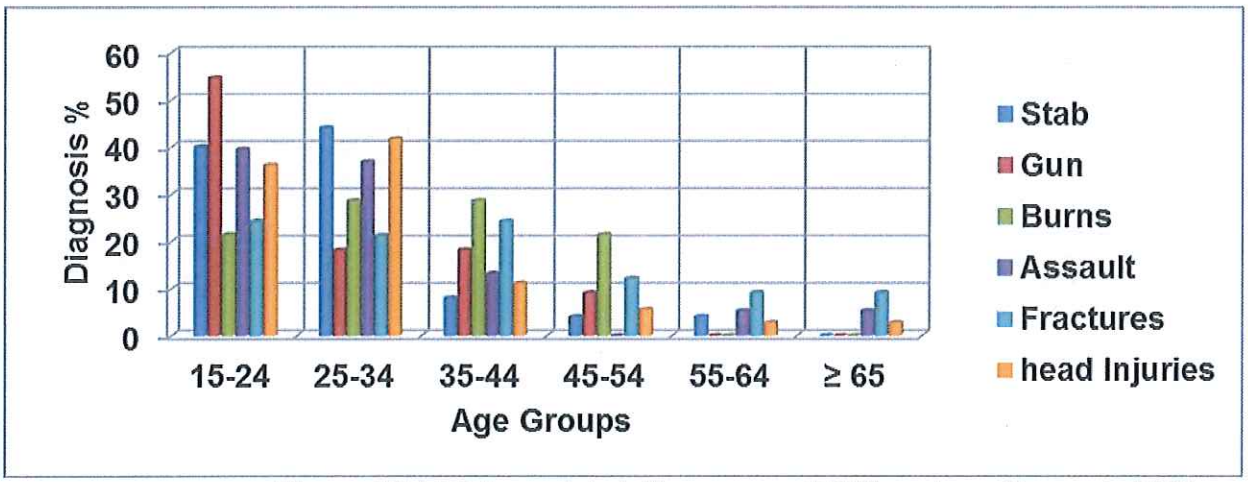


Figure 4.3.14 Injury related diagnoses and Different age Groups in 2008

Stabbings

With a percentage of 38% for the age group (15 – 24years) and 39% for (25 – 34 years) across the period of study the admissions influenced by stabbings were among the highest in the admissions related to injuries.

In 2006, in the age group (15-24 years) 29% were stabbings. This was 13% below the findings for 2007 which recorded 42% of stabbing. The findings for the year (2007) were higher than the other two years with 2008 at 40%. The age group (25-34 years) showed a similar trend for 2006 as the percentage for stabbing were at 29% for 2006, going up to 42% in 2007 and 44% for 2008 respectively.

Table 4.3.5 Diagnosis of stabbings per age group across study period

Year	Total		Age group											
			15-24		25-34		35-44		45-54		55-64		≥ 65	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
2006	21	29	6	29	6	29	3	14	3	14	2	10	1	5
2007	26	36	11	42	11	42	3	12	1	4	0	0	0	0
2008	25	35	10	40	11	44	2	8	1	4	1	4	0	0
TOTAL	**72**	**100**	**27**	**38**	**28**	**39**	**8**	**11**	**5**	**7**	**3**	**4**	**1**	**1**

% in the 2nd column represent the number of admissions to stabbing during the study year to the total stabbing for study period

% in the age group columns represent the percentage admissions to stabbings per age group to the total admissions in the study year

The central age groups (35 – 44 and 45 – 54 years) show a very sharp decrease across all the years of study. There were fewer admissions related to stabbings in these age groups compared to the younger age group above.

The trend for the older age group (54 – 64 and ≥ 65 years) reflected the percentages for admissions based on stabbing as diagnoses. The age group 54 – 64 years showed 10% of admissions that were caused by stabbing for 2006, with the oldest group (≥ 65) only registering 5%. Very few numbers were seen in the subsequent two years.

Gunshots

This diagnosis was more common in the younger age groups (15-24 and 25-34 years) at an average of 48% and 25% respectively and lower in the oldest age groups (Table 4.3.6). For the age groups (15-24 years) the diagnosis of gunshots was between 29% and 60%. The study showed an interesting trend where for 2006 the age group (15 – 24) had a high admission figure

for gunshots (60%). The same age group showed a much lower percent in 2007 with gunshot admissions going down to 29%.

Table 4.3.6 Diagnosis of gunshots per age groups across the study period

Year	Total		Age groups											
			15-24		25-34		35-44		45-54		55-64		≥ 65	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
2006	20	53	12	60	6	30	2	10	0	0	0	0	0	0
2007	7	18	2	29	2	29	1	14	2	29	0	0	0	0
2008	11	29	6	55	2	18	2	18	1	9	0	0	0	0
Total	**38**	**100**	**20**	**48**	**10**	**25**	**5**	**14**	**3**	**13**	**0**	**0**	**0**	**0**

% in the 2nd column represent the number of admissions to gunshots during the study year to the total stabbing for study period

% in the age group columns represent the percentage admissions to gunshots per age group to the total admissions in the study year

The finding in the year 2008 confirmed gunshot as the main cause for concern as it remained at the highest percentage (55%) in the same age group. The numbers of gunshot related admissions appeared to decrease in the older age groups as illustrated in Table 4.3.6.

Assault

Assault was also one of the top causes of surgical admissions. This was noticed from the higher percentage seen in the younger age groups 15 – 24 and 25 – 34years. The 24% reflection for the (15 – 24 years) age group in 2006 was the lowest percentage compared to the other two years. For 2007 and 2008 these age groups were reflected as 43% and 42% admissions respectively (Figures 4.3.13 .and 4.3.14).

Table 4.3.7 Diagnoses of assault per age group across study period

Year	Total		Age group											
	n	(%)	15-24		25-34		35-44		45-54		55-64		≥ 65	
			n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
2006	25	26	6	24	9	36	9	36	1	4	0	0	0	0
2007	35	36	15	43	10	29	7	20	2	6	0	0	1	3
2008	36	38	15	42	13	36	5	14	0	0	2	6	1	3
Total	**96**	**100**	**36**	**38**	**32**	**33**	**21**	**22**	**3**	**3**	**2**	**2**	**2**	**2**

% in the 2nd column represent the number of admissions to assault during the study year to the total stabbing for study period

% in the age group columns represent the percentage admissions to assault per age group to the total admissions in the study year

The age groups (35 – 44 and 45 – 54) also reflected earlier trends in other injury related conditions with decreasing numbers of admissions compared to the younger groups.

The (45 – 54) age group also showed a low diagnosis on assault at an average of 3%. For the older group (55 – 64) the diagnoses on assault was found to be 0% for both 2006 and 2007 with 2008 recording 6%, at an average of 2% across the study period. The age group ≥65, at an average of 2% showed 3% for 2007 and 2008 with 2006 recording 0% admissions.

Burns

The majority of the patients admitted for burns were from the three younger age groups (15-24, 25-34 and 35-44 years) (Table 4.3.8). The spread of burns as a diagnosis across the age groups for all the years of study showed an inconsistent trend. Much as there was generally a high percentage within the younger age group it did not start from the younger age group to the oldest or the other way round.

As demonstrated in figure 4.3.12, burns were at 37% in 2006 for the (15 – 24) age group. The situation for 2007 as demonstrated in figure 4.3.13 showed a decrease of diagnosis for burns in the age group 15 – 24 at 35% (table 4.3.8). This proportion further dropped in 2008 to 21%.

Table 4.3.8 Diagnosis of burns per age group across study period

Year	Total		Age group											
			15-24		25-34		35-44		45-54		55-64		≥ 65	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
2006	19	38	7	37	4	21	5	26	2	11	1	5	0	0
2007	17	34	6	35	5	29	1	6	2	12	1	6	2	12
2008	14	28	3	21	4	29	4	29	3	21	0	0	0	0
Total	**50**	**100**	**16**	**32**	**13**	**26**	**10**	**20**	**7**	**14**	**2**	**4**	**2**	**4**

% in the 2nd column represent the number of admissions to burns during the study year to the total stabbing for study period

% in the age group columns represent the percentage admissions to burns per age group to the total admissions in the study year

At 32% burns remained one of the high causes of admissions to the surgical unit in Pholosong Hospital in the age group 15 – 24 years.

In the age group (25 – 34 years) the number of admissions had increased in 2007 and 2008 (Table 4.3.8).The central age group of 35 – 44 and 45 – 54 years did not indicate any specific trend. In the age group (45 – 54 years) again, admissions appeared to increase in 2007 and 2008.

The older age group (54 – 64 and ≥65) had the lowest numbers of admissions due to burns across the three years at approximately 4% of all the groups.

Fractures

Fractures were one of the most common causes for admissions at the Pholosong Hospital Surgical unit (Table 4.3.9). At 33% for the youngest age group (15 – 24) and 23% for just older group (25 – 34) the findings showed that the younger age was more vulnerable to fractures compared to all other age groups. The proportion of fractures also decreased over the three years in this age group.

Table 4.3.9 Diagnosis of fractures per age group across study period

Year	Total		Age group											
			15-24		25-34		35-44		45-54		55-64		≥ 65	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
2006	24	29	11	45	5	21	3	13	3	13	2	8	0	0
2007	17	21	7	41	6	35	1	6	2	12	0	0	1	6
2008	41	50	9	22	8	20	10	24	5	12	5	12	4	10
Total	**82**	**18**	**27**	**33**	**19**	**23**	**14**	**17**	**10**	**12**	**7**	**9**	**5**	**6**

% in the 2nd column represent the number of admissions to fractures during the study year to the total stabbing for study period

% in the age group columns represent the percentage admissions to fractures per age group to the total admissions in the study year

Head Injuries

Like other injuries, head injuries were also common in the younger age group. The average for the age group (15 – 24) was the highest at 36% followed by the age group (25 – 34) at 34% (Table 4.3.10). This was once more an indication that injury related diagnoses was more in the younger age groups than the older groups.

Although there were differences in the slope of the curve down to the older age groups the actual demonstration was that older age group experienced less head injuries across all the years of study.

Table 4.3.10 Diagnoses of head injuries per age group across study period													
Year	Total		**Age group**										
			15-24		25-34		35-44		45-54		55-64		≥ 65	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
2006	14	11	4	29	6	43	3	21	1	7	0	0	0	0
2007	27	21	11	41	5	19	6	22	4	15	0	0	1	4
2008	37	24	14	38	15	41	4	11	2	5	1	3	1	3
Total	**78**	**19**	**29**	**36**	**26**	**34**	**13**	**18**	**7**	**9**	**1**	**1**	**2**	**2**
% in the 2nd column represent the number of admissions to head injuries during the study year to the total stabbing for study period % in the age group columns represent the percentage admissions to head injuries per age group to the total admissions in the study year														

4.4.7 ABSCESS RELATED DIAGNOSES PER AGE GROUP

On average the abscess related diagnosis showed its influence on admissions to be higher at the younger age group, declining with an increase in age (Table 4.3.11). The admissions for the age group (15 – 24) indicated 26% admissions caused by abscess related diagnosis, followed by 32% admissions in the age group (25 – 34).

Table 4.3.11 Diagnoses of abscess per age group across study period													
Year	Total		**Age group**										
			15-24		25-34		35-44		45-54		55-64		≥ 65	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
2006	50	16	11	22	15	30	10	20	11	22	1	2	2	4
2007	38	12	11	29	14	37	5	13	5	13	2	5	1	3
2008	50	13	14	28	15	30	10	20	6	12	5	10	0	0
Total	**138**	**14**	**36**	**26**	**44**	**32**	**25**	**18**	**22**	**16**	**8**	**6**	**3**	**2**
% in the 2nd column represent the number of admissions to abscess during the study year to the total stabbing for study period % in the age group columns represent the percentage admissions to abscess per age group to the total admissions in the study year														

The abscess related diagnoses show a different pattern in the 2007 (Table 4.3.11 and Figure 4.3.10). It is 7% higher in 2007 (29%) than the 2006 period (22%) in the younger age group (15-24 years).

4.4.8 HERNIA RELATED DIAGNOSES PER AGE GROUP

From all the diagnoses across the study period hernia was the lowest cause of admissions in the Pholosong Hospital Surgical unit. This was shown by the low percentage (2%) compared to all the other diagnoses for the study period (figures 4.3.9, 4.3.10 and 4.3.11). Admissions due to Hernia were more in the age group (35 – 44) at 38%, with the (25 – 34) age group coming in second (24%) during the study period (table 4.3.12). Most admissions were in 2006.

The younger age group (15 – 24) which had been the highest in most of the other conditions had quite low admissions caused by hernia.

Table 4.3.12 Diagnoses of Hernia per age group across study period

Year	Total		Age group											
			15-24		25-34		35-44		45-54		55-64		≥ 65	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
2006	13	52	1	8	3	23	6	46	0	0	1	8	2	15
2007	7	28	1	14	2	29	2	29	1	14	0	0	1	14
2008	5	20	0	0	1	20	2	40	1	20	0	0	1	20
Total	**25**	**100**	**2**	**7**	**6**	**24**	**10**	**38**	**2**	**11**	**1**	**2.6**	**4**	**16**

% in the 2nd column represent the number of admissions to Hernia during the study year to the total stabbing for study period

% in the age group columns represent the percentage admissions to Hernia per age group to the total admissions in the study year

4.4.9 CANCER RELATED DIAGNOSIS PER AGE GROUP

The diagnosis of cancer at Pholosong Hospital reflected that admissions were higher among age groups (45 – 54) and ≥ 65 years. The proportion for the age group (≥ 65 years) was at 25.2% which was higher than the age group (45 – 64 (Table 4.3.13). In 2007 the age group (35 – 44) and (55- 64) had 30.4% of admissions.

Table 4.3.13 Diagnosis of cancer per age group across study period

Year	Total		Age group											
			15-24		25-34		35-44		45-54		55-64		≥ 65	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	N	(%)	n	(%)
2006	19	6	1	5.3	2	10.5	1	5.3	7	36.8	2	10.5	6	31.6
2007	23	7	1	4.3	4	17.4	7	30.4	2	8.7	7	30.4	2	8.7
2008	17	4	0	0.0	1	5.9	3	17.6	4	23.5	3	17.6	6	35.3
Total	**59**	**6**	**2**	**3.2**	**7**	**11.3**	**11**	**17.8**	**13**	**23.0**	**12**	**19.5**	**14**	**25.2**

% in the 2nd column represent the number of admissions to Cancer during the study year to the total stabbing for study period

% in the age group columns represent the percentage admissions to Cancer per age group to the total admissions in the study year

4.4.10 CELLULITIS

Cellulitis made up only 6% of all the diagnoses as a cause for admission in the surgical unit of Pholosong hospital. With regards to the age groups the highest group with admissions due to cellulitis at 22% was the group (35 – 44 years) followed by the group (25 – 34 years) with 21%.

Table 4.3.14 Diagnoses of Cellulitis per age group across study period												
Year	Total		**Age group**									
			15-24		25-34		35-44		45-54		55-64		≥ 65	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
2006	17	6	2	11.8	4	23.5	4	23.5	3	17.6	2	11.8	2	11.8
2007	24	8	4	17	8	33	1	4	3	13	4	17	4	17
2008	16	4	2	13	1	6	6	38	2	13	4	25	1	6
Total	**57**	**6**	**8**	**14**	**13**	**21**	**11**	**22**	**8**	**15**	**10**	**18**	**7**	**12**
% in the 2nd column represent the number of admissions to Cellulitis during the study year to the total stabbing for study period % in the age group columns represent the percentage admissions to Cellulitis per age group to the total admissions in the study year												

4.4.11 OTHER SURGICAL DIAGNOSES

This category included all diagnoses other than the injuries, cellulitis, hernia, cancer and abscesses. It was 30% of the total admissions in the surgical unit at Pholosong Hospital across the study period. For 2006 as indicated in table 4.3.15 admissions due to other surgical diagnosis was 26%, which increased to 35% in 2008. In terms of age grouping the admissions were higher in the younger age groups.

Table 4.3.15 Other Surgical diagnoses per age group across study period												
Year	Total		**Age group**									
			15-24		25-34		35-44		45-54		55-64		≥ 65	
	n	(%)	N	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
2006	80	26	20	25	11	14	17	21	15	19	8	10	9	11
2007	88	28	14	16	18	21	16	18	14	16	13	12	13	13
2008	136	35	27	20	32	24	24	18	27	20	14	10	12	9
Total	**304**	**30**	**61**	**20**	**61**	**20**	**57**	**13**	**56**	**18**	**36**	**11**	**33**	**8**
% in the 2nd column represent the number of admissions to other surgical diagnosis during the study year to the total stabbing for study period % in the age group columns represent the percentage admissions to other surgical diagnosis per age group to the total admissions in the study year												

4.5 INFLUENCE OF DIAGNOSES ON THE LENGTH OF STAY (LOS)

The average length of stay (ALOS) is higher in injury related diagnoses, namely four days. This is similar across all the years of study with 2006 and 2008 slightly higher than the average at 3.7 days. Figure 4.3.15 also illustrated that in 2008, there was a longer ALOS for all the diagnosis except for cancer (CA) related diagnoses.

The diagnosis for hernia showed a similar duration as for other surgical diagnoses for the year

(2008). The overall ALOS for the study period (2006 – 2008) was approximately three days across all the conditions.

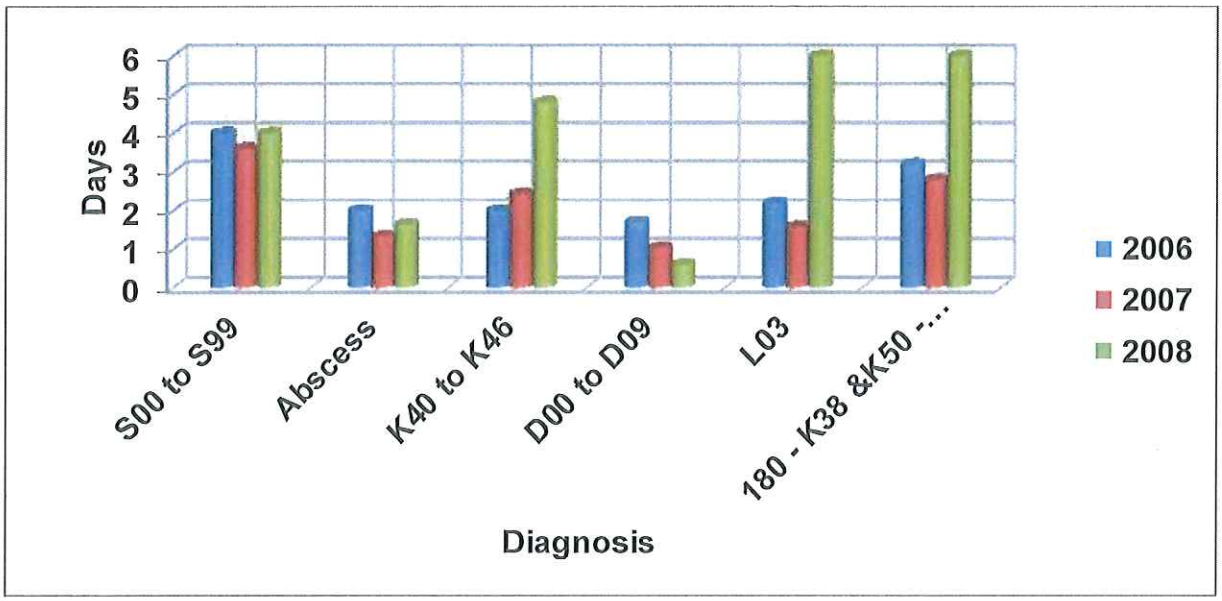


Figure 4.3.15 Average Length of stay per diagnosis

4.5.1 INJURY RELATED DIAGNOSES AND AVERAGE LENGTH OF STAY IN THE SURGICAL UNIT

The injury related diagnoses showed an ALOS at 4.3 days for the period of study (2006 – 2008) (Table 4.3.17). The overall ALOS for all diagnoses was five days as indicated by the table.
With regards to injury related diagnosis, burns had the highest ALOS compared to the rest of the diagnoses. With an average of 13 days the 2008 recorded the highest at 18.7 days.
Head injuries and gunshots both had a ALOS of 3 days across the study period. The two diagnoses had a similar trend across the period. Fractures and assualt also showed the same number of days spent for admission on average (2 days).

Table 4.3.16 Average Length of stay for injury related diagnoses during the study period

Diagnosis	Total	2006	2007	2008
Stabbing	4	3	5	3.4
Gunshot	3	4	3	2.4
Assault	2	3	1.5	2.5
Burns	13	11	10	18.7
Fractures	2	2	1.4	3
Head Injuries	3	4	2.7	1.6
Total	**5**	**5**	**4**	**5**

CHAPTER 5
DISCUSSION

5.1 INTRODUCTION

The dynamics and disease profile in the study site which can have a reflection on the profile of diseases in the area may have had an impact on the trends of admissions seen. Pholosong Hospital's urban location could have influenced admissions of injury related conditions since violence and accidents are usually higher in urban areas compared to places out of town like farms and small towns. It is not surprising therefore that the type of diagnoses that most influenced admissions were found to be injury related in this study. As may be the case demographic variables such as age and gender were found to contribute to the trend where young male adults were found to be in more numbers than any other admitted patients in the surgical wards. This may be a reflection of the situation within the community which is within the catchment area of the hospital.

In contrast, a study done in Ireland found more unintentional injuries in rural settlements (Boland et al, 2005). A Ugandan study, on the other hand, showed no difference between the mortality caused by injuries in urban and rural areas (Hulme, 2010).

5.2 DATA MANAGEMENT

The process of retrieving data from the hospital filling system proved to be a difficult one in terms of providing the study with sufficient complete records for the period. The number of files retrieved for the study which covered the entire period could not even provide the sample required for one year. Admission registers were used to trace the files. The register was found to have the information required for the study and could provide an adequate number of patient details. The source for the sample thus became the admission register. This source also had its short comings regarding sample selection, in the sense that the required number of study subjects could not be reached. For the study year 2006 the sample found was 345 (86%) out of the required 400. The 2007 study period only got 90% of the 400 required while the 2008 period, recorded 97% of the sample required.

In total 1000(83%) of the required sample size of 1200 patient details was obtained over the three years. When considering that the hospital has an average of 22148 surgical admissions per year over the three years, it is of concern that 400 patient records per year could not be

selected. Data retrieved from the hospital Health Information System (HIS) showed a higher number of admissions over the study period. The admission register on the other hand showed fewer numbers compared to the HIS database, it is not clear why this discrepancy arose. Either patient details were not recorded in the admission register, or incorrect figures were entered into the HIS database. The quality and reliability of the information obtained in the study were therefore questionable. If the admission register and HIS database figures had been similar and all the files had complete information for inclusion in the study, sampling may better.

5.3 COMPARISON OF SURGICAL ADMISSIONS FROM 2006 TO 2008

Admissions at the Hospital for the period of study were 20,971 for 2006, 19,641 for 2007 and 18,221 for 2008. The number of admissions appeared to be dropping over the three years. The reasons for this apparent decrease could probably be attributed to various factors, some of which may have been to do with the poor filing system in the hospital, or improvement of services and improved capacity of clinical diagnosis and treatment at the hospital resulting in fewer patients requiring admission. The poor filing system was evidently shown by the fact that the number of retrieved surgical files could not be compared to the admissions in the registers including what the hospital Health information System (HIS) showed the admission numbers.

Until about 2006 or just before as reported in the Hospital records, surgical services in the hospital were functioning with very few doctors. This created a constraint in providing surgical cover after hours on weekends and holidays, and resulted in surgical patients being admitted without being properly examined for appropriate surgical management. The increased capacity in the surgical unit over the study period could have resulted in more appropriate management over weekends and public holidays, resulting in fewer surgical admissions over the three years.

The availability of 24 hour services as well as the increase in the number of doctors in the surgical unit could have increased the capacity to manage better and arrive faster at a final diagnosis without having to admit the patients unnecessarily.

5.4 DEMOGRAPHIC PROFILES

5.4.1 GENDER

The study showed a difference in admissions between males and females at the surgical unit in Pholosong Hospital. Across all the years of study, 72% of the admitted patients were males

compared to 28% of female admissions. This finding could have been an indication that male patients were admitted in the surgical unit because of the violent life style which most of the males are usually exposed to. The reason for this could be found from the disease profile as some factors such as life style differences are evident as creating different exposures to people in terms of gender. Reza and Mercy (2001) found that 28.3 per 100 000 homicide cases around the world were among male, of which 156.7 per 100 000 were from Sub-Saharan Africa.

5.4.2 AGE

The study showed a high number of surgical admissions in the younger age group compared to the older age groups. This was similar to the findings of a study done by Genuario et al (2008) on surgically treated pelvic and acetabular fractures. The high percentage of surgical admissions in the age group (25-34) in Pholosong Hospital conforms to these studies as most of the admissions were young males which were caused mostly by injuries, some of which were homicide.

Admissions for the older age groups compared to the younger age groups were lower in surgical conditions. Maxwell et al (2007) found that admissions for assault cases in England were more stable or less in males and females of the ages above 44 years.

5.4.3 AGE AND GENDER DISTRIBTUION

The study by Boland et al (2005) found that of all the admissions in urban and rural areas for unintentional injuries, male patients accounted for 66.1% of deaths. Females were also found admitted for the same diagnosis however in lower numbers (33, 9%) compared to men. A similar trend of admissions in this study is demonstrated.

5.5 CLINICAL PROFILES

5.5.1 LENGTH OF STAY

Regional hospitals have the ALOS as an indicator which is set at a national norm of four days (Gauteng Department of Health 2012). This means that all units within a hospital of this level should be within the length of stay of four days. In the study under review, the slightly lower ALOS could have indicated an efficient or inefficient health service.

An effective and well equipped hospital would require advanced medical equipment and

clinical skill from doctors, nurses and other categories of staff. This would afford the Hospital's surgical unit to do diagnose quickly and put patients on treatment faster for earlier discharge. This would then be found as an improvement on the services in Pholosong Hospital unless a readmission rate of these patients can prove to be higher than the expected.

If at the point of admissions more patients were transferred from the hospital to a higher level the average length of stay might be lower that the norm. If this was done due to lack of capacity and skills by the surgical unit the low ALOS would indicate that the unit is ineffective. On the contrary the study under review showed that 87% of the admissions were managed at the hospital, and only 10% are being transferred for higher level management. The study also showed that only 3% of discharges were through deaths, which confirms that the unit's ALOS showed efficient patient management.

Demir (2007) found that there was a relationship between the clinical characteristics of the patients and the ALOS. With regards to Pholosong Hospital the pattern of referrals also showed that complicated clinical conditions were referred to tertiary hospitals with only the minor cases requiring 0 to 3 days of ALOS.

5.5.2 OUTCOMES AT THE TIME OF SEPARATION

The results clearly indicated that most patients were discharged home after treatment. The contributing factor related to the referral pattern which allowed for patients with severe conditions like head injuries to be taken to the next level (tertiary) hospital as soon as was possible. The quality of care also contributed as patients remaining in the hospital were managed effectively by affording the unit to discharge more patients (87%) with only 3% lost through death.

Noting that the transfers included transfers to other units within the hospital (e.g. Obstetrics and Gynaecology, Medical) it could be assumed that transfers to tertiary hospitals were less than 10%. Although this has not be proven in this study appointment of more clinical staff including the clinical manager could have been contributing factors to the improvement of the services in the surgical unit. Of interest is that even though the transfers look relatively low the trend from 2006 showed an increase, this can also be part of the benefit related to improvement of diagnoses and increased appropriate referrals rather than missed diagnoses.

There was no evidence of patients absconding or refusing hospital treatment (RHT). Given that

complaints were often received by public hospitals, a reflection of this in the case of admitted patients was not shown in the study. Inadequate recording of patients' separation may have been the reason for this lack of information; or an indication that there were fewer complaints about the surgical unit.

It was comforting to note that the lowest percentage of separation was found to be death. The study indicates that only 3% of the admissions were separated from the surgical unit through death. This is 1% lower than the number of deaths that were found to have been caused by violence in the world in 1990 (Reza and Mercy. 2001).

5.6 DISEASE PROFILE

From the study the trend of admissions at Pholosong surgical unit indicated that violence related conditions were the most found in the unit. This was followed by the group referred to as Other surgical Admissions (I80 – K38 & K50 – L97), which included Effusion, Appendicitis, Obstruction, Gangrene, Gallstones and Conditions that include (Tonsillitis, Circumcision and removal of Cysts).

Injury related diagnosis at 36.7% proves to be the condition mostly found in the surgical units. Bradshaw et al (2002) found that injury related conditions were among the top three causes of death, especially young adults and middle-aged men. The confirmation that injury related admissions was a cause for concern was also demonstrated by Boland et al (2005). They found that 64% of 520 772 admissions in Ireland were injury related.

INJURIES

Injuries related admission included stabbings, gunshots, assaults, burns, various fractures and head injuries. With 80% of all patients admitted for injury related conditions being male across the study period it can be confirmed that males are more prone to violence related life style than females. Females were mainly admitted for assault and burns. This was much more noticeable in the years of study 2006 and 2007. A study done by Maxwell et al (2007) on the trend in admission to hospital involving assault in England also found males to be more at 90% admissions compared to females

The younger age group (15–24 and 25 – 34 years) showed a higher influence on the trend for admission of patients with injuries. Of all the years of study the younger age group had a higher percentage on all the injury based diagnosis across the study period. Stabbings, gunshot and

assault came top of the list with stabbing and gunshots leading across the study period. Reza and Mercy (2001) found that globally homicides were highest in the age group 15 – 29 years. This was found to have been pushed by males of the same age who contributed 28.3 per 100 000 homicides in the world. Other studies in South Africa also found that 156.7 per 100 000 people in Sub Saharan Africa died of homicide.

Stabbing is an injury that is caused through the use of a sharp instrument such as a knife (most of the time) screw drivers etc. The action is usually influenced by alcohol abuse where at the slightest provocation a knife can be used to stab a person. Males especially of a young age (15 to 34 years) are quick to use this method of violence to penetrate one another or other people especially women in their age group. It is thus not surprising that the findings at the Pholosong Hospital showed that 37% males in the younger age group across the period of study were admitted for stabbings. Maxwell et al (2007) in their study on the trend of admissions to hospital involving use of a knife or other sharp instrument found that 89% of male admissions were aged between 15 and 44 years. The middle age group (35 – 54) showed a very sharp decrease across all the years of study (8.7%).

Gun control has been a cause for concern which made the South African government to try and reduce their numbers in the hands of the community by using various methods including amnesty on carrying illegal firearms. An appeal was also made for legal guns to be returned to government for disposal. The findings on gunshot admissions reiterate the need for such an intervention by government. The findings on the study showed that up to 60% of diagnoses were caused by gunshots to patients in the ages between 15 and 34 years.

Assault was also found to be among the top causes for admissions in the surgical unit. In this study assault included injuries such as bodily force, use of blunt object, strangulation and hanging. Coming in as the third cause for injury, assault also showed that it was related to the younger age group, where 32% patients aged between 15 and 44 years were admitted. The findings from this study conformed to the fact that trauma was more acute in Sub – Saharan Africa of which South Africa is a part (Bowley et al, 2002). They reported that the male population at the age of 15 – 29 years were the greatest victims and perpetrators of trauma. This was found more in urban areas such as Gauteng province in South Africa.

Burn related conditions in Pholosong Hospital had a high admission rate in the younger age groups for all the years of study. This was confirmed by the study done at Nelson Mandela

Academic Hospital (Kingu and Mazwai, 2010) found that burns affected children of younger age more than the older groups mostly due to inquisitiveness and activity characteristics. They did not find any influence of gender. Feng et al (2007) in a study done in China found that more males were affected than females (3:1). They did not find any annual trend which came out to be the same as in this study. The year 2006 showed a higher admission from the younger age group that declined with ascending years. The year 2007 on the other hand demonstrated a bell shaped curve where the middle age group showed a higher admission and the 2008 showing a meandering curve. Although this study did not show the cause and time of the burns the other studies showed that burns, mostly of open fire or paraffin stove occurred between 12h00 and 18h00. For adults the studies also showed a level of intentional burn injuries. The period of day for the burns indicated that burns were mostly at the time for evening meals preparation especially in areas with low socio economic situation that could be prevented through education as Kingu and Mazwai (2010) indicated.

Fractures of the human body are mostly related to some kind of violence and accidents mostly under the influence of alcohol. In terms of socio economic traits the population in the poorer categories are mostly affected as violence is common in this life style. Age of the people likely to be involved in the behaviour leading to sustaining fractures is mostly of the 15 – 24 year old. This study confirmed all indicated above even though some of the variables such as alcohol and socio economic status of the community were not observe. The age of the patients admitted indicated clearly that younger age groups were more admitted than other age groups. The study by Shekar and Reddy (2008) supported this as they found that 78% of such injuries fell within the age group 11 – 40 years. They also found that most of fractures were found in areas with economic distress where unemployment was high with alcohol coming in as a catalyst for interpersonal violence and reckless driving. With Pholosong Hospital serving a population of which 40% are unemployed, most of whom being young males, Shekar and Reddy's study even though done in India show similar factors that contribute to fractures as a means for admission. With regards to gender because of the life style and occupation, men compared to women were more involved in such injuries. According to Lee (2009) the ratio for male to female involvement in sustaining fractures of the mandible in New Zealand is 9:1. This is supported by the 4.7:1 male to female ratio of the study by Shekar and Reddy (2008).

Most of the injuries sustained in assault related injuries were to the head and neck (Maxwell et al.2007). According to Maxwell et al (2007) 49% men compared to 41% female sustained injuries to this part of the body. In this study 36% of men at age 15 – 34 years were diagnosed

with head injuries.

5.7 LIMITATIONS

The following limitations were identified:

- Missing, untraceable or destroyed patient records.
- Incomplete information in the ward registers.
- The variables utilised in the study were recorded by different people at different times in the surgical records, providing opportunity for information bias.

CHAPTER 6

The main aim of the study was to determine the trend of patients admitted in the surgical wards of Pholosong Hospital over a three year the period from 1 January 2006 to December 2008 and the factors influencing that trend

CONCLUSION

6.1 THE TREND OF SURGICAL ADMISSIONS IN THE PHOLOSONG HOSPITAL OVER A THREE YEAR THE PERIOD

Admissions were within 20,000 with a declining numbers of just more than 1000 from the earlier year (2006) to the last year of study (2008) across the study period

6.2 THE DEMOGRAPHIC PROFILE OF SURGICAL PATIENTS ADMITTED DURING THE STUDY PERIOD

The admissions in terms of gender were more for males (72%) compared to 28% for females across the study period. With regards to age the research found more younger patients (15 to 34) admitted to the surgical unit.

6.3 THE CLINICAL PROFILE OF SURGICAL PATIENTS ADMITTED DURING THE STUDY PERIOD

No major influence of the Average length of stay (ALOS) outside the norm (4 days) on the surgical admissions was observed across the study period. Most of the patients were discharged home (87%) with only 3% separated through death across the study period

Most patients admissions at the surgical unit were injury related diagnosis (41.6%). The injury related diagnosis influenced the admissions across the study period. There were more cases of stabbing within the injury related admissions (37%).

RECOMMENDATIONS

The study has provided a baseline against which to observe the trends of admissions at Pholosong Hospital in future. What was found can create the foundation for an epidemiological database in the surgical unit. A duplication of this study in and on other disease trends can be

considered to provide a comparative base in the trend of admissions in the hospital. This can assist in understanding the differences in the load of hospitalisation, prioritise in line with the demands, rationalise the planning of effective interventions and evaluate their impact.

Hospital data management regarding patient filing was found to be very weak and require urgent attention from the hospital management. The challenges in collecting more reliable data proved to be more difficult than anticipated. To introduce effective electronic data collection and storage, with fully trained data capturers will enhance the better management of patient information in the hospital. The units which generate the data will be made to understand their important role in ensuring no loss of such information. The accessibility of reliable information is invaluable to the planning and development of hospital services. In addition, an analysis of hospital statistics would assist in determining the causes of morbidity in an area as a whole. This, in turn can facilitate public health planning and intervention.

Educating the community on issues such as addressing conflicts through dialog and prevention of crime will reduce the progression of violence related injuries with a consequent reduction on the strain of hospitalisation. Since violence has a dramatic influence on injuries in South Africa, it is necessary to focus on prevention of this behaviour especially in young people. For example, the influence of alcohol, which is evident as a contributor to violent behaviour, needs a strong community intervention.

FUTURE RESEARCH

The study was a record review, assessing trends over time. It did not investigate risk factors which need further exploration to identify causes for increased admissions particularly due to injuries among male and younger age groups.

Since this study only analysed surgical admissions, and did not include patients seen in the outpatients department, a further study is needed to analyse the disease profile and number of patients treated on an outpatient's basis. This will provide more evidence in planning for the ambulatory patients.

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APPENDICES

APPENDIX A: ETHICS CLEARENCE CERTIFICATE AND LETTERS OF APPROVAL

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Division of the Deputy Registrar (Research)

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
R14/49 Conrad S Modise

CLEARANCE CERTIFICATE	**M090948**
PROJECT	Trends in Surgical Admissions at Pholosong Hospital, Gauteng, for the Period 2006 to 2008
INVESTIGATORS	Conrad S Modise.
DEPARTMENT	School of Public Health
DATE CONSIDERED	2009/10/02
DECISION OF THE COMMITTEE*	Approved unconditionally

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

DATE 2009/10/02 **CHAIRPERSON** .....
(Professor PE Cleaton-Jones)

*Guidelines for written 'informed consent' attached where applicable

cc: Supervisor : Prof S Naidoo

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10004, 10th Floor, Senate House, University.
I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to a completion of a yearly progress report.**

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES...

APPENDIX B: PERMISSION FROM GAUTENG HEALTH DEPARTMENT

Umnyango wezempilo no Kuthuthukiswa Komphakathi
Lefapha la Maphelo le Tshebeletso le Ntshetsopele ya Sechaba
Department of Health and Social Development
Departement van Gesondheid en Maatskaplike Ontwikkeling
OFFICE OF THE CHIEF EXECUTIVE OFFICER
Enquiries :Dr G.S. Maseko
Reference :
Telephone : 011 7383225
Fax number :011 738 3000
E-mail :
Cell number :

TO WHOM IT MAY CONCERN

RE: PERMISION FOR Mr C.S. MODISE TO DO RESEARCH WORK AT PHOLOSONG HOSPITAL

This is to confirm the hospital management's permission for the above mentioned Wits Masters' student (Mr Conrad Sekwakwalla Modise)to do research at the designated unit within Pholosong hospital.

This permission is based on the following conditions:

That the student receives ethical approval by both the university ethics committee
That Gauteng Department of Health and Social Development also provides such approval

The hospital management commits to assist the students with all reasonable resources as will be required in line with the guidelines.

Hoping this will assist you

Yours truly

ACTING CHIEF EXECUTIVE OFFICER
Dr. G.S. MASEKO
DATE: 19/02/10

APPENDIX C: DATA COLLECTION TOOLS

1. Surgical Inpatient Data sheet

	PATIENT NAME	AGE (YRS)	GENDER	DATE OF ADMISSION	DATE OF SEPARATION	LOS	DIAGNOSIS	OUTCOME
1								
2								
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