

https://dspace.org/

The comparative cost of treating medical aid and non-medical aid patients attending private general practitioners

Modi, Bhadrashil Hasmukhlal

2014-03-25
http://hdl.handle.net10539/14304

Downloaded from a DSpace repository. https://dspace.org/

THE COMPARATIVE COST OF TREATING MEDICAL AID AND NON-MEDICAL AID PATIENTS ATTENDING PRIVATE GENERAL PRACTITIONERS

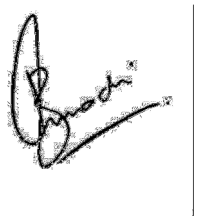
Dr. BHADRASHIL HASMUKHLAL MODI

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 Masters of Medicine in the Branch of Family Medicine.

Johannesburg 2013

DECLARATION

I, Bhadrashil Hasmukhlal Modi, declare that this Research Report is my own work. It is being submitted for the degree of Master of Medicine in the branch of Family Medicine, in the University of Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.



_____.

Signature

31 March 2013

ABSTRACT

Background

It is widely assumed that the Private Health Sector in South Africa caters only for the 16% of the population who can afford to belong to a Medical Aid. However, a number of patients who consult private general practitioners self-fund their health expenses because they do not belong to a Medical Aid. This study measured the proportion of Medical Aid as compared to the Non-Medical Aid encounters in private general practice and the nature and cost of the encounters and medical management differences between these two groups.

Methodology

This is a prospective, descriptive study of patient encounters with private general practitioners in the Johannesburg Inner City during the month of March 2002. The details of each patient encounter were recorded anonymously onto a data capture sheet by the participating doctor.

Findings

A response rate of 94% was achieved when thirty-three general practitioners out of 35 agreed to participate. The study population consisted of 3652 encounters, comprising 53.7% (1961) Non-Medical Aid and 46.3% (1691) Medical Aid encounters.

The two groups (Medical Aid and Non-Medical Aid) had similar demographic profiles, with respect to sex, age, occupation and place of residence. Only 8% of the patients consulted were unemployed. The findings indicate no significant differences with respect to consultations, diagnoses, radiological and pathological investigations and procedures performed in the doctors' rooms.

Only 5.4% of the encounters resulted in a referral for secondary care. The Non-Medical Aid encounters had a three times higher referral rate compared to the Medical Aid encounters and were more likely to be referred to a medical facility (public clinic or hospital). Although the Public Health Sector provides free medical care for children less than 6 years of age and for ante-natal care, there was a higher frequency of such encounters in the Non-Medical Aid group.

Although both groups received, on average, the same number of medication per encounter, the average medication costs in the Medical Aid encounter was 22.7% higher than in the Non-Medical Aid encounters due to lower usage of generic medication. There was no difference in the treatment protocols in both groups for the five diagnoses studied.

Overall, consultations and medication contributed 88.9% of the overall encounter costs and there is a significant difference between the overall mean costs of the two groups. The overall mean cost for Non-Medical Aid encounters was R185.75 and for the Medical Aid encounters was higher at R240.30. This significant difference ($p<0.01$) is due to the difference in the cost of medications, which is a

result of the higher frequency of generic medication prescribed in the Non-Medical Aid encounters.

Conclusion

General Practitioners in Private Practice in the Greater Johannesburg Inner City have higher frequency of Non-Medical Aid encounters than Medical Aid encounters.

There were no significant demographic and medical management differences (in the five diagnoses reviewed) between the two groups consulting the private general practitioner. The findings suggest that private general practitioners treats both groups similarly irrespective of whether they have medical insurance or not.

The overall costs for the Non-Medical Aid encounters is 22.7% lower than for the Medical Aid encounters, largely due to the lower average cost of medications.

ACKNOWLEDGEMENTS

- Prof Bruce Sparks and Dr. Graham Hukins – for guidance and encouragement during the supervision of this research report
- Dr. Martyn Schikkerling and the staff of African Health Synergies – for writing the database program and for capturing the patient data forms
- Dr. Billyy van der Merwe from Managed Healthcare systems – for assisting in analysing the data
- Yildiz Brunings and Andrea from Medprax – for providing the medication database and March 2002 medication prices
- MAP-IT – for supplying the digital Johannesburg Map
- Dina Venter for assistance in the statistical analysis

TABLE OF CONTENTS

Page

DECLARATION ..... **ii**
ABSTRACT ..... **iii**
ACKNOWLEDGEMENTS ..... **vi**
TABLE OF CONTENTS ..... **vii**
LIST OF FIGURES ..... **ix**
LIST OF TABLES ..... **x**
NOMENCLATURE ..... **xii**
1.0 INTRODUCTION **1**
2.0 AIM **8**
3.0 OBJECTIVES **8**
4.0 METHOD **9**
4.1 STUDY DESIGN 9
4.2 SITE of RESEARCH 10
4.3 STUDY POPULATION 10
4.4 STUDY DAYS 11
4.5 MEASUREMENT 11
4.5.1 Measuring Instrument 11
4.5.2 Variables 12
4.5.3 Coding 13
4.5.4 Pilot Study 14
4.6 ETHICS 14
4.7 LOGISTICS and TIME SCHEDULE 15
4.8 RESOURCES 15
4.9 FUNDING 15
5 ANALYSIS **15**
6 INFORMATION SHEET/CONSENT FORM **16**
7 RESULTS **16**
7.1 SAMPLE POPULATION & RESPONSE RATE 16
7.2 DEMOGRAPHICS 17

7.2.1 Sex 17
7.2.2 Occupation 18
7.2.3 Age Groups 20
7.2.4 Residential Suburbs 21
7.3 CONSULTATIONS and DIAGNOSES 22
7.4 PROCEDURES 25
7.5 RADIOLOGY 26
7.6 PATHOLOGY 28
7.7 REFERRALS 31
7.8 MEDICATION 33
7.9 OVERALL COSTS 39
7.10 DISEASES 44
7.10.1 Encounters 44
7.10.2 Age 46
7.10.3 Gender 48
7.10.4 Geographic Suburb 49
7.10.5 Occupation 50
7.10.6 Diagnoses 51
7.10.7 Referrals 52
7.10.8 Medication 53
7.10.9 Radiology investigations 59
7.10.10 Pathology investigations 60
8 DISCUSSION 61
9 CONCLUSION 71
APPENDIX A 72
APPENDIX B: 74
APPENDIX C: 77
REFERENCES 79

LIST OF FIGURES

Figures **Page**

Figure 1: Financing flows within the South African health care system (adapted)[2] 3

Figure 2: Frequency of Medical Aid and Non-Medical Aid encounters 17

Figure 3: Johannesburg Map of Residential Suburbs 21

Figure 4: Number and cost of Medication 35

Figure 5: Type and Frequency of medication prescribed 36

Figure 6: Top 15 prescribed medication by frequency 37

Figure 7: Top 15 prescribed medication by costs in Rands 38

Figure 8: Percentage cost comparison between Medical Aid and Non-Medical Aid encounters 41

Figure 9: Mean cost comparison between Medical Aid and Non-Medical Aid encounters 43

Figure 10: Medication summary for Gonorrhoea 56

Figure 11: Medication summary for Pelvic Inflammatory Disease (PID) 57

Figure 12: Medication summary for Diabetes 57

Figure 13: Medication summary for Hypertension 58

Figure 14: Medication summary for Upper Respiratory Tract Infection (URTI) 58

LIST OF TABLES

Tables **Page**

Table 1: Sex distribution in the Medical Aid and Non-Medical Aid encounters 18

Table 2: Frequency of Occupation in the Medical Aid and Non-Medical Aid encounters 19

Table 3: Age Groups as per Medical Aid and Non-Medical Aid encounters 20

Table 4: Type and Duration of Medical Aid and Non-Medical Aid Consultations 22

Table 5: The overall Top 10 Diagnoses recorded 23

Table 6: The Top 10 Diagnoses per Med Aid and Non-Med Aid encounters 24

Table 7: Mean number of Procedures performed in the rooms 25

Table 8: Top 10 Procedures for Medical Aid and Non-Medical Aid encounters 26

Table 9: Mean number of Radiology Investigations ordered 27

Table 10: Radiology investigations performed 27

Table 11: Frequency of encounters where a Pathology investigations was ordered 29

Table 12: Description of Pathology investigations ordered as per the SAMA tariff codes 29

Table 13: Top 20 pathology investigations ordered per Med Aid and Non-Med Aid encounters 31

Table 14: Frequency of Referrals in Medical Aid / Non-Medical Aid encounters 32

Table 15: Type of Referrals in Medical Aid/Non-Medical Aid encounters 32

Table 16: Mean number of medication per encounter 33

Table 17: Medications Dispensed or Not Dispensed by GPs for Medical Aid / Non-Medical Aid encounters 34

Table 18: Top 15 prescribed medication by frequency 37

Table 19: Top 15 prescribed medication 38

Table 20: Costs related to Medical Aid and Non-Medical Aid encounters 42

Table 21: Mean Costs related to Medical Aid and Non-Medical Aid encounters 42

Table 22: Number of Diagnoses per Med Aid and Non-Med Aid encounters 44

Table 23: Number of encounters with Simultaneous Diagnoses 45

Table 24: Frequency and Distribution of Common Diagnoses among Age Groups 47

Table 25: Frequency and Distribution of Common Diagnoses between Gender Groups 49

Table 26: Frequency and Distribution of Common Diagnoses among Areas 50
Table 27: Frequency and Distribution of Common Diagnoses between Occupation Groups..... 51
Table 28: Frequency and Distribution of Common Diagnoses between Medical Aid statuses 52
Table 29: Distribution of Referrals among the Diagnoses 53
Table 30: Number of Medication prescribed per Diagnoses 54
Table 31: Average Cost for Medicines Prescribed 55
Table 32: Radiology Investigations in the five diagnoses 59
Table 33: Average Cost for Radiology Investigations 59
Table 34: Pathology Investigations in the five diagnoses 60
Table 35: Average Cost for Pathology Investigations 60

NOMENCLATURE

Beneficiary – Member or a dependant belonging to a Medical Aid

BHF – Board of Healthcare Funders

Branded medication – the original medication patented and not a copy

CBD – Central Business District

Child – A person who is not yet of school going age

Dispensing – The General Practitioner provides medication at the time of the consultation

Employed – A salaried employee

ENT – Ear, Nose and Throat

Generic Medication – medication that is identical in ingredient and strength to the original branded medication

GDP – Gross Domestic Product

Housewife – An unemployed person not looking for work and manages the household

ICD-10 – International Classification of Diseases, version 10

IPA – Independent Practitioners Association

JHB – Johannesburg

KDP – Kliptown

Med Aid – Medical Aid

Medical Facilities – Public Health Sector Primary Care Clinics and Hospitals

MRC – Medical Research Council

NAPPI Codes – National Pharmaceutical Product Interface

NGO – Non Governmental Organisation

Non-Dispensing – The General Practitioner does not provide medication at the time of the consultation and gives the patient a prescription to obtain their medication from a Pharmacy

Non-Med Aid – Non Medical Aid

O & G – Obstetrics and Gynaecology

Pensioner – Males aged 65 and above and Females aged 60 and above, as per the South African pension guidelines

PID – Pelvic Inflammatory Disease

Procedures – side room investigations and minor surgery performed in the doctor's consulting rooms

SAMA – South African Medical Association

Scholar – child of school going age

Self-employed – a person who is working for themselves instead of an employer

Student – person studying at a tertiary education facility

URTI – Upper Respiratory Tract Infections (includes Influenza, Sinusitis, Otitis, Tonsillitis and Pharyngitis (ICD10 codes J00 to J15))

1.0 INTRODUCTION

Preamble

This study investigates the similarities and/or the differences in the medical management and its associated costs provided by general practitioners to patients belonging to a Medical Aid or to those who are self-funded (Non-Medical Aid). Medical management that the doctor provides includes the consultation, procedures, prescription of medication, further investigations (radiology and pathology) and referral to another healthcare practitioner or health facility if necessary. This all embracing activity between a doctor and patient is termed the "encounter" for the purpose of this study.

Introduction

The current South African Health Care system is organised into Public and Private Health Sectors. The Public Health Sector is financed largely from general taxes and minimally through donors and service fees at hospitals[1]. The facilities provided by the Public Health Sector encompass a comprehensive range of health care services and is accessible to the entire population. There is no cost to the patient to attend the Public healthcare services neither at primary health clinics, nor for hospital care for children less than 6 years of age and for women attending antenatal clinics. The use of public hospitals otherwise are subject to a nominal fee at the time of service.

The Private Health Sector is funded by the section of the population who subscribe to private medical insurance. This consists mostly of self-employed and the middle to high income salaried workers, or as a result of their employment conditions. The employer, in some cases by up to 50%, subsidises the Medical Aid premiums. The Government, in addition, provides a tax concession for the Medical Aid contributions paid by the individuals and employers. Privately funded insured individuals and their dependants have the freedom of choice with respect to the private health care providers and facilities to use, although some medical aid options restrict this freedom of choice to preferred providers. The Medical Aid premiums are then paid to Medical Schemes / Health Insurers who reimburses private health care providers when the patients, who are members of the Medical Scheme, utilise the services of the healthcare practitioner[2].

The above mentioned South African Healthcare system is adapted and encapsulated in Figure 1 below.

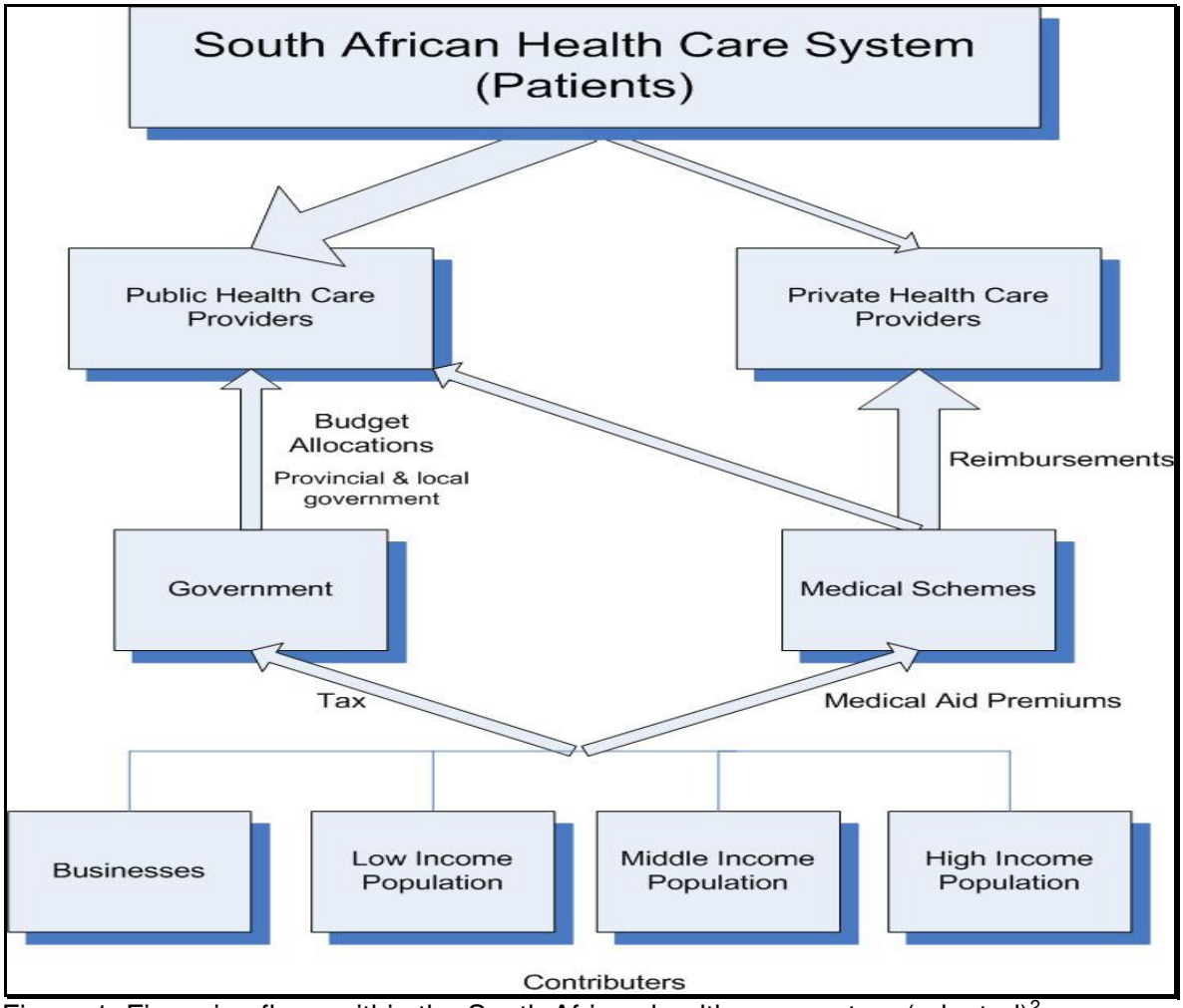


Figure 1: Financing flows within the South African health care system (adapted)[2]

The amount of money spent in the public and private health sectors are almost equal, 4.1% of the GDP is spent in the private sector (R96.5 billion in 2010) and 4.2% of GDP is spent in the public sector[3]. It is commonly stated that the private health sector spend is attributable only for the 16% of the population who are covered by Medical Aid. This however, does not take into account the "unknown" out of pocket expenditure by Non-Medical Aid patients attending the practitioners in the private health sector.

The Public Health Care Sector caters for 84% of the South African population. It therefore, as opposed to the private sector, has to cater for more people, with the same money/budget, fewer resources and fewer healthcare personnel[3]. The public sector is stretched to the limit with high patient loads and patient dissatisfaction with the quality of care received (cleanliness, safety and security of staff and patients, long waiting times, staff attitudes, infection control and drug stock-outs)[1]. This concern about the quality in the public health care sector has resulted in many uninsured patients (Non-Medical Aid) consulting health care practitioners in the private sector and paying for health services out of pocket[4].

Since it is mostly those in the middle and high income bracket who can afford to belong to Medical Aid, this has given rise to the assumption that private healthcare is exclusively for the wealthy "with a privileged few having disproportionate access to health services"[1]. However, the 2005 General Household Survey conducted by Statistics South Africa reported that 55.3% of households that have accessed the private health sector do not belong to a Medical Aid[5].

This situation is by no means unique to South Africa. KJ Lee[6] reports that the USA has 44 million uninsured people (17% of the total population) that have to pay out of pocket to access private health care.

The uninsured in the United States consists mainly of people with low income earners, part-time workers, unemployed and children. The majority of the uninsured (40%) fall in the 18 to 35 years age group[7].

Many studies report that the lack of health insurance results in a reduction of access to health care, less use of the health services and the postponement of seeking health care until a condition becomes severe[8]. It is stated that when uninsured patients attend private health care facilities, they receive less quality of care than the insured for similar diagnoses and they are less likely to be admitted to the hospital[9,10].

In the US, studies have shown that there are 45000 additional avoidable deaths per annum attributed to the lack of health insurance[11]. Uninsured patients are generally treated by lower quality of physicians and the quality of physicians is associated with adverse health outcomes[12]. Furthermore, the uninsured patients tend to wait for their medical condition to worsen before consulting with the doctors. They receive fewer preventative and diagnostic services and as a result, cancer is detected at a later stage than patients with health insurance[13].

When facing patients who cannot afford to pay for the medical services they need, the doctor finds ways to treat the uninsured patients, i.e.

a) To refer the patient to a public health facility, or
b) To forego indicated tests and/or therapies because of costs, or
c) To dispense advice telephonically to save office visit costs, or
d) To provide drug samples to the needy who cannot afford medication, or
e) To reduce the fees for healthcare services rendered[14, 15, 16].

The National Health Insurance (NHI) policy paper states that the private health sector in South Africa has a problem of high costs which will not be sustainable over the long term. The high costs relates to the high price and high utilisation of healthcare services and possible over-servicing of patients because of the fee-for-service financial model in the private sector[1]. There is an incentive for healthcare practitioners to gain higher income from the encounter by increasing the number of healthcare services provided.

However, in a study of Sexually Transmitted Infections (STI's), Chabikulil, et al[17], found that the insured and the uninsured patients received similar prescriptions of medication for STI's and not "extra" medication for the insured patients as over-servicing would imply. Although the effectiveness of prescriptions for insured and uninsured patients were similar, the uninsured patients were offered significantly cheaper medication (generic medication) based on the perception by the doctor on the patient's willingness and/or ability to pay for the medication.

There are very few studies that have investigated the similarities and differences in the healthcare management provided by general practitioners to patients with or without health insurance.

Demographic Overview of Johannesburg[18]

The population of South Africa was 44 819 778 on Census day 2001 and the total population of Johannesburg was 3 225 810. Johannesburg's population closely mirrors the demographic profile of Gauteng province as a whole. However, it is

different from the South African profile in three main areas. There are a higher percentage of people in the working age of 20-60 years in Johannesburg (62.8%) as compared to South Africa (49.5%). In addition, there is a lower percentage of younger people aged between 0-20 years old in Johannesburg (30.9%) as compared to 43.2% in South Africa and fewer people older than 60 years (6.3% as compared to 7.3%). Almost two thirds (62.7%) of the economically active people in Johannesburg are employed.

The population of Johannesburg is mainly black at almost 74%, compared to the national average of 79%. The next largest population is white at 16% (national average 9.6%) while the Johannesburg's population of coloureds and Indians is 6% and 4.2% respectively.

The residents of the city are also relatively well qualified, with 28.7% holding a Grade 12 qualification (national average 20.4%) and almost 14% have a post-school education as compared to the national average of 8.4%. Johannesburg has a much lower percentage (7.2%) of people with no schooling at all (national average 17.9%).

This study attempts to investigate if the difference in the funding status (Medical Aid or Non-Medical Aid) for healthcare services makes a significant difference in the medical management provided by the general practitioners.

2.0 AIM

To compare the nature and cost of encounters (Non-Medical Aid and Medical Aid) at Private General Practitioners in the Johannesburg Inner City.

3.0 OBJECTIVES

3.1 To determine the proportion of Non-Medical Aid and Medical Aid encounters.

3.2 To describe and compare Non-Medical Aid and Medical Aid encounters with respect to:

3.2.1 Demographics of patients (age, sex, employment, residence, medical insurance) consulted

3.2.2 Diagnosis made

3.2.3 Medications prescribed

3.2.4 Procedures performed in the doctor's rooms

3.2.5 Investigations (radiology and pathology) ordered, and

3.2.6 Referrals made

3.3 To determine and compare the average costs per encounter (Non-Medical Aid and Medical Aid) with respect to:

- Consultation cost
- Medications prescribed
- Procedures performed

- Investigations ordered (pathology and radiology)
- Referrals made

3.4 To specifically compare the following common diagnoses, with respect to the demographics, diagnosis, medications, procedures, investigations, referrals and the costs related to them:

- Upper respiratory tract infections (URTI) such as influenza, sinusitis, otitis external, otitis media and tonsillitis (ICD-10 codes from J00 to J15) ,
- Hypertension (ICD-10 code I10),
- Diabetes (ICD-10 code E10 and E11),
- Gonorrhoea (ICD-10 Code A54) and
- Pelvic inflammatory disease (PID) (ICD-10 code N70).

4.0 METHOD

4.1 STUDY DESIGN

All details of the doctor-patient encounter (Medical Aid and Non-Medical Aid) that took place on the study days were recorded in the questionnaire provided to the GPs, thus a Prospective, Descriptive study[19]. This study does not involve any experimental interventions, any control subjects nor is an observational study.

4.2 SITE of RESEARCH

This study was conducted amongst the participating private general practitioners based in the Johannesburg Inner City, which includes the Johannesburg CBD, Hillbrow, Braamfontein and Fordsburg. Names of doctors practicing in the Johannesburg Inner City were compiled from the Johannesburg City Medical Group, a doctor's association based in the Inner City.

The researcher works in the Johannesburg CBD and has close association with the Johannesburg City Medical Group. The good relationship between the researcher and the members of this association would result in a fair and unbiased survey because cooperation could be ensured from the participating GPs, especially given the sensitivity and nature of this study and the financial conclusions derived from this study.

4.3 STUDY POPULATION

The study population consisted of all patient encounters with the participating GPs on the study days during March 2002.

The statistician suggested that in order to achieve statistical significance, a minimum number of 23 participating General Practitioners in private practice with an average of 15 encounters per GP per day were needed to achieve a minimum study population target of 1500 Non-Medical Aid and 1500 Medical Aid encounters. Only nine study days were required to achieve the minimum 3000

encounters. The number of participating GPs (33 GPs) and the size of the study population (a total of 3 652 encounters with 1691 Medical Aid and 1961 Non-Medical Aid encounters) exceeded the above minimum requirements and is elaborated further in section 7.1.

4.4 STUDY DAYS

To avoid variations in diagnoses and frequency of the encounters as a result of seasonal variation (there are more frequent encounters in winter as compared to summer months) and days of the week and month (there are more frequent encounters on Mondays than Fridays and at month end than mid-month), a non-random purposeful sampling method was used to choose the study days. Further details are provided in Appendix C.

4.5 MEASUREMENT

4.5.1 Measuring Instrument

A data collection sheet with a unique number (Appendix A) was completed by the participating doctor at the time of the encounter. These sheets were collected from each doctor at the end of the study. The unique number of each data sheet allowed them to be kept separately for each participating doctor. This was necessary so that participating doctors could be provided with a report of their own data. However, the research report is aggregated and no one doctor can be identified.

At the time of the study, there were no exclusion criteria and all encounters on the study days were included.

4.5.2 Variables

The following data variables were collected at every encounter as per the data collection sheet:

- Age or year of birth of the patient
- Sex of the patient
- Place of residence of the patient (only the name of the suburb where the patient resides was required)
- Employment status, i.e. if the patient is employed, self-employed, unemployed, housewife, student, scholar or a child
- Medical Aid status, i.e. if the patient belong to a medical aid or not
- Diagnosis made by the GP at the time of the encounter and recorded as per the ICD10 codes (3 digit)
- Consultation code, i.e. the appropriate SAMA tariff code that describes the consultation (first or repeat visit and length of duration of the consultation)
- Name, strength and quantity of medication prescribed and whether the medication was dispensed by the GP or not
- Procedures performed in the GPs rooms
- Special investigations (pathology and radiology) ordered by the GP
- Any referrals made to other health practitioners or medical facilities

4.5.3 Coding

The above variables were coded by the investigator as follows:

- The ages of the patients were grouped by decades
- The residential suburbs were coded using the South African Post Office postal codes
- SAMA tariff codes for consultations, procedures performed, investigations ordered and referrals were used
- Diagnoses were coded using the ICD-10 codes up to 3 digits
- NAPPI codes were used to code the medication prescribed
- Medprax price file for March 2002 was used to group and cost the medication. The cost of medication prescribed is the same whether dispensed by the GP or by the pharmacist
- BHF scale of benefits fees for 2002 for the above SAMA tariff codes was used to price the healthcare services provided
- Cost of the encounter between the patient and the GP includes the cost of the consultation, medication prescribed, procedures performed, radiology and pathology investigations ordered (i.e. Total cost to patient = cost of consultation + cost of medication prescribed + cost of procedures + cost of radiology + cost of pathology). The cost of referral to other health practitioners or medical facilities was not included in the total cost calculation.

4.5.4 Pilot Study

Three private GPs, not practicing in the Johannesburg Inner City, but practicing in the CBD's of Lenasia, Lenasia South and Eldorado Park, were requested to pilot the data capture sheet. The pilot study ran during the second week of January 2002. Feedback obtained from these GPs allowed the data collection sheet to be improved (with clearer descriptions) and the finalised Data Capture Sheet is attached as Appendix A. The data from these GPs was not included in this study.

4.6 ETHICS

The Ethics Committee of the University of Witwatersrand (Protocol Number M01-09-28), granted Ethical Approval for this study on 4th December 2001.

Each participating general practitioner was requested to participate on a voluntary basis. Their names and details were kept anonymous and confidential. The results of this study are presented as aggregate data and no one general practitioner can be identified by this report.

On the data capture sheet, no patient names or particular identifying details was recorded or captured. Thus, the patients remained anonymous.

The doctors were not asked to record their earnings per patient. They were only asked to document what health services the patients' received in the encounter, investigations ordered and referrals made. The costs calculated thereafter were based on the BHF scale of benefits fees for 2002.

4.7 LOGISTICS and TIME SCHEDULE

The logistics and time schedule is detailed in Appendix C.

4.8 RESOURCES

The resources required was a Data Capturer, printing of the data collection sheets, telephone and faxing facilities, transport to and fro from the participating GPs, a personal computer, Microsoft Access Software and NCSS/PASS Dawson Edition Statistical Software.

4.9 FUNDING

The cost of this study, as elucidated in resources above, was approximately R 50 000.00. The investigator self-financed this study.

5 ANALYSIS

A qualified statistician was consulted prior to and after the data capture.

An experienced data capturer captured the data, from the data sheets, into Microsoft Access Database. The data was captured a second time to detect and correct any errors. Each data sheet had a unique number, which allowed the data to be checked by the investigator as well and any inaccuracies that were found, were corrected.

The data was exported from Microsoft Access and analysed using NCSS/PASS Dawson Edition Statistical Program for the statistical analysis. The analytical parameter used to statistically analyse the data was the Chi-square and *p*-values were considered to be significant at 0.05 or less.

6 INFORMATION SHEET/CONSENT FORM

The invitation letter that was sent to the prospective study GPs is attached as Appendix B.

7 RESULTS

7.1 SAMPLE POPULATION & RESPONSE RATE

Thirty-Five private General Practitioners practicing in the Johannesburg Inner City were invited to participate in this study. Thirty-three doctors agreed to participate, resulting in a response rate of 94%.

There were a total of 4520 patient encounters and the following data were removed:

- Where medical insurance data was missing from 163 (3.6%) encounters and one could not determine whether they were Medical Aid or Non-Medical Aid encounters
- Where a repeat or subsequent encounter was stated (discussed further in limitations on page 67).

This resulted in a study population of 3652 patient encounters, which comprised of 1691 (46.3%) Medical Aid and 1961 (53.7%) Non-Medical Aid encounters, as illustrated in Figure 2 below.

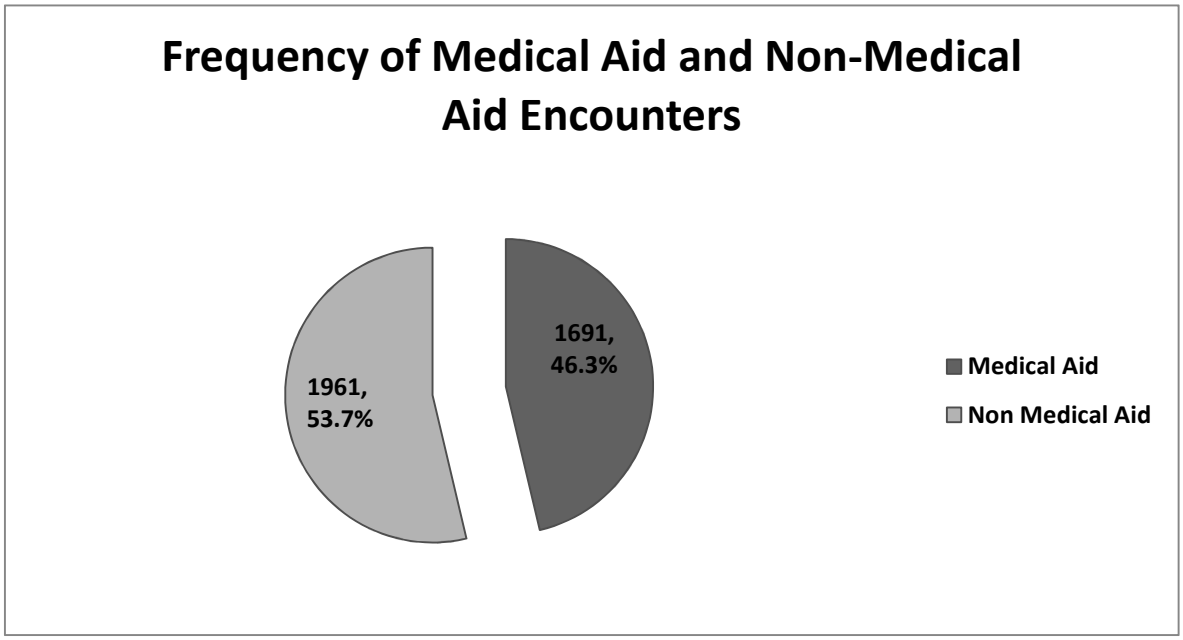


Figure 2: Frequency of Medical Aid and Non-Medical Aid encounters

The 33 participating GPs averaged approximately 16 encounters per day. This comprised an average of 7 Medical Aid and 9 Non-Medical Aid encounters per day. Only 4 of the participating doctors consulted on a Sunday.

7.2 DEMOGRAPHICS

7.2.1 Sex

The proportion of male and female patients in the encounters belonging to Medical Aid is 46.9% (789) and 53.10% (893) respectively and for Non-Medical Aid

encounters, there were 44.8% (871) males and 55.20% (1073) female patients. Overall, males comprised of 45.8% (1660) and females 54.2% (1966) (Table 1).

There was no significant difference (p = 0.205) in the sex distribution between the two groups.

Table 1: Sex distribution in the Medical Aid and Non-Medical Aid encounters

Sex	Medical Aid		Non-Medical Aid		Total	
	Frequency	%	Frequency	%	Frequency	%
Male	789	46.90%	871	44.80%	1660	45.80%
		47.53%		52.47%		100.00%
Female	893	53.10%	1073	55.20%	1966	54.20%
		45.42%		54.58%		100.00%
TOTAL	**1682**	**100.00%**	**1944**	**100.00%**	**3626**	**100.00%**
		46.39%		**53.61%**		**100.00%**

Note: the first % in each row refers to the vertical % of the total and the second % refers to the horizontal % of the total

7.2.2 Occupation

Almost two thirds (63.2%, n=2269) of the patients in the encounters were employed.

When the occupation categories of the two groups (Med Aid and Non-Med Aid) are grouped as Employed and Rest, there is a significant difference (p<0.001) between the Medical Aid and the Non-Medical Aid groups.

Medical aid encounters comprised of 74.2% of patients who are employed, as compared to 53.8% in the non-medical aid encounters. In the non-medical aid group there was a higher proportion of encounters by the self-employed (6.7% vs. 0.8%), unemployed (13.5% vs. 1.6%) and children (11.2% vs. 9.6%) when compared to the medical aid group, as shown in Table 2 below.

Table 2: Frequency of Occupation in the Medical Aid and Non-Medical Aid encounters

Occupational Groups	Medical Aid		Non-Medical Aid		Total	
	Frequency	%	Frequency	%	Frequency	%
Employed	1227	74.20%	1042	53.80%	2269	63.20%
		54.08%		45.92%		100.00%
Self-Employed	14	0.80%	129	6.70%	143	4.00%
		9.79%		90.21%		100.00%
Pensioner	30	1.80%	51	2.60%	81	2.30%
		37.04%		62.96%		100.00%
Housewife	69	4.20%	108	5.60%	177	4.90%
		38.98%		61.02%		100.00%
Unemployed	27	1.60%	261	13.50%	288	8.00%
		9.38%		90.63%		100.00%
Student	89	5.40%	84	4.30%	173	4.80%
		51.45%		48.55%		100.00%
Scholar	37	2.20%	43	2.20%	80	2.20%
		46.25%		53.75%		100.00%
Child	159	9.60%	216	11.20%	375	10.40%
		42.40%		57.60%		100.00%
Other	1	0.10%	2	0.10%	3	0.10%
		33.33%		66.67%		100.00%
TOTAL	**1653**	**100.00%**	**1936**	**100.00%**	**3589**	**100.00%**
		46.06%		**53.94%**		**100.00%**

Note: the first % in each row refers to the vertical % of the total and the second % refers to the horizontal % of the total

7.2.3 Age Groups

The largest proportion of patients encounters was in the 30 to 39 year age group (29.1%) followed by the 20 to 29 year old age group (23.4%). These two age groups comprise 52.5% of the sample population.

The age group 0 to 9 years comprised 11.1% of the study population, and almost two thirds in this age group (60.25%) were in the non-medical aid group (Table 3). Within the 0 to 9 years age group, the 0 to 6 years patients comprised 83.2% (134) and 88.1% (215) of the medical aid and non-medical aid encounters respectively. This is despite free medical care available for these patients in the public health sector.

There is a significant difference (p=0.015) between the Med Aid and the Non-Med Aid groups, with a larger proportion of younger (< 9 years) and older (>60 years) patients in the Non-Medical group.

Table 3: Age Groups as per Medical Aid and Non-Medical Aid encounters

Age Groups	Medical Aid		Non-Medical Aid		Total	
	Frequency	%	Frequency	%	Frequency	%
0 to 9 yrs	161	9.50%	244	12.50%	405	11.10%
		39.75%		60.25%		100.00%
10 to 19 yrs	107	6.30%	59	3.00%	166	4.60%
		64.46%		35.54%		100.00%
20 to 29 yrs	310	18.30%	543	27.70%	853	23.40%
		36.34%		63.66%		100.00%
30 to 39 yrs	522	30.90%	539	27.50%	1061	29.10%

		49.20%		50.80%		100.00%
40 to 49 yrs	336	19.90%	293	15.00%	629	17.20%
		53.42%		46.58%		100.00%
50 to 59 yrs	186	11.00%	162	8.30%	348	9.50%
		53.45%		46.55%		100.00%
60 to 69 yrs	52	3.10%	74	3.80%	126	3.50%
		41.27%		58.73%		100.00%
70 to 79 yrs	14	0.80%	38	1.90%	52	1.40%
		26.92%		73.08%		100.00%
80 yrs +	2	0.10%	5	0.30%	7	0.20%
		28.57%		71.43%		100.00%
TOTAL	**1690**	**100.00%**	**1957**	**100.00%**	**3647**	**100.00%**
		46.34%		**53.66%**		**100.00%**

Note: the first % in each row refers to the vertical % of the total and the second % refers to the horizontal % of the total

7.2.4 Residential Suburbs

In almost two thirds (64.6%) of all encounters, the patients reside in the

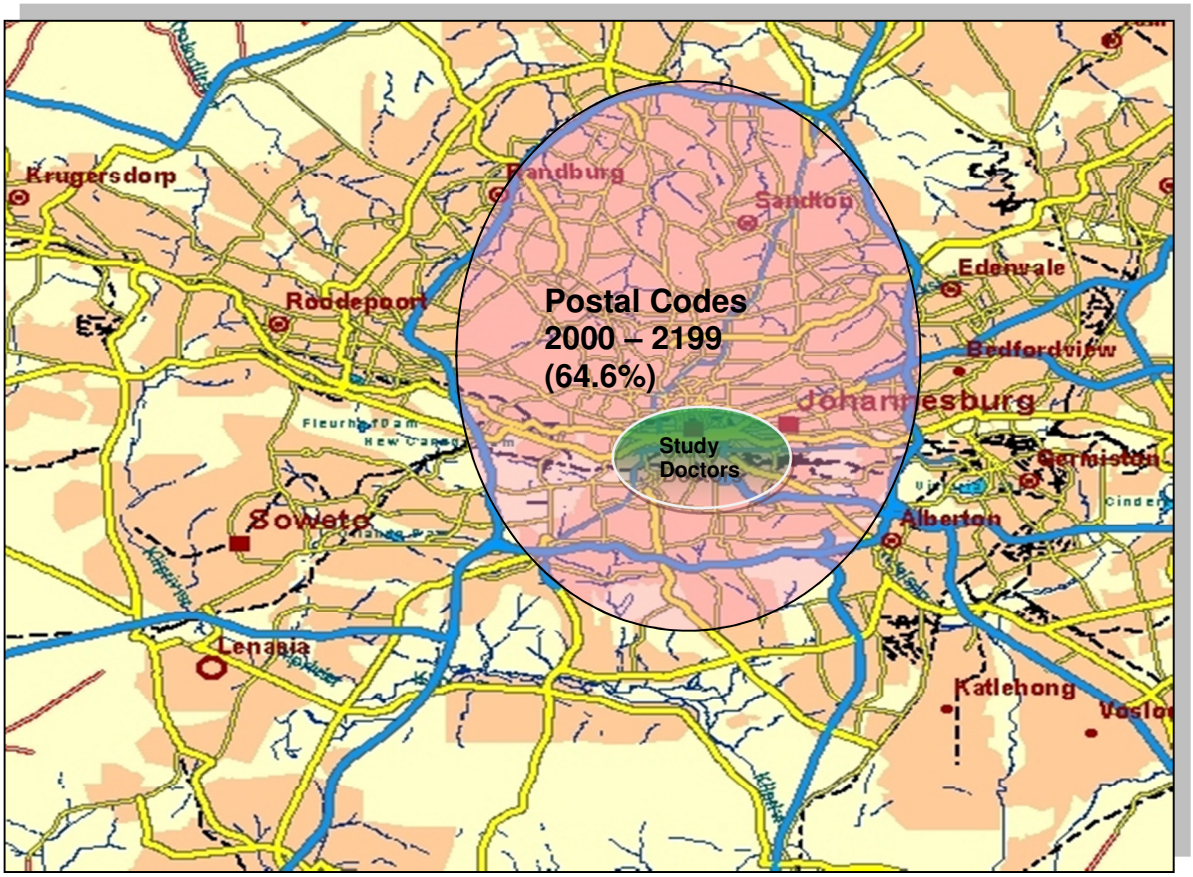


Figure 3: Johannesburg Map of Residential Suburbs

Johannesburg postal code (2000-2199) region. Encounters from patients from the Klipriver/Soweto (1800 – 1870) region comprise 22.2%. There was a minority of encounters (1.5%) by patients who were not from the Gauteng Province.

The majority of the patients in Non-Med Aid group (73%) reside in the Johannesburg postal code (2000 – 2199) region, while only 57.4% of the patients in the Med Aid group reside in the same region. This is a significant difference ($p<0.0001$) between the two groups.

7.3 CONSULTATIONS and DIAGNOSES

7.3.1 Consultations

The majority of the consultations (95.5%) were less than 20 minutes in duration with almost equal proportions of the sample consultations being less than 10 minutes (48.5%) and between 10 and 20 minutes (47.0%), as illustrated in

Table **4** below. A larger proportion of the Medical Aid encounters (51.7%) were less than 10 minutes in duration than for the Non-Medical Aid encounters (45.8%). The reverse is true for consultations that were between 10 and 20 minutes in duration.

Table 4: Type and Duration of Medical Aid and Non-Medical Aid consultations as per the SAMA tariff codes

Type and duration of Consultation	Medical Aid		Non-Medical Aid		TOTAL	
	Frequency	%s	Frequency	%s	Frequency	%s
0181 First Visit (<10 min)	875	51.7%	898	45.8%	1773	48.5%
		49.4%		50.6%		100%

0182 First Visit (10 - 20 min)	746	44.1%	970	49.5%	1716	47.0%
		43.5%		56.5%		100%
0183 First Visit (20 - 30 min)	65	3.8%	78	4.0%	143	3.9%
		45.5%		54.5%		100%
0184 First Visit (>30 min)	5	0.3%	15	0.8%	20	0.5%
		25.0%		75.0%		100%
TOTAL	1691	100%	1961	100%	3652	100%
		46.3%		53.7%		100%

Note: the first % in each row refers to the vertical % of the total and the second % refers to the horizontal % of the total

There was no significant difference (p = 0.066) between the two groups. The final conclusion that can be drawn from this result is that the medical aid status of a patient most likely had no influence on the duration of the consultation.

7.3.2 Diagnosis

The ICD-10 Codes Classification (3 digit) was used to classify each clinical diagnosis made at the time of an encounter and recorded by the participating GP.

In total, 4322 diagnoses (1961 and 2361 diagnoses per Med Aid and Non-Med Aid encounters) were recorded resulting in an average of 1.24 diagnoses per encounter. A total of 332 diseases were recorded. The top 10 diagnoses are listed below in Table 5.

Table 5: The overall Top 10 Diagnoses recorded

No	Diagnoses	Med Aid	Non-Med Aid	Total	%
1	URTI	490	432	922	25.2%
2	Essential hypertension	93	123	216	5.00%

3	Dorsalgia	72	59	131	3.03%
4	Diarrhoea and gastroenteritis	51	76	127	2.94%
5	Gastritis and duodenitis	47	48	95	2.20%
6	Other arthritis	59	36	95	2.20%
7	Cystitis	39	46	85	1.97%
8	Salpingitis and oophoritis	31	49	80	1.85%
9	Antenatal screening	15	64	79	1.83%
10	Atopic dermatitis	39	28	67	1.55%
TOTAL		**936**	**961**	**1897**	**47.77%**

As can be seen from the above table, diagnoses involving URTI conditions constitute 25.2% of the overall 4322 diagnoses. The overall top ten diagnoses constitute 47.77% of all the diagnoses.

Table 6: The Top 10 Diagnoses per Med Aid and Non-Med Aid encounters

	Med Aid (n=1961)		**Non-Med Aid (n=2361)**	
No	**Diagnoses**	**%**	**Diagnoses**	**%**
1	URTI	26.02	URTI	19.27
2	Hypertension	4.74	Hypertension	5.21
3	Dorsalgia	3.67	Diarrhoea and gastroenteritis	3.22
4	Arthritis	3.01	Antenatal screening	2.71
5	Diarrhoea and gastroenteritis	2.60	Dorsalgia	2.50
6	Gastritis	2.40	Salpingitis and oophoritis	2.08
7	Depression	2.09	Gastritis	2.03
8	Atopic dermatitis	1.99	Pregnancy test	1.99
9	Cystitis	1.99	Cystitis	1.95
10	Headache	1.68	Soft Tissue Disorders	1.74
	TOTAL	**50.19**	**TOTAL**	**42.70**

There are a higher number of Non-Medical Aid encounters with a diagnosis of Essential Hypertension, Diarrhoea and gastroenteritis, Salpingitis and oophoritis and Antenatal Screening. For antenatal screening, the diagnosis in the Non-Medical Aid Patient group is four times more common than the Medical Aid group, although this service is offered free at the Public medical facilities. There is no significant difference between the two groups (p = 0.0951).

7.4 PROCEDURES

Procedures are those side room investigations and minor surgery, in addition to a consultation, that is performed in the doctor's consulting rooms.

In total, 497 procedures were performed in the doctors' consulting rooms, resulting in an average of 0.14 procedures per encounter. There were 182 procedures performed in Medical Aid encounters with an average of 0.11 procedures and 315 procedures were performed in Non-Medical Aid encounters with an average of 0.16 procedures (Table 7).

Table 7: Mean number of Procedures performed in the rooms

Medical Aid	Non-Medical Aid	Overall Total	p
0.11	0.16	0.14	p = 0.066

The final conclusion that can be drawn from this result is that the medical aid status of a patient does not have an influence on whether a procedure is performed on a patient in the rooms.

The most common procedure types performed by the participating general practitioners are listed in Table 8 below. The most common procedure performed is urine dipstick in both groups. The top 10 procedures account for 83.5% and 94.0% of all the procedures performed in the Medical Aid and the Non-Medical Aid groups respectively.

Table 8: Top 10 Procedures for Medical Aid and Non-Medical Aid encounters

Med Aid (n = 182)		**Non-Med Aid (n = 315)**	
Description	**%**	**Description**	**%**
Urine Chemistry (dipsticks)	33.0%	Urine Chemistry (dipsticks)	49.5%
Random Glucose	14.3%	Ultrasound Pelvis	12.7%
Ultrasound Pelvis	8.2%	HCG - Pregnancy test	10.5%
Individual Psychotherapy	7.1%	Haemoglobin	6.0%
HCG - Pregnancy test	4.9%	Random Glucose	5.7%
Circumcision	4.4%	Circumcision	2.9%
Peak Expiratory Flow Volume	3.8%	Drainage of subcutaneous abscess	2.2%
Drainage of subcutaneous abscess	2.7%	Nebulisation	1.9%
Flow volume test (spirometry)	2.7%	Electrocardiogram (ECG)	1.3%
Suturing of wound	2.2%	Individual Psychotherapy	1.3%
TOTAL	**83.5%**	**TOTAL**	**94.0%**

7.5 RADIOLOGY

Radiology investigations were ordered only in a minority of all encounters (2.4%). The number of radiology investigations ordered in Medical Aid and Non-Medical Aid encounters is 39 and 53 respectively. Two encounters had more than one radiology investigations ordered.

Table 9: Mean number of Radiology Investigations ordered

Medical Aid	Non-Medical Aid	Overall Total	p - value
0.023	0.027	0.025	p = 1.322

The non-significant result (p>0.05) in Table 9 indicates that there is no significant relationship demonstrated between a patient's Medical Aid status and whether a radiology investigation was ordered.

The radiology investigation that were most often ordered is an ultrasound of the pelvis (35.9%), two (6.1%) of which were ordered in Medical Aid encounters and 31 (93.9%) in Non-Medical Aid encounters. The second most frequent investigation was chest X-ray (30.4%), 18 (64.3%) of which were ordered in Medical Aid encounters and 10 (35.7%) in Non-Medical Aid encounters, illustrated in Table 10 below.

Table 10: Radiology investigations performed

Description	Med Aid		Non-Med Aid		Total	
	Frequency	%	Frequency	%	Frequency	%
Chest X-Ray	18	46.2%	10	18.9%	28	30.4%
		64.3%		35.7%		100%
Cervical neck	5	12.8%	1	1.9%	6	6.5%
		83.3%		16.7%		100%
Mammogram	3	7.7%	1	1.9%	4	4.3%
		75.0%		25.0%		100%
Skull	2	5.1%	0	0%	2	2.2%
		100%		0%		100%
Sinus	2	5.1%	1	1.9%	3	3.3%
		66.7%		33.3%		100%
Ultrasound - Pelvis	2	5.1%	31	58.5%	33	35.9%
		6.1%		93.9%		100%
Knee	2	5.1%	1	1.9%	3	3.3%
		66.7%		33.3%		100%

Finger, toe	1	2.6% 100%	0	0% 0%	1	1.1% 100%
Facial Bones	1	2.6% 100%	0	0% 0%	1	1.1% 100%
Intra-venous Pyelogram (IVP)	1	2.6% 100%	0	0% 0%	1	1.1% 100%
Ultrasound - Abdomen	1	2.6% 25.0%	3	5.7% 75.0%	4	4.3% 100%
Ankle	1	2.6% 50.0%	1	1.9% 0.5%	2	2.2% 100%
Hystero-Salpingogram (HSG)	0	0% 0%	4	7.6% 100%	4	4.3% 100%
Total	**39**	**100%** **42.4%**	**53**	**100%** **57.6%**	**92**	**100%** **100%**

Note: the first % in each row refers to the vertical % of the total and the second % refers to the horizontal % of the total

7.6 PATHOLOGY

There were 235 pathology investigations ordered in 157 encounters, which is 4.3% of all the encounters. Of the 235 pathology investigations, 91 investigations were ordered in 70 Non-Medical Aid encounters and 144 investigations were ordered in 87 Medical Aid encounters.

Almost equally large proportions of Medical Aid (94.9%) and Non-Medical Aid (96.4%) encounters had no pathology investigations ordered (Table 11).

Table 11: Frequency of encounters where a Pathology investigations was ordered (p=0.195)

Pathology investigations	Medical Aid		Non-Medical Aid		Total	
	Frequency	%s	Frequency	%s	Frequency	%s
Pathology Investigations	87	5.1%	70	3.6%	157	4.3%
Nil Pathology investigations	1604	94.9%	1891	96.4%	3495	95.7%
Total	1691	100%	1961	100%	3652	100%

There is not a significant association (p = 0.195) which indicates that the relationship between the medical aid status of an encounter does not have an influence on whether a pathology investigation is ordered.

The pathology investigation that was most frequently ordered is a full blood count (11.49%), 22 (81.48%) of which were ordered for Medical Aid encounters and 5 (18.52%) for Non-Medical Aid encounters. The second most frequent investigation was for Pap smear (10.64%), 11 (44.0%) of which were ordered for Medical Aid encounters and 14 (56.0%) for Non-Medical Aid encounters (Table 12 and Table 13).

Table 12: Description of Pathology investigations ordered as per the SAMA tariff codes

Description	Frequency	Percent
3755 Full Blood Count (FBC)	27	11.49%
4566 Pap smear	25	10.64%
4451 BHcg (blood pregnancy test)	18	7.66%
4507 TSH	14	5.96%
3932 HIV Elisa	13	5.53%

4188 Urine dipstick	13	5.53%
3816 CD4 only	10	4.26%
4027 Total cholesterol	10	4.26%
4171 U&E Creatinine	10	4.26%
4182 HbA1c	10	4.26%
3743 ESR	7	2.98%
3865 Malaria screen	6	2.55%
3948 Syphilis screen	6	2.55%
4155 Uric Acid	6	2.55%
4429 Quantitative PCR (DNA/RNA)	6	2.55%
3928 Urine MC&S	5	2.13%
4531 Hepatitis B	5	2.13%
3764 Blood Group	4	1.70%
3999 Liver Function Test (LFT)	4	1.70%
4057 Glucose - random/fasting	4	1.70%
4503 Menopausal Screen	4	1.70%
4519 PSA	4	1.70%
4561 Cytology (First)	4	1.70%
4482 T4	3	1.28%
4509 T3	3	1.28%
3856 D-Dimer	2	0.85%
4025 Lipogram	2	0.85%
4516 FSH	2	0.85%
3765 Blood Group RH antigens	1	0.43%
4032 Creatinine - serum	1	0.43%
4050 Glucose	1	0.43%
4071 Iron studies	1	0.43%
4441 Semen Cytology	1	0.43%
4442 Semen Analysis	1	0.43%
4517 LH	1	0.43%
4528 Ferritin	1	0.43%
Total number of pathology investigations	**235**	**100%**

Table 13: Top 20 pathology investigations ordered per Med Aid and Non-Med Aid encounters

	Med Aid		Non-Med Aid	
	Description	**Frequency**	**Description**	**Frequency**
1	Full Blood Count (FBC)	22	Pap smear	14
2	Pap smear	11	BHcg (blood pregnancy test)	11
3	TSH	9	Urine dipstix	7
4	U&E Creatinine	8	HIV Elisa	6
5	BHcg (blood pregnancy test)	7	Full Blood Count (FBC)	5
6	Total cholesterol	7	CD4 only	5
7	HIV Elisa	7	Malaria screen	5
8	ESR	6	TSH	5
9	Urine dipstix	6	Syphilis screen	4
10	HbA1c	6	HbA1c	4
11	CD4 only	5	Uric Acid	3
12	Glucose - random/fasting	4	Total cholesterol	3
13	Quantitative PCR (DNA/RNA)	4	Cytology (First)	3
14	Blood Group	4	Quantitative PCR (DNA/RNA)	2
15	Menopausal Screen	4	Urine MC&S	2
16	Liver Function Test (LFT)	3	Hepatitis B	2
17	Urine MC&S	3	U&E Creatinine	2
18	PSA	3	Semen Cytology	1
19	Uric Acid	3	Semen Analysis	1
20	Hepatitis B	3	ESR	1

7.7 REFERRALS

Referral to another health practitioner (specialists, physiotherapist or allied health practitioners) or to a medical facility (state clinics and state hospitals) were made in 199 (5.4%) of the 3652 encounters. Of the 199 referrals made by the participating GPs, 55 (27.6%) were in Medical Aid and 144 (72.4%) were in Non-

Medical Aid encounters (Table 14). There is a significant higher number of referrals in Non-Medical encounters (p<0.001).

Table 14: Frequency of Referrals in Medical Aid / Non-Medical Aid encounters (p<0.001)

Referral	Medical Aid		Non-Medical Aid		TOTAL	
Encounters with Referrals	55	27.60%	144	72.40%	199	100.00%
		3.30%		7.30%		5.40%
Encounters without any Referrals	1636	47.40%	1817	52.60%	3453	100.00%
		96.70%		92.70%		94.60%
Total	1691	46.30%	1961	53.70%	3652	100.00%
		100.00%		100.00%		100.00%

Note: the first % in each row refers to the horizontal % of the total and the second % refers to the vertical % of the total

From Table 15 below, it can be seen that almost two thirds of the 199 encounters where a referral took place, the referral was to a medical facility (62.3%) and the rest (37.7%) were to other health practitioners.

Table 15: Type of Referrals in Medical Aid/Non-Medical Aid encounters

Referrals	Medical Aid		Non-Medical Aid		TOTAL		p-value
Medical Facility	10	8.10%	114	91.90%	124	100.00%	p< 0.001
		18.20%		79.20%		62.30%	
Other Health practitioner	45	60.00%	30	40.00%	75	100.00%	p< 0.001
		81.80%		20.80%		37.70%	
TOTAL	55	27.60%	144	72.40%	199	100.00%	
		100.00%		100.00%		100.00%	

Note: the first % in each row refers to the horizontal % of the total and the second % refers to the vertical % of the total

When a patient referral occurs in an encounter, the GP's tended to refer them to another health practitioner if they have Medical Aid (81.8%) and to a medical facility for the Non-Medical Aid (79.2%) encounters.

The highly significant result ($p<0.001$) indicates that there is a relationship between whether an encounter is Non-Medical Aid or Medical Aid and whether the referral was to a medical facility or to another health practitioner, implying that the medical aid status of an encounter played a role when the GP decided to refer either to a Medical Facility or to another health practitioner.

7.8 MEDICATION

There were a total of 9294 medications prescribed in all encounters, resulting in an average of 2.54 medications per encounter. There were 4050 medications prescribed in the Medical Aid encounters with an average of 2.40 medications per encounter and 5244 medications were prescribed in the Non-Medical Aid encounters with an average of 2.67 medications per encounters (Table 16).

Table 16: Mean number of medication per encounter

	Medical Aid	Non-Medical Aid	Overall Total	p-value
Mean number of medication per encounter	2.40	2.67	2.54	0.134

Although the higher the number of medication prescribed and dispensed by a GP will result in higher income for the GP, the non-significant result ($p>0.05$) implies that the medical aid status of an encounter did not have an influence on the number of medications prescribed per encounter.

The total number of medications, for which information regarding whether it was dispensed or not dispensed was recorded, is 8749 (94.14% of total number of medications prescribed). Of these medications, 91.8% of the medication was dispensed and 8.2% were not dispensed by the GPs. From Table 17 it can be seen that the proportion of medication not dispensed is larger in the Medical Aid encounters (16.5%) than in the Non-Medical Aid encounters (1.8%).

Table 17: Medications Dispensed or Not Dispensed by GPs for Medical Aid / Non-Medical Aid encounters

Medical Aid Status	Dispensed		Not Dispensed		TOTAL	
	Frequency	%	Frequency	%	Frequency	%
Medical Aid	3214	83.6%	633	16.5%	3847	100%
		40.0%		88.0%		44.0%
Non-Medical Aid	4816	98.3%	86	1.8%	4902	100%
		60.0%		12.0%		56.0%
Total	8030	91.8%	719	8.2%	8749	100%
		100%		100%		100%

Note: the first % in each row refers to the horizontal % of the total and the second % refers to the vertical % of the total

The mean cost of the non-dispensed medication is almost three times larger than medication that was dispensed (R90.78 and R34.79 respectively).

Although the number of prescribed medications in the Medical Aid encounters accounted for 44% (4050) of the total number of medications prescribed (9294), the sum of the cost of medications in the Medical Aid encounters accounted for 59% (R208 474) of the total costs of medication (R348 485) as shown in Figure 4. The converse is true for the Non-Medical Aid encounters. The mean cost of medication in the Medical Aid encounters is 43% higher than in the Non-Medical Aid encounters (R136.70 and R77.80 respectively).

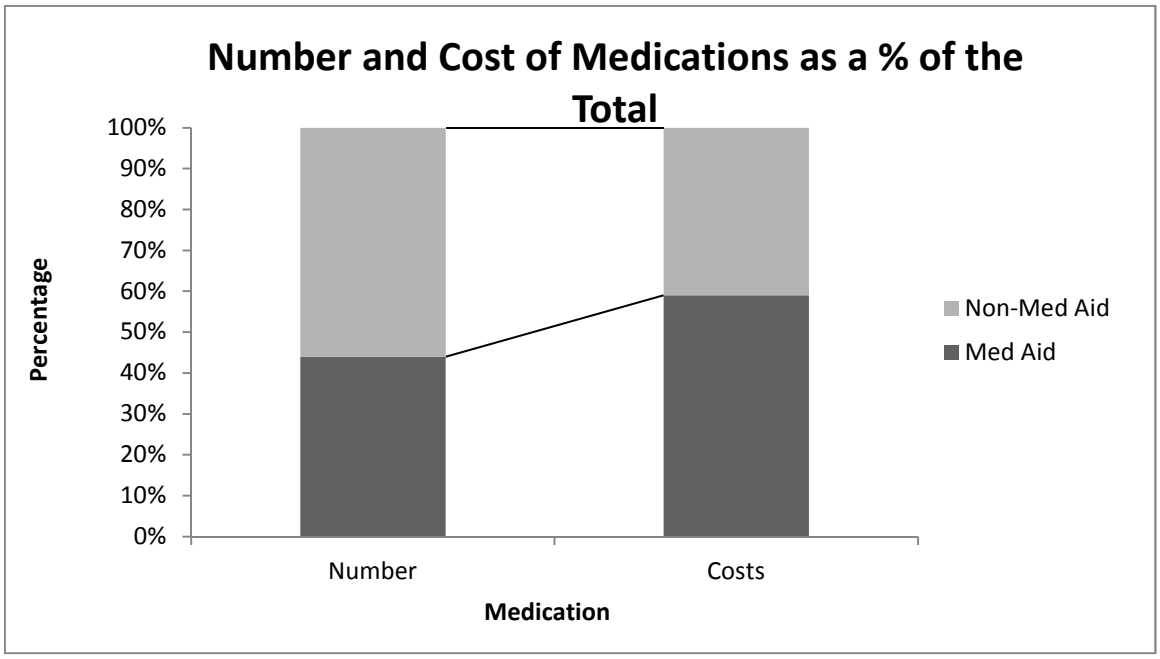


Figure 4: Number and cost of Medication

In grouping the medications into branded and generic products as per the Medprax medication database of March 2002, one notes that 33% more generic products ($p<0.001$) were prescribed in the Non-Medical Aid encounters than in the Medical Aid encounters (4310 and 2903 respectively), as shown in Figure 5. Both groups were prescribed an equal number of branded products.

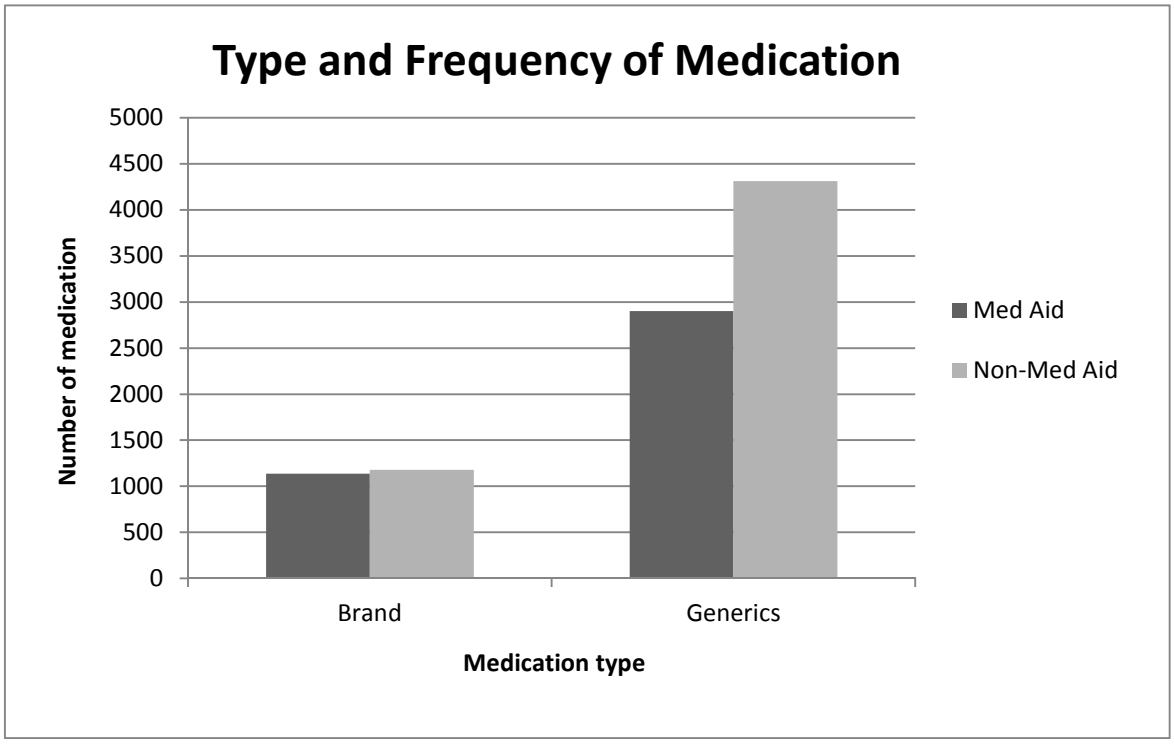


Figure 5: Type and Frequency of medication prescribed ($p<0.001$)

Medication grouped by the frequency prescribed has only one branded medication in the Top 15 (Ciprobay 250mg). The rest of the medication are generic products and used predominantly in the Non-Medical Aid encounters (Figure 6 and Table 18). The bulk of the top 15 medication prescribed comprises of analgesics, anti-inflammatories and antibiotics.

The Top 15 Medication grouped by costs consists of 5 branded products and are prescribed predominantly in the Medical Aid encounters, as seen in Figure 7 and Table 19.

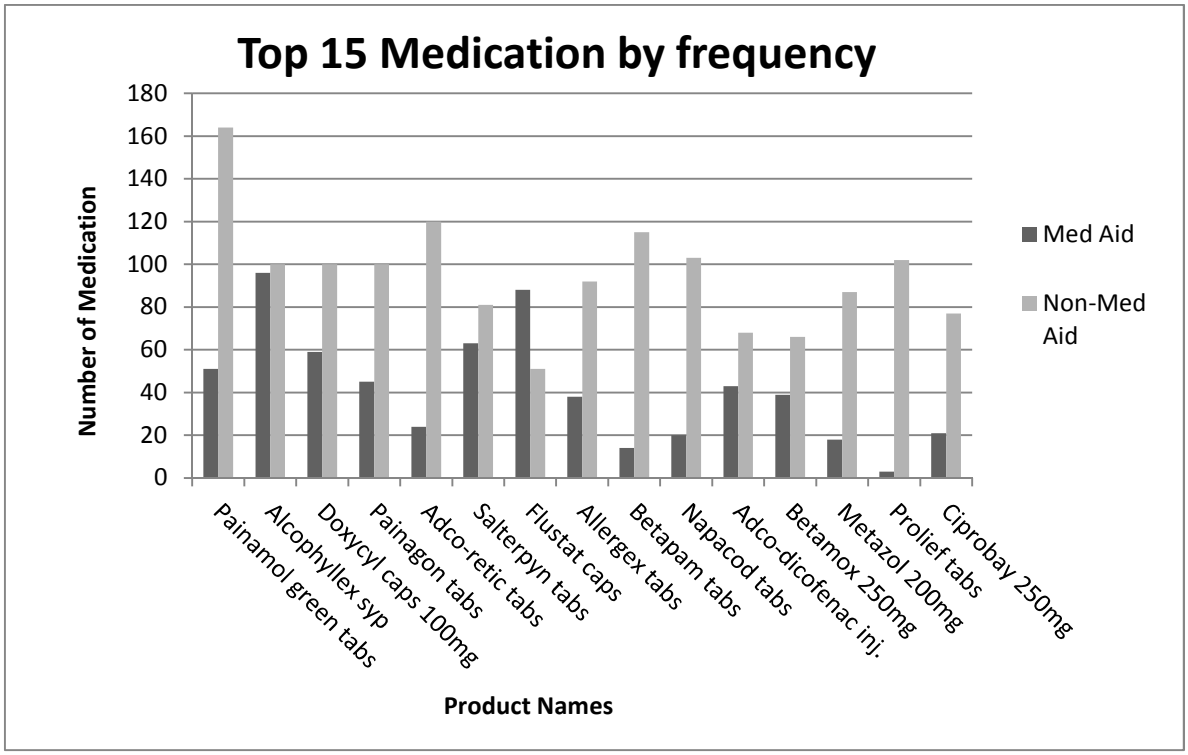


Figure 6: Top 15 prescribed medication by frequency

Table 18: Top 15 prescribed medication by frequency

	Non-Med Aid		Med Aid	
No	**Medication**	**Frequency**	**Medication**	**Frequency**
1	Painamol green tabs	164	Alcophyllex syp	96
2	Adco-retic tabs	120	Flustat caps	88
3	Betapyn	115	Salterpyn tabs	63
4	Napacod tabs	103	Doxycyl caps 100mg	59
5	Prolief tabs	102	Stilpane tabs	56
6	Alcophyllex syp	100	Painamol green tabs	51
7	Painagon tabs	100	Painagon tabs	45
8	Doxycyl caps 100mg	100	Pax	44
9	Allergex tabs	92	Adco-dicofenac inj.	43
10	Metazol 200mg	87	Suncodin tabs	42
11	Salterpyn tabs	81	Adco-dicofenac tabs	42
12	Ciprobay 250mg	77	Augmaxil	41
13	Napamol tabs	74	Betamox 250mg caps	39
14	Mis Pot Cit syp	74	Betamox 250mg caps	39
15	Be-oxytet	70	Medifed	39

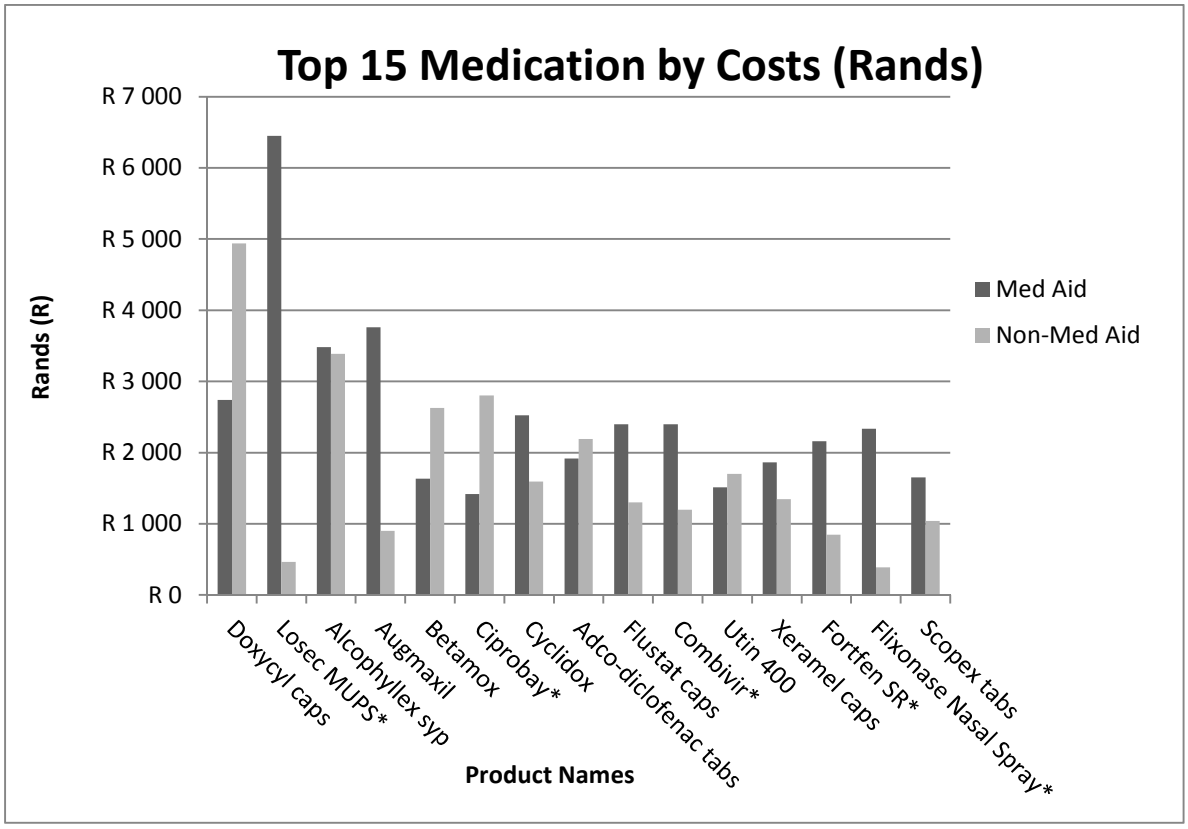


Figure 7: Top 15 prescribed medication by costs in Rands *(* = Branded medication)*

Table 19: Top 15 prescribed medication (Rands)

	Non-Med Aid		Med Aid	
No	**Medication**	**Costs**	**Medication**	**Costs**
1	Doxycyl caps	R 4 938	Losec MUPS	R 6 450
2	Alcophyllex syp	R 3 386	Augmaxil	R 3 672
3	Ciprobay tabs 250mg	R 2 803	Alcophyllex syp	R 3 480
4	Betamox 500mg caps	R 2 628	Doxycyl caps	R 2 741
5	Adco-dicofenac tabs	R 2 192	Cyclidox	R 2 525
6	Indocid caps	R 2 075	Combivir	R 2 400
7	Doxitabs	R 1 971	Flustat caps	R 2 398
8	Canex Vag	R 1 748	Flixonase Nasal Spray	R 2 335
9	Utin 400	R 1 700	Lipitor tabs	R 2 255
10	Cyclidox caps	R 1 592	Vaxigrip Prefill vaccine	R 2 245
11	Doxyhexal caps	R 1 558	Fortfen SR*	R 2 162
12	Captohexal	R 1 508	Mybulen	R 2 121
13	Adco-retic tabs	R 1 488	Adco-diclofenac tabs	R 1 916
14	Painagon tabs	R 1 478	Xeramel caps	R 1 862
15	Betamox 250mg caps	R 1 416	Pyrocaps	R 1 843

7.9 OVERALL COSTS

The mean cost per encounter in the Medical Aid group is R242.40 and in the Non-Medical Aid group is R181.35. This significant difference between the two groups is as a result of the significant difference in the cost of prescribed medication between the two groups (R136.70 and R77.18 for the Medical Aid and the Non-Medical Aid groups respectively).

Since the standard BHF scale of benefits fee for a consultation was used for each patient encounter, there is no variability in the cost per consultation for Medical Aid and Non-Medical Aid consultations.The mean cost for each category of additional costs was calculated based on only the sub-sample of encounters that incurred that type of additional cost.

As noted previously, of the 3652 encounters:

- 3339 (91.43%) encounters had medication prescribed,
- 87 (2.38%) encounters had radiology investigations ordered,
- 157 (4.30%) encounters had pathology investigations ordered and
- 427 (11.69%) encounters had procedures performed.

The 194 (5.31%) encounters where there was a referral to another health practitioner or to a medical facility were not taken into account, as elaborated earlier. (The proportions above do not add up to 100% since the sub-samples are not independent – one patient encounter could have incurred more than 1 additional cost)

It can be seen from Table 20 and Figure 8 that the Medical Aid and Non-Medical Aid cost proportions involved in the different types of additional (to consultation) costs incurred as a result of their encounters are similar. Non-Medical Aid costs are slightly larger than Medical Aid costs in all categories except for medication and pathology investigations costs.

Since consultation and medication costs account for 90.6% of the total cost of an encounter, and there is no difference in the mean costs of consultations, the difference in the medication costs is reflected in the significant difference ($p < 0.001$) between the total mean cost in the Medical Aid and Non-Medical Aid encounters (R240.30 and R185.75 respectively), illustrated in Figure 9 and Table 21. For the rest of the cost categories, the proportionate differences are small and non-significant.

The cost for medication is the major contributor to the overall total costs (45.2%). Of the R419 193.33 of additional costs (excluding cost of consultations), 83.1% (R348 485.71) was as a result of medication. Medications costs in Medical Aid encounters (52.1%) make up a substantially larger proportion of the total cost incurred by the patients than in Non-Medical Aid encounters (39.4%).

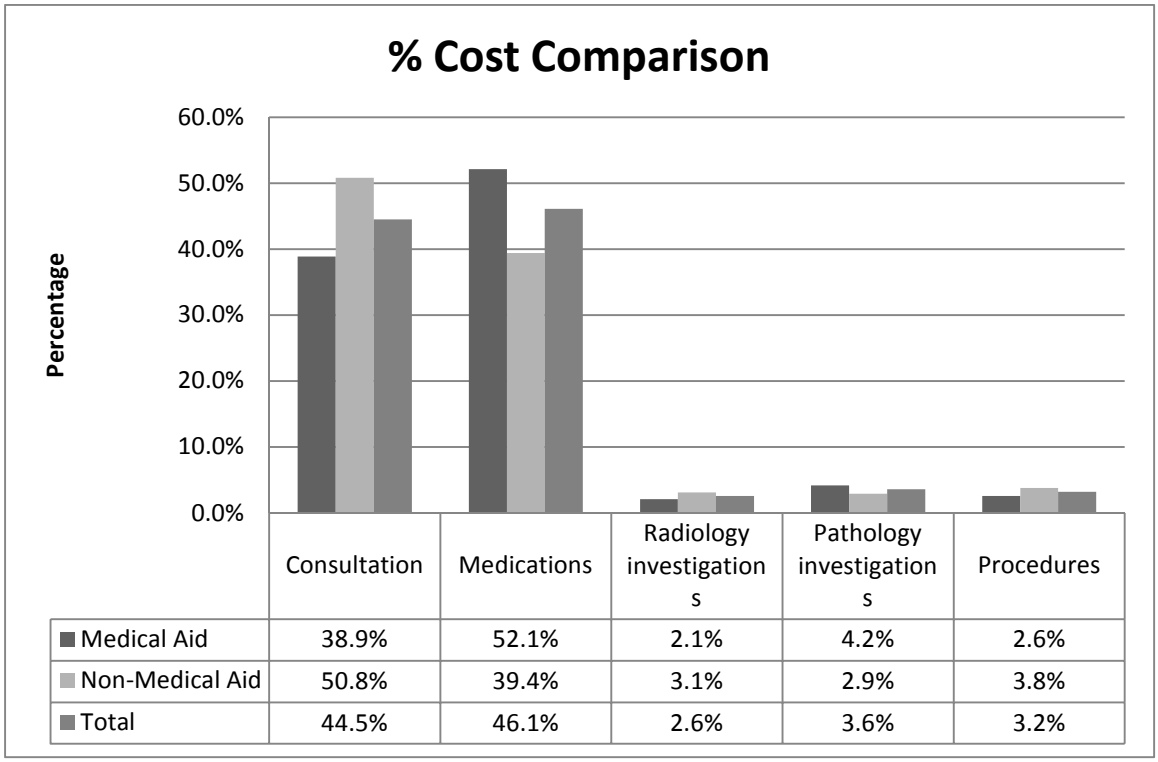


Figure 8: Percentage cost comparison between Medical Aid and Non-Medical Aid encounters

Consultations (44.5%) and Medications (46.1%) contribute 90.6% towards the total overall cost per encounters. However, medications (52.1%) contribute more than consultations (38.9%) towards the total costs in Medical Aid encounters, while medication costs (39.4%) are lower than consultation costs (50.8%) in Non-Medical Aid encounters.

Table 20: Costs related to Medical Aid and Non-Medical Aid encounters (N = number of encounters)

Cost Categories	Medical Aid			Non-Medical Aid			Total			p-value
	N	Sum	%s	N	Sum	%s	N	Sum	%s	
Consultation	1691	R 155 741.10	46.3% 38.9%	1961	R 180 608.10	53.7% 50.8%	3652	R 336 349.20	100% 44.5%	1.000
Medications	1525	R 208 474.18	59.8% 52.1%	1814	R 140 011.53	40.2% 39.4%	3339	R 348 485.71	100% 46.1%	0.001
Radiology investigations	35	R 8 424.33	43.4% 2.1%	52	R 10 996.30	56.6% 3.1%	87	R 19 420.63	100% 2.6%	0.160
Pathology investigations	87	R 16 696.91	61.6% 4.2%	70	R 10 400.23	38.4% 2.9%	157	R 27 097.14	100% 3.6%	0.222
Procedures	161	R 10 579.41	43.7% 2.6%	266	R 13 610.44	56.3% 3.8%	427	R 24 189.85	100% 3.2%	0.060
Total costs	**1691**	**R 399 915.93**	**52.7%** **100%**	**1961**	**R 355 626.60**	**47.3%** **100%**	**3652**	**R 755 542.53**	**100%** **100%**	**0.001**

Note: the first % in each row refers to the horizontal % of the total and the second % refers to the vertical % of the total

Table 21: Mean Costs related to Medical Aid and Non-Medical Aid encounters (N = number of encounters)

Cost Categories	Medical Aid			Non-Medical Aid			Total		
	N	Mean	Std Dev	N	Mean	Std Dev	N	Mean	Std Dev
Consultation Costs	1691	R 92.10	R -	1961	R 92.10	R -	3652	R 92.10	R -
Medications Costs	1525	R 136.70	R 132.94	1814	R 77.18	R 74.42	3339	R 104.37	R 109.34
Radiology investigations Costs	35	R 240.70	R 212.62	52	R 211.47	R 80.77	87	R 223.23	R 148.15
Pathology investigations Costs	87	R 191.92	R 274.45	70	R 148.57	R 186.29	157	R 172.59	R 239.46
Procedures Costs	161	R 65.71	R 78.94	266	R 51.17	R 71.55	427	R 56.65	R 74.66
Total costs	**1691**	**R 242.40**	**R 169.12**	**1961**	**R 181.35**	**R 100.81**	**3652**	**R 206.88**	**R 139.41**

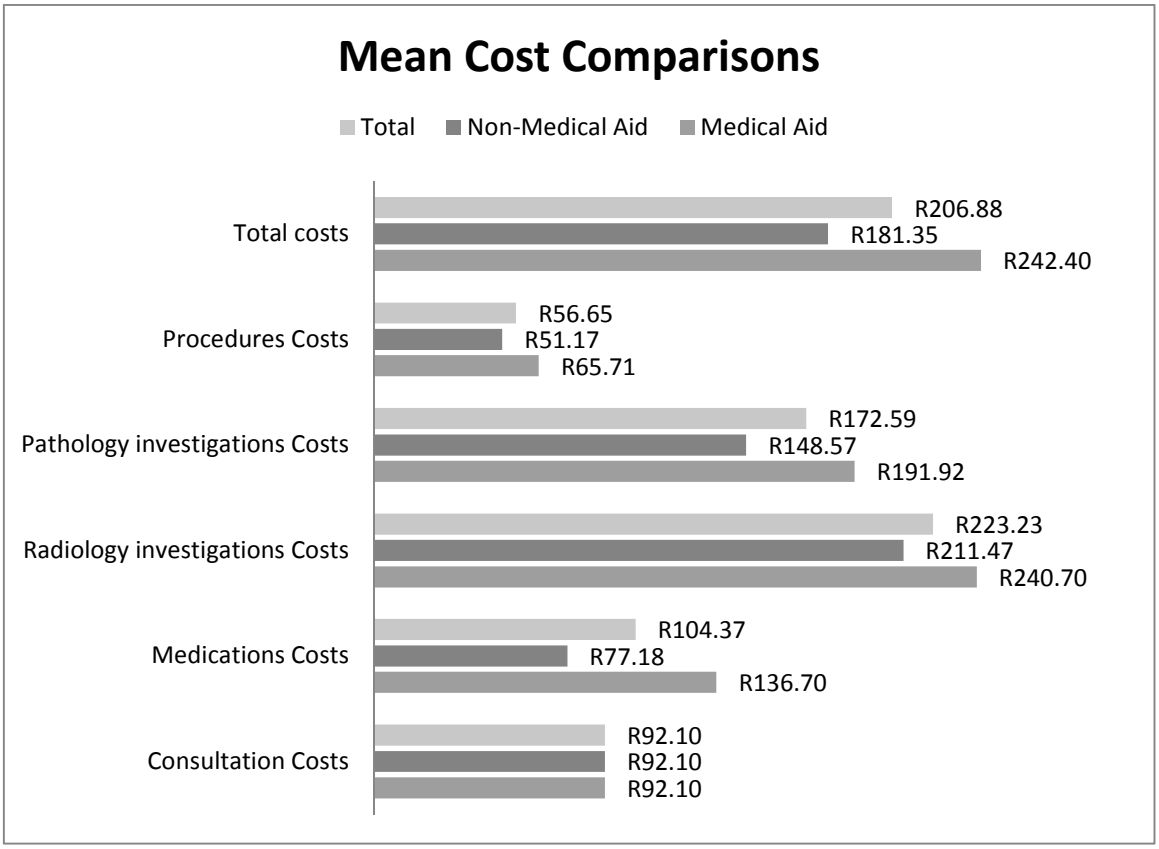


Figure 9: Mean cost comparison between Medical Aid and Non-Medical Aid encounters

The significant difference ($p < 0.001$) in the mean cost of medication incurred in the Medical Aid encounters is higher (R136.70) than that for the Non-Medical Aid encounters (R77.18) and this is due to more expensive medications prescribed (there is no significant difference in the mean number of medication between the Medical Aid and Non-Medical Aid encounters, as stated previously).

7.10 DISEASES

A total of five acute and chronic diseases were analysed to note any demographic, clinical and medical management differences between the Medical Aid and Non-Medical Aid encounters.

The diseases (Hypertension, Diabetes and URTI) were chosen because they are the most frequent acute and chronic diseases. The balance two diseases (Gonorrhoea and PID) were chosen because they are the most frequent sexually transmitted infections.

7.10.1 Encounters

As can be seen from Table 22, 1263 (35.9%) of the 3652 encounters involved in the study was diagnosed with one or more of the five diagnoses. A total of 1313 of these diagnoses were made in the 1263 encounters, because some encounters have more than one diagnosis.

Table 22: Number of Diagnoses per Med Aid and Non-Med Aid encounters

Diagnoses	Medical Aid	%	Non-Medical Aid	%	Total	%	p-value
Upper respiratory tract infections	490	53.1%	432	46.9%	922	100.0%	p = 0.080
		75.3%		65.3%		70.2%	
Hypertension	93	43.1%	123	56.9%	216	100.0%	p = 0.324
		14.3%		18.6%		16.5%	

Diabetes	32	58.2% 4.9%	23	41.8% 3.5%	55	100.0% 4.2%	p = 0.075
Gonorrhoea	5	12.5% 0.8%	35	87.5% 5.3%	40	100.0% 3.0%	p = 0.071
Pelvic Inflammatory Disease	31	38.8% 4.8%	49	61.3% 7.4%	80	100.0% 6.1%	p = 0.171
Total	651	49.6% 100.0%	662	50.4% 100.0%	1313	100.0% 100.0%	

Note: the first % in each row refers to the horizontal % of the total and the second % refers to the vertical % of the total

The diagnosis that was most commonly made is Upper Respiratory Tract Infection (*n*=922, 70.2% of all of these diagnoses and 25.2% of the total sample of encounters), shown in Table 22. Upper Respiratory Tract infections and Diabetes were diagnosed more frequently in the Medical Aid encounters while the other three diagnoses were more frequently diagnosed in the Non-Medical Aid encounters, although the differences are non-significant.

Table 23: Number of encounters with Simultaneous Diagnoses

	Upper respiratory tract infections	**Hypertension**	**Diabetes**	**Gonorrhoea**	**Pelvic Inflammatory Disease**
Upper Respiratory Tract Infections	922				
Hypertension	28	216			
Diabetes	7	15	55		
Gonorrhoea	1	0	0	40	
Pelvic Inflammatory Disease	0	1	0	0	80

From Table 23 above, it can be seen that of the 922 encounters where Upper Respiratory Tract Infection was diagnosed, patients in 28 such encounters were also diagnosed with Hypertension, 7 with Diabetes and 1 with Gonorrhoea. Of the 216 encounters where Hypertension was diagnosed, patients in 15 such encounters were also diagnosed with Diabetes and 1 patient with Pelvic Inflammatory Disease.

7.10.2 Age

As can be seen from Table 24, 26.8% (247) of the 922 Upper Respiratory Tract Infection diagnoses involved patients in the 30 to 39 year old group and 21.3% (196) involved patients in the 20 to 29 year old group. Thus, almost 50% of these patients fall into the 20 to 39 year old group while almost two thirds (63.1%, 581) are 20 to 49 years old. The other age group that seems susceptible to Upper Respiratory Tract Infections is the 0 to 9 year olds (19.2%, 177).

More than 90% of the 216 Hypertension diagnoses involved patients in the 30 to 79 year old group. More than 85% of the 55 Diabetes diagnoses involved patients between 40 and 69 years old. More than 75% of the 40 Gonorrhoea diagnoses involved patients in the 20 to 39 year old group and almost all of the 80 Pelvic Inflammatory Disease diagnoses involved patients in the 20 to 49 year old group.

Chronic disease (Hypertension and Diabetes) occurs more frequently in the older patients, while acute conditions like UTRI in the younger patients in both groups of

Medical Aid and Non-Medical Aid encounters. The sexually transmitted infections occur in young sexually active adults.

Table 24: Frequency and Distribution of Common Diagnoses among Age Groups

		Upper respiratory tract infections	Hypertension	Diabetes	Gonorrhoea	Pelvic Inflammatory Disease	Total
0 to 9 yrs	Medical Aid	77	0	0	0	0	77
	Non-Medical Aid	100	0	0	0	0	100
10 to 19 yrs	Medical Aid	40	0	0	0	0	40
	Non-Medical Aid	23	0	0	0	1	24
20 to 29 yrs	Medical Aid	87	1	2	0	8	98
	Non-Medical Aid	109	1	0	13	28	151
30 to 39 yrs	Medical Aid	141	12	1	4	13	171
	Non-Medical Aid	106	13	1	14	15	147
40 to 49 yrs	Medical Aid	86	26	10	1	9	126
	Non-Medical Aid	52	32	5	4	5	89
50 to 59 yrs	Medical Aid	46	37	10	0	1	80
	Non-Medical Aid	30	39	11	3	0	73
60 to 69 yrs	Medical Aid	10	13	7	0	0	27
	Non-Medical Aid	6	26	4	1	0	34
70 to 79 yrs	Medical Aid	3	3	1	0	0	6
	Non-Medical Aid	6	11	2	0	0	17
80 yrs and older	Medical Aid	0	1	1	0	0	2
	Non-Medical Aid	0	1	0	0	0	1
Total		**922**	**216**	**55**	**40**	**80**	**1263**

7.10.3 Gender

As can be seen from Table 25 below, some of the patients who were diagnosed with one or more of these illnesses did not provide information regarding their gender.

The Upper Respiratory Tract Infection diagnoses are more or less equally distributed between males and females. The proportion difference of about 11% between males and females regarding whether they were diagnosed with Hypertension is also not statistically significant (p=0.732).

Pelvic Inflammatory Disease diagnoses only involved females because they do not occur in males. The male and female proportions for Diabetes and Gonorrhoea were found to differ statistically significantly (p<0.001). Almost 90% of Gonorrhoea diagnoses involved males and more than 70% of Diabetes diagnoses involved males.

There is no significant difference between Medical Aid and Non-Medical Aid within each gender except for Gonorrhoea, which is present mainly in males and Non-Medical Aid. However, the sample size is small within this study and their significance is doubtful.

Table 25: Frequency and Distribution of Common Diagnoses between Gender Groups

Diagnoses	Male		Female		Total	
	Med Aid	Non-Med Aid	Med Aid	Non-Med Aid	Med Aid	Non-Med Aid
Upper Respiratory Tract Infections	227	207	261	224	488	431
Hypertension	45	51	48	71	93	122
Diabetes	24	16	8	7	32	23
Gonorrhoea	4	31	1	3	5	34
Pelvic Inflammatory Disease	0	0	31	49	31	49

7.10.4 Geographic Suburb

In the case of each of these common illnesses, prevalence is the highest among patients from the Johannesburg area (Table 26). All the diagnoses (except Diabetes) follow the overall distribution with the Johannesburg area comprising almost two thirds of the diagnoses.

In the Johannesburg area the number of encounters with Upper Respiratory Tract infections, Hypertension, Gonorrhoea and Pelvic Inflammatory Disease is lower in the Medical Aid encounters than in the Non-Medical Aid encounters. The reverse is true for the other areas except for Diabetes and Gonorrhoea. However, the sample size is small within this study and their significance is doubtful.

Table 26: Frequency and Distribution of Common Diagnoses among Areas

Diagnoses	Johannesburg		KDP/Soweto		Other		Total	
	Med Aid	Non-Med Aid	Med Aid	Non-Med Aid	Med Aid	Non-Med Aid	Med Aid	Non-Med Aid
Upper Respiratory Tract Infections	272	278	129	76	63	32	464	386
Hypertension	38	83	33	24	19	10	90	117
Diabetes	10	11	13	7	8	3	31	21
Gonorrhoea	2	21	2	5	1	6	5	32
Pelvic Inflammatory Disease	12	35	9	10	9	2	30	47

7.10.5 Occupation

The Employed and the rest proportions for Upper Respiratory Tract Infection diagnoses, Hypertension and Gonorrhoea was found to differ statistically significantly ($p<0.001$). The results are listed in Table 27 below.

More specifically, more than 60% of all Upper Respiratory Tract Infection diagnoses, almost 80% of Hypertension diagnoses and almost 90% of Gonorrhoea diagnoses involved Employed patients. There were more frequent Medical Aid encounters of Upper Respiratory Tract Infections and Diabetes and more frequent Non-Medical Aid encounters for Hypertension, Gonorrhoea and Pelvic Inflammatory Disease in the employed population.

These statistically significant results are, however, are very small in the overall study population and their significance should be cautiously interpreted.

Table 27: Frequency and Distribution of Common Diagnoses between Occupation Groups

Diagnoses	Employed		Rest		Total	
	Med Aid	Non-Med Aid	Med Aid	Non-Med Aid	Med Aid	Non-Med Aid
Upper Respiratory Tract Infections	324	226	157	202	481	428
Hypertension	74	95	17	28	91	123
Diabetes	25	11	4	12	29	23
Gonorrhoea	5	30	0	5	5	35
Pelvic Inflammatory Disease	23	32	7	17	30	49

7.10.6 Diagnoses

As can be seen from Table 28, the Medical Aid and Non-Medical Aid proportions for Upper Respiratory Tract Infection diagnoses and Gonorrhoea were found to differ statistically significantly. The sample size is small and should be used cautiously.

More specifically, almost 90% of Gonorrhoea diagnoses, more than 60% of Pelvic Inflammatory Disease and 56% of Hypertension diagnoses involved Non-Medical Aid encounters while a larger proportion of Upper Respiratory Tract Infection and Diabetes diagnoses were made in Medical Aid encounters.

Table 28: Frequency and Distribution of Common Diagnoses between Medical Aid statuses

		Medical Aid	Non-Medical Aid	Total	p- value
Upper respiratory tract infections	Frequency	490	432	922	0.001
	%	53.10%	46.90%	100.00%	
Hypertension	Frequency	93	123	216	0.324
	%	43.10%	56.90%	100.00%	
Diabetes	Frequency	32	23	55	0.075
	%	58.20%	41.80%	100.00%	
Gonorrhoea	Frequency	5	35	40	0.001
	%	12.50%	87.50%	100.00%	
Pelvic Inflammatory Disease	Frequency	31	49	80	0.171
	%	38.80%	61.30%	100.00%	

7.10.7 Referrals

From Table 29 it can be seen that 27 (2.1%) of the 1263 encounters, where there was at least one of the common diagnoses, were referred to a medical facility or to another health practitioner.

Of these 27 encounters that were referred, there were 12 (44.4%) encounters with Upper Respiratory Tract Infections, 7 (25.9%) with Hypertension, 6 (22.2%) with Diabetes, 1 (3.7%) with Gonorrhoea and 1 (3.7%) with Pelvic Inflammatory Disease.

There were more referrals in Non-Medical Aid encounters (63%), while the encounter where Upper Respiratory Tract infection was diagnosed is the largest group for referrals. There were almost equal numbers of referrals in the Hypertension and Diabetes categories.

Table 29: Distribution of Referrals among the Diagnoses (n = 1263)

Diseases	Medical Aid	Non-Medical Aid	Total
Upper respiratory tract infections	4	8	12 (44.4%)
Hypertension	3	4	7 (25.9%)
Diabetes	3	3	6 (22.2%)
Gonorrhoea	0	1	1 (3.7%)
Pelvic Inflammatory Disease	0	1	1 (3.7%)
Total	**10**	**17**	**27 (100%)**

7.10.8 Medication

Of the total encounters of 1263 for these five diagnoses, no medication was prescribed in 24 encounters (14 Medical Aid encounters and 10 Non-Medical Aid encounters). There were 4102 medications prescribed, comprising of 46.9% of the total number of medications in the study.

Although overall there is no significant difference between the number of medication prescribed between Medical Aid and Non-Medical Aid encounters, there were significantly more medications prescribed in Non-Medical Aid encounters for Hypertension, Gonorrhoea and Pelvic Inflammatory Disease (Table 30).

Table 30: Number of Medication prescribed per Diagnoses

Disease	Medical Aid	%	Non-Medical Aid	%	Total	%	p - value
Upper respiratory tract infections	1542	52.0%	1421	48.0%	2963	100.0%	0.134
		77.8%		67.0%		72.2%	
Hypertension	253	42.4%	343	57.6%	596	100.0%	0.031
		12.8%		16.2%		14.5%	
Diabetes	66	49.3%	68	50.7%	134	100.0%	0.237
		3.3%		3.2%		3.3%	
Gonorrhoea	15	12.9%	101	87.1%	116	100.0%	<0.001
		0.8%		4.8%		2.8%	
Pelvic Inflammatory Disease	106	36.2%	187	63.8%	293	100.0%	0.034
		5.3%		8.8%		7.1%	
Total	1982	48.3%	2120	51.7%	4102	100.0%	0.123
		100.0%		100.0%		100.0%	

Note: the first % in each row refers to the horizontal % of the total and the second % refers to the vertical % of the total

With regards to the cost of medication (Table 31), the average cost of medications in Medical Aid encounters was significantly higher ($p<0.0001$) than in the Non-Medical Aid encounters when they were diagnosed with Upper Respiratory Tract Infections, Hypertension, Diabetes, Gonorrhoea and Pelvic Inflammatory Disease. This cost difference is despite the higher number of medications prescribed in the Non-Medical Aid encounters.

Table 31: Average Cost for Medicines Prescribed

	Medical Aid		Non-Medical Aid	
Upper respiratory tract infections	R121.95	*n*=490	R77.44	*n*=432
Hypertension	R196.61	*n*=93	R77.19	*n*=123
Diabetes	R219.28	*n*=32	R132.91	*n*=23
Gonorrhoea	R148.31	*n*=5	R73.51	*n*=35
Pelvic Inflammatory Disease	R136.09	*n*=31	R108.86	*n*=49

The above cost difference in medication prescribed in the Medical Aid and Non-Medical Aid encounters is as a result of a larger quantity of branded medication prescribed in the Medical Aid encounters and larger number of generic medication prescribed in the Non-Medical Aid encounters. Generic medication has the same chemical formulation as the branded products but at a lower cost.

The difference in medication costs and generic medication usage has not resulted in different treatments, whether it is a Medical Aid or a Non-Medical Aid encounters. In Figure 10 to Figure 14 below, the use of medication per class of medication is almost the same in the two groups. The more expensive classes of medication (e.g. Insulin in Diabetes, Calcium Channel Blockers in Hypertension) were prescribed more often in Medical Aid encounters while the lower cost classes of medication (e.g. Diuretics in Hypertension and Doxycycline in Gonorrhoea and Pelvic Inflammatory disease) were prescribed more frequently in Non-Medical Aid encounters.

There is low adherence to clinical protocols in both Medical Aid and Non-Medical Aid encounters almost equally. Aspirin is recommended for every person who suffers from Diabetes and less than 1% of those who received medication for Diabetes received aspirin. Similarly, antibiotics are not recommended in the treatment of Upper Respiratory Tract Infections but both groups (>80%) received them.

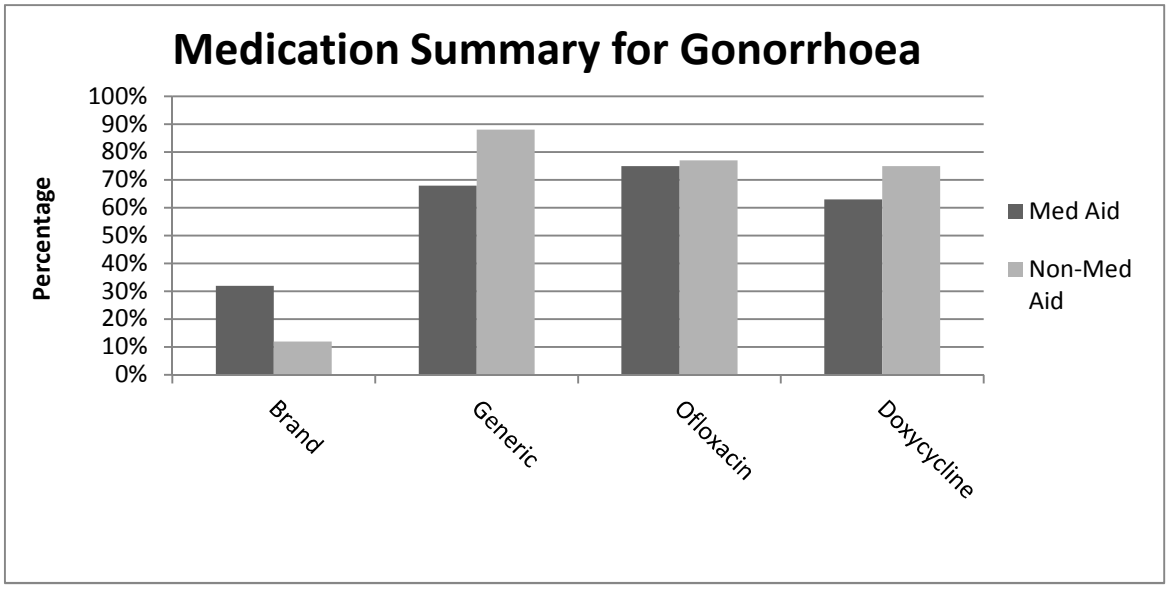


Figure 10: Medication summary for Gonorrhoea

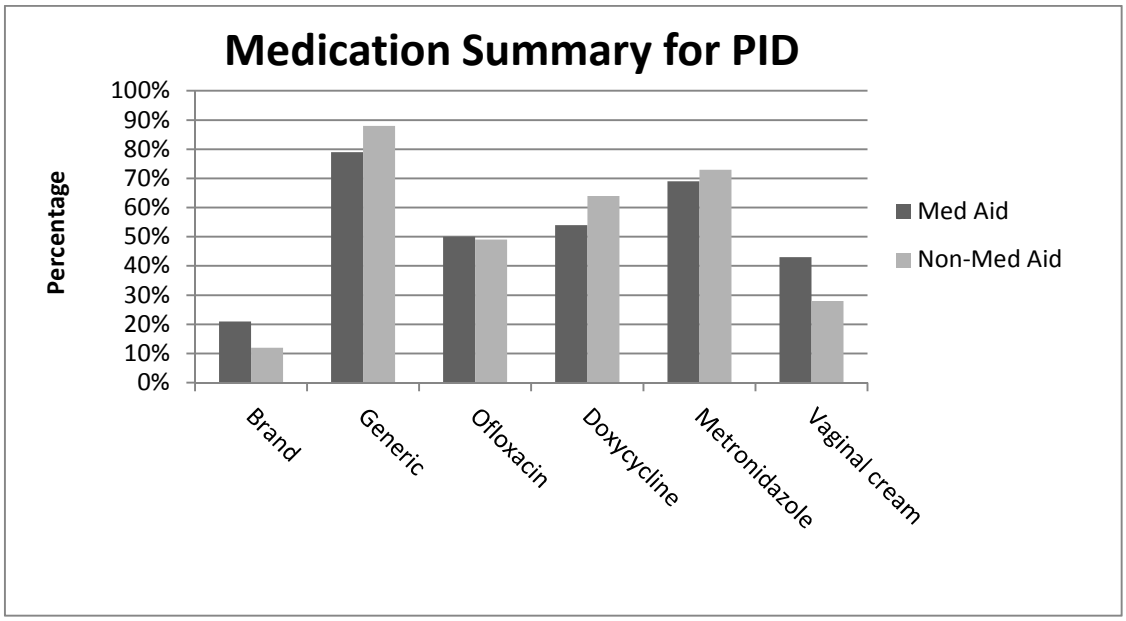


Figure 11: Medication summary for Pelvic Inflammatory Disease (PID)

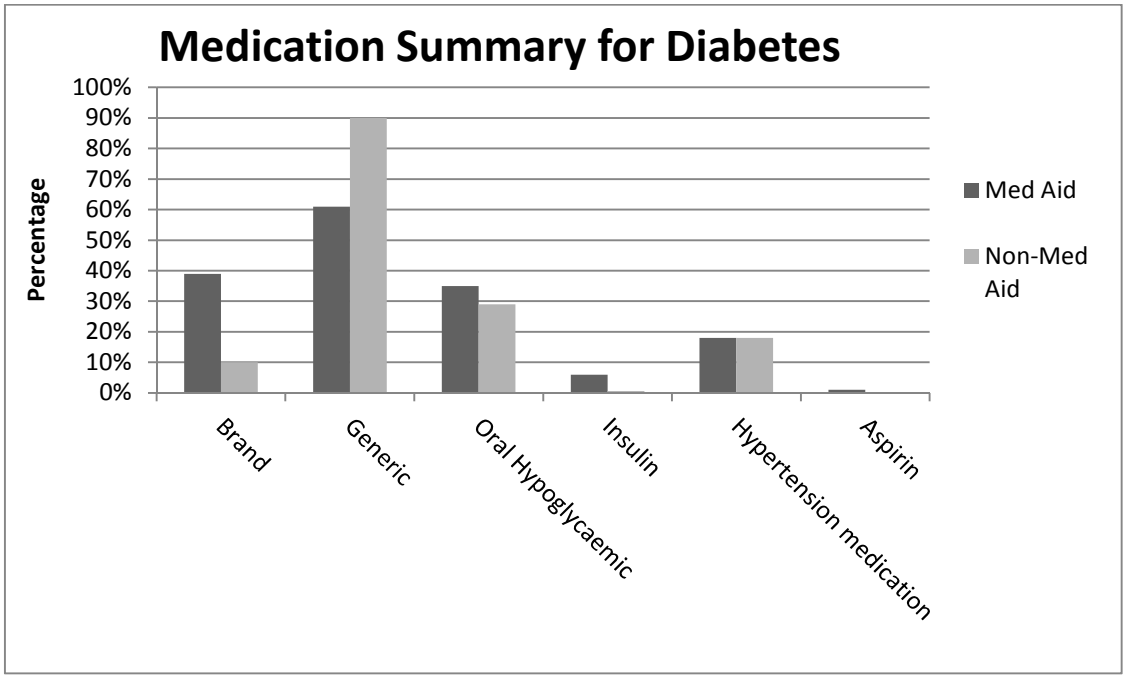


Figure 12: Medication summary for Diabetes

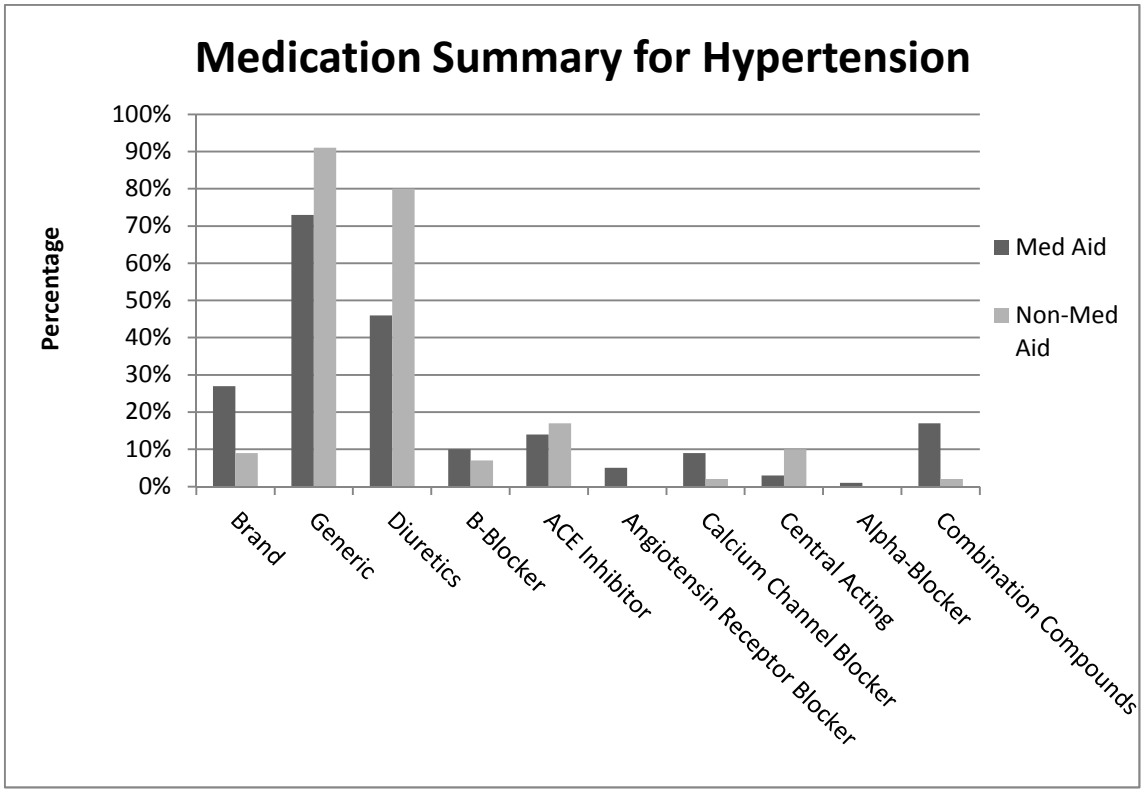


Figure 13: Medication summary for Hypertension

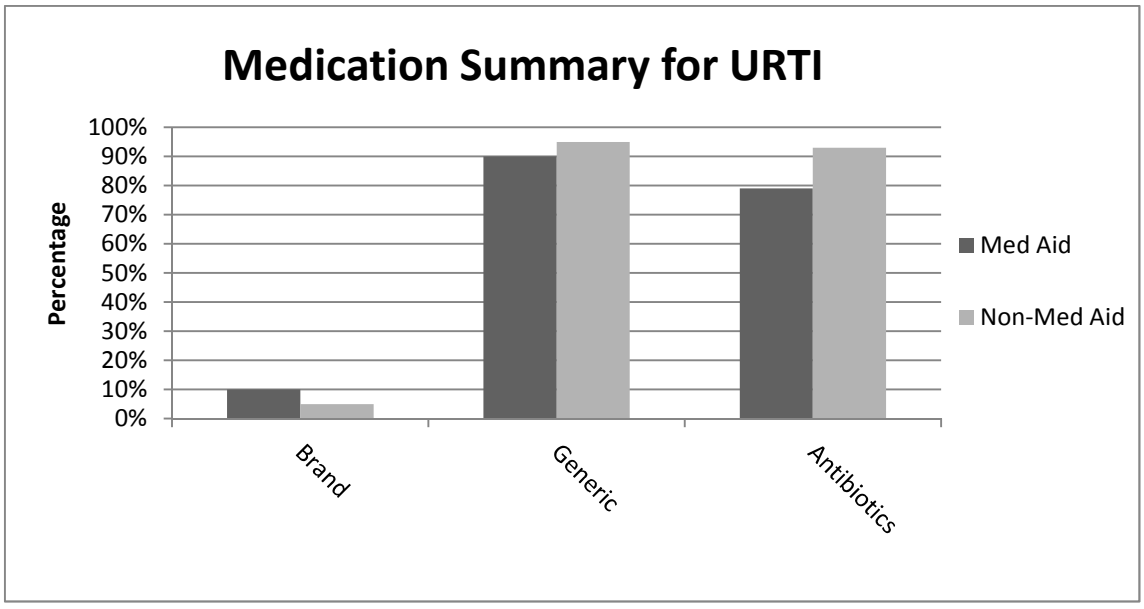


Figure 14: Medication summary for Upper Respiratory Tract Infection (URTI)

7.10.9 Radiology investigations

As can be seen from Table 32 and Table 33, only 10 encounters had radiology investigations performed in these five diagnoses. This sample is too small to do inferential statistics, for both, frequency and mean costs.

Table 32: Radiology Investigations in the five diagnoses

	Medical Aid	Non-Medical Aid	Total
Upper respiratory tract infections	4 (57.1%)	3 (100%)	7 (70.0%)
Hypertension	1 (14.3%)	0 (0.0%)	1 (10.0%)
Diabetes	2 (28.6%)	0 (0.0%)	2 (20.0%)
Gonorrhoea	0 (0.0%)	0 (0.0%)	0 (0.0%)
Pelvic Inflammatory Disease	0 (0.0%)	0 (0.0%)	0 (0.0%)
Total	**7**	**3**	**10**

Table 33: Average Cost for Radiology Investigations

	Medical Aid Patient		Non-Medical Aid Patient	
Upper respiratory tract infections	R266.30	*n*=4	R164.20	*n*=3
Hypertension	R148.50	*n*=1	.	*n*=0
Diabetes	R135.30	*n*=2	.	*n*=0
Gonorrhoea	.	*n*=0	.	*n*=0
Pelvic Inflammatory Disease	.	*n*=0	.	*n*=0

The data was not eligible for significance testing.

7.10.10 Pathology investigations

From Table 34 and Table 31 below, it can be seen that of the 1263 encounters that were diagnosed with at least one of the five diagnoses, only 31 encounters had pathology investigations performed. Please note that the total number of encounters sum to more than 31 since there could be more than one diagnosis per encounter. This sample is too small to do inferential statistics.

Table 34: Pathology Investigations in the five diagnoses

	Medical Aid	Non-Medical Aid	Total
Upper respiratory tract infections	8 (33.3%)	3 (23.1%)	11 (29.7%)
Hypertension	6 (25.0%)	2 (15.4%)	8 (21.6%)
Diabetes	9 (37.5%)	3 (23.1%)	12 (32.4%)
Gonorrhoea	1 (4.2%)	2 (15.4%)	3 (8.1%)
Pelvic Inflammatory Disease	0 (0.0%)	3 (23.1%)	3 (8.1%)
Total	**24**	**13**	**37**

Table 35: Average Cost for Pathology Investigations

	Medical Aid Patient		Non-Medical Aid Patient	
Upper respiratory tract infections	R163.14	*n*=8	R88.47	*n*=3
Hypertension	R79.02	*n*=6	R178.35	*n*=2
Diabetes	R73.13	*n*=9	R81.83	*n*=3
Gonorrhoea	R114.60	*n*=1	R87.40	*n*=2
Pelvic Inflammatory Disease	.	*n*=0	R74.60	*n*=3

The data was not eligible for significance testing.

8 DISCUSSION

This study has shown that the assumption that General Practitioners in private practice cater for only the 16% of population who are on Medical Aid is incorrect. In the Johannesburg Inner City, there are more Non-Medical Aid encounters (53.7%) in Private General Practice. The findings of this study are in keeping with the 2005 General Household Survey, conducted by Statistics South Africa[20]. They reported that 55.3% of households that accessed the Private Health sector were not on Medical Aid.

8.1 Demographic Profile of the Patients

The profile of the patients consulting the private General Practitioner in the Johannesburg Inner city comprises mostly of females (54.2%), within the age category of 20 to 39 years (69.7%), employed (63.2%) and living in the Johannesburg postal code area of 2000 to 2199 (64.6%). This is reflective of the young working adults living and/or working in the Johannesburg Inner City and in keeping with the demographic profile of Johannesburg[18]. The profile of the patients is also similar to the profile of the uninsured patients in the United States, i.e. the majority of the uninsured are in the 18-35 years age group and mainly employed[7].

Public healthcare is free for children under the age of 6 years and for Ante-natal Care. There are 4 Public Hospitals and 22 public clinics in the Greater Johannesburg Metropolitan City. Nevertheless, there were a higher number of Non-Medical Aid encounters in these categories consulting the private general

practitioners, preferring to self–fund their visits. Children under the age of 9 years comprised of 11.1% of the encounters.

This experience of attending a general practitioner in private practice and paying out of pocket is in line with other reports where there is a perception of better quality of care in the private sector[21, 22]. The patients, for non-urgent care, will prefer to wait and save up sufficient cash in order to attend the general practitioner in private practice and only attend the public facilities when they cannot afford the cost nor cannot wait[8].

8.2 Clinical Review of the encounters

The diagnoses recorded for the Medical Aid and Non-Medical Aid encounters are remarkably similar where 7 of the top 10 diagnoses for both groups are common. Thus, not only is the demographic data similar for both the groups, but the clinical diagnoses as well. The top 25 diagnoses in this study have 17 diagnoses in common with the top 25 diagnoses for the United Kingdom, as reported by McWhinney[23].

Furthermore, there were many more Non-Medical Aid encounters for chronic conditions such as hypertension and fewer encounters for acute conditions such as URTI. Suffering from chronic diseases implies more frequent and higher costs for consultations and medications than visits for acute illness. There were more frequent Non-Medical Aid encounters and they were prepared to pay out of pocket for health services from private general practitioners for the more serious and life

threatening chronic diseases than the self-limiting acute illnesses. Patients are clearly concerned of developing complications of chronic diseases and preferring to self-fund their care at private general practitioners than obtain free services in the Public health facilities, which has a perception of lower quality.

When reviewing investigations, radiology and pathology, there were no significant differences between the two groups. Concerning radiological requests, there was no difference between the two groups in terms of the number of X-Rays ordered and the cost thereof. There were more antenatal sonar's ordered in Non-Medical Aid encounters than in the Medical Aid encounters. This is probably because the Medical Aids restrict the number of Sonar's they fund during pregnancy while there are no restrictions for the self-funding patients who do not belong to a medical aid.

Pathology investigations were only ordered in a minority of encounters (4.3%) without any significant differences in the number and type of tests ordered between the two groups. A preventative investigation such as pap smears was low in both groups. Both the radiology and the pathology results are different from various studies which show that the uninsured receive lower number of investigations[24]. The possible difference in the South African context is that the uninsured patients are referred to the State hospitals for the investigations at no or minimal costs to the patients.

Almost 6% of the encounters were referred to another health practitioner or to a medical facility for secondary care. There were higher referrals in the Non-Medical

Aid encounters to the private Gynaecologists for antenatal care than in the Medical Aid encounters, despite free antenatal care provided by the public health sector. It seems that patients will prefer a specialist consultation to review if their pregnancy is proceeding normally as compared to the nurse-based clinic system of antenatal care of the public health sector. Overall, 15.1% of those referred in the Non-Medical Aid group would have to pay out of pocket for the secondary care at a private practitioner. There is no obvious explanation for this behaviour in this study. One can only assume that there was a consideration of cost implication by the general practitioners for the non-medical aid patients by referring them to the State hospitals for delivery (which is expensive) while referring the patients to the private Gynaecologists for antenatal review which is cheaper than delivery.

There was no difference in the mean number of items prescribed by the GP's per encounter, despite the fact that dispensing more drugs in the Medical Aid encounters will result in higher income for the GP. In fact, dispensing by the GPs in Medical Aid encounters was lower than in the Non-Medical Aid encounters (84% versus 98%).

However, the average cost of medication is the main difference between the two groups. The average cost of medication in the Medical Aid encounters is higher than the average cost of medication in the Non-Medical Aid encounters (R136.70 versus R77.18 respectively). The cost of medication contributes significantly to the overall costs (51.3% in the Medical Aid encounters and 38.4% in the Non-Medical Aid encounters) and significantly influences the overall costs for the encounters.

Besides the cost of the consultation, medication makes up 80% of the additional costs. The decreased costs of the non-medical aid encounters is in keeping with studies that found that there is a decreased cost of care for the uninsured, and in the hospital setting, can lead to increased mortality amongst the uninsured[25].

Medications are classified as either brand or generic medication. Generic medication is where there is more than one medication which is identical in chemical formulation, dosage and indications. They are usually cheaper than the branded medication. Both groups received almost the same number of branded medications but the Non-Medical Aid encounters received 33% more generic medications. This explains the cheaper average cost of medication in the Non-Medical Aid encounters.

This is a concern because it appears to be a possible profit motive for the dispensing general practitioner to prescribe the more expensive medication for the medical aid patients. Another point of view is that the general practitioners were cost sensitive and in order to assist the non-medical aid patients, prescribed the cheaper generic medication. There needs to be further exploration of such nuances where the “wealthier” patients are prescribed the more expensive medication and to review the impact of the Single Exit Price legislation to control medication costs on the prescribing behaviour of the general practitioners.

Specific diseases such as acute conditions (Gonorrhoea, Pelvic Inflammatory Disease, URTI) and chronic conditions (Hypertension and Diabetes) were

analysed to note any particular differences in the medical management between the two groups. Besides the rate and cost of referrals, the patient demographics, radiology, pathology, procedures and consultations all had no significant differences demonstrated. The concern with chronic diseases such as diabetes is the time of diagnosis, i.e. patients without health insurance (non-medical aid) have a lower screening rate and are thus diagnosed later than the patients with medical aid[24].

Gonorrhoea, Pelvic Inflammatory Disease and Hypertension had many more Non-Medical Aid encounters, while there were more Medical Aid encounters for URTI and Diabetes. The major difference between the two groups, in relation to the above diagnoses, is the lower average cost of medications in the Non-Medical Aid encounters. Although there is a difference in the cost of medication, both groups received medication from the same class for the conditions listed above and both groups had similar compliance of standard treatment protocols.

The results of this study are in keeping with the results as reported by Chabikulil, et al[17], where they found that the Insured and the Uninsured patients received similar prescriptions of medication for STI's (Gonorrhoea and Pelvic Inflammatory Disease) and the difference was in the cost of medication. The uninsured was prescribed medications which were at least 31% cheaper than those received by the Insured. One can safely deduce that although there is a difference in the cost of medication, both groups received the same type of treatment.

Concerning outcomes of the treatment given, patients are not registered to any particular doctor and the patients have the freedom to choose any private or public health service. If they do not improve in their clinical condition, they will not return to the particular doctor. Thus one can assume that patients who do not belong to a Medical Aid, although receiving cheaper medication but from the same class of medication, their clinical outcome would be the same as the patients who belong to a Medical Aid. However, studies show that uninsured patients have a higher mortality rate (by 1.5%) than insured patients, mainly due to lower quality of care and poorer outcomes[25].

8.3 Cost comparison between Medical Aid and Non-Medical Aid encounters

The overall mean cost (which includes consultation, medication, pathological tests, radiological investigations and procedures performed in the doctor's rooms) in the Non-Medical Aid encounters is significantly lower (22.7%) than in the Medical Aid encounters (R185.75 versus R240.30 respectively). This difference is largely due to the difference in medication costs.

Although the Non-Medical Aid encounters made up 56% of the overall encounters, they contribute 47.3% of the General Practitioners' gross income, standardised at the BHF tariff rates. However, we are aware that patients who do not belong to a Medical Aid pay a lower single package fee to the general practitioner. This package fee includes consultation, dispensed medications and procedures performed in the doctor's rooms, which will result in a lower financial income to the GPs.

During the time of this study, the average cost for a Non-Medical Aid consultation for the general practitioners was approximately R80 per consultation, which also included medication dispensed and procedures performed in the rooms. Economic pressures forced the general practitioners to contain medical costs in the Non-Medical Aid encounters as compared to the Medical Aid encounters where the doctor is reimbursement in the classical fee for service methodology.

The general practitioners discounted the consultation fee component (as compared to the Medical Aid consultation rate) and used lower cost generic medication in order to make it affordable for the self-funded Non-Medical Aid patient and at the same time, maintain the medical practice patient base. This pattern is similar to physicians in other parts of the world where there is an active decision by the doctor to discount their fees in order to ensure access and affordability for the uninsured (non-medical aid) patients[15, 16].

8.4 Limitations

The results of this study cannot be extrapolated to South Africa and is limited to one group of general practitioners in the Johannesburg CBD following similar medical management protocols.

The researcher was unable to verify the doctor's input onto the data capture sheet. Although one has to assume that the data that the doctors provided is accurate and reliable, there was continuous emphasis on accuracy throughout this study

with frequent reminder calls. The researcher was known to the general practitioners participating in this study and the general practitioners were aware that this study was being performed on the care of their patients (both medical aid and non-medical aid patients). This could have possibly affected their style of practice and they could have changed their behaviour. But in discussion with the general practitioners afterwards, most felt that such behaviour probably reverted to the usual style of practice after the initial few patients, given that the number of patients recorded was, on average, more than 145 patients per doctor.

The number of questionnaires without Medical Aid status information was small at 3.6% (section 7.1, sample population) and was removed from the study population completely. In addition, although some data were missing in the different sections and were removed when analysing each section, i.e. consultations, medication, procedures, radiology, pathology and referrals), there was not a significant negative impact by these missing data.

The actual amount of money that the patients in a Non-Medical Aid encounter paid to the general practitioner was not recorded. The BHF scale of benefits fees for 2002 was used to standardise the tariff rates for both the Medical Aid and the Non-Medical Aid encounters. While cost of medication prescribed was calculated using the Medprax database, there was no confirmation that this prescription was actually filled when not dispensed by the general practitioner. The comparative costs are therefore inferred and do not represent the actual amount of monies paid by the patients.

Referrals to medical facilities, i.e. to State clinics and State hospitals provided a challenge to code and price. We do not know who the patient consulted with, be it a nurse, a general practitioner or a specialist. Due to the above uncertainty, the cost of referrals were not used in the comparison between the Medical Aid and the Non-Medical Aid encounters and not included in the overall costs per encounter. Although cost was not utilised in differentiating between the two groups, the type of referral documented reveals that patients in the Non-Medical Aid encounters were mainly referred to the Public health facilities and this is most likely due to financial reasons. These facilities are much cheaper than the private health facilities. In addition, the inference is that Non-Medical Aid patients are prepared to fund out of pocket for general practitioner care and access the public health facilities for specialist and hospital care.

Regretfully, the encounters which stated a repeat consultation was excluded since it was not clear whether the repeat visit encounter meant:

a. A patient was entering the study for the first time but was actually a repeat visit for the same medical condition
b. A repeat visit when the original medical condition was already recorded in the study
c. The repeat visit meant that the patient was an established patient of the practice and was now seen for a new medical condition

9 CONCLUSION

Despite the availability of numerous Public Hospitals and Clinics within the Greater Johannesburg City, General Practitioners in Private Practice in the Johannesburg Inner City have more frequent Non-Medical Aid than Medical Aid encounters.

There are no demographic or clinical differences between the two groups consulting the participating private general practitioners. The overall mean cost for the Non-Medical Aid encounters is 22.7% lower than the mean costs of Medical Aid encounters, largely due to the difference in medication costs. The major portion of the general practitioner's gross income is from medication for Medical Aid encounters at the time of this study.

The private general practitioner medically manages both groups (Medical Aid and Non-Medical Aid) similar except for the lower average cost of medication in the Non-Medical Aid encounters, being price conscious but ensuring appropriate medical care in the five diagnoses studied.

APPENDIX A

Data capture sheet

	Date: _____ March 2002				
Age or Year of Birth	AGE=		YYYY=		
Sex	Male		Female		
Name of Residential Suburb					
Occupation	Employed	Unemployed	Housewife	Student	Child
	Self-employed		Pensioner	Scholar	Others
Health Insurance	Name of Medical Aid =				
	Private	Insurance	RAF	WCA	Others
Consultation Code	**Time**	**< 10 min**	**10-20 min**	**20-30 min**	**> 30 min**
	New	0181	0182	0183	0184
	Follow up	0186	0187	0188	
Diagnosis (ICD-10 code)					
Primary (1)		**3**			
2		**4**			

Medications	**Trade Name**	**Strength**	**Quantity**	**Dispensed(D)/ Prescribed(P)**
1				D or P
2				D or P
3				D or P
4				D or P
5				D or P
6				D or P

Procedures performed (bhf code)	**1**		4	
	2		5	
	3		**6**	
Investigations (Bloods and X-Rays)				

Referrals	Clinic	Hospital	Psychiatrist	Physician	Surgeon	O & G
	ENT	Opthalm.	Dermatologist	Physio	Allied Health	Others

APPENDIX B:

Doctor information and consent letter

Dr. B. H. Modi
MBChB, MCFP(SA)

126 Jeppe Street, cnr Simmonds
Johannesburg
2001
Email: buddymodi@freemail.absa.co.za

Tel: 833-1588
Fax: 838-2630
Cell: 0824573587

11 February 2002

Dear Doctor

RE: Research Participation

The two major role players in the South African health care sector is the public sector funded by the government and the private sector, funded mainly by individuals and employers. Although the private sector mainly services those patients that the Medical Aids cover, there are a number of patients who do not belong to a Medical Aid and who utilise the services of the private general practitioners, instead of the public sector and pay for their services.

For the completion towards my MFAMMED degree by the University of Witwatersrand, I am undertaking a research project to profile such Non-Medical Aid encounters at the private general practitioners. This information will be presented to the government and the private sector to improve the accessibility and quality of health services available to this sector of our population.

This research is being conducted within the Johannesburg Inner City area. All private general practitioners practicing within this area will receive this letter. Your participation will be on a voluntary basis and your information will be kept completely confidential and anonymous. The results will be published in an aggregated format and no-one particular doctor will be identified. If you would like your particular data to be sent to you separately, in addition to the aggregated data, please indicate so below.

You are not obliged to participate and there will not be any repercussions if you do not participate. Your indication of participation does not automatically guarantee your enrollment in this study. The final selection will be done on a random basis from those who indicated their willingness to participate and you will be informed as such.

Participation in this project will entail recording clinical and demographic details of all patients who consult you on the nine study days, as per the attached data capture sheet. You will enter the details onto the data capture sheet at the time of the encounter. There will not be any request for any financial details between the

patients and yourself. A workshop will be held, before the beginning of the study, to introduce you to the process and requirements and to answer or clarify any points that you have.

I would appreciate it if you could complete the following by ticking the relevant items and faxing this page to 838-2630, as soon as possible:

1. I would like to participate in this research project

2. I would not like to participate in this research project ☐

3. I would like the final report, upon completion, to be sent to me ☐

4. Please send my own practice's data, in addition to the final report ☐

Name: _____

Address: _____

_____

For any further questions and clarification, please do not hesitate to contact me at the numbers above.

Yours truly,

Dr. B. H. Modi

APPENDIX C:

Study Days

The month of March 2002 was chosen because it is midway between December (peak summer month) and June (peak winter month). The 9 study days during March 2002 were chosen as follows:

- Two days per week for first three weeks and the last week consisted three study days
- The study days chosen were:
    - The Monday and Wednesday in the first week of March 2002
    - The Tuesday and Thursday in the second week
    - The Wednesday and Friday in the third week
    - The Thursday, Saturday and Sunday in the fourth week

In the above method, Wednesday and Thursday is repeated. In order to delineate nine study days, two days will unavoidably be repeated.

Logistics and Time Schedule

Once Ethics approval was received from the Ethics committee of the University of Witwatersrand in December 2001, this study proceeded as outlined below:

January 2002:

The pilot study was conducted during the second week in January and the necessary corrections to the data capture sheet were made.

February 2002:

Letters inviting doctors to participate were sent out with a deadline by mid February 2002. To indicate their willingness to participate, the doctors needed to sign the consent form and fax it back to the investigator.

The participating doctors were invited to a workshop during the last week of February where the methodology of the study was reviewed and any questions or queries raised were answered. The data capture sheets were distributed to each participating doctor at the workshop.

March 2002:

Each participating doctor received a telephone call a day before each study day. This was to remind them about the study day and in addition, to remind them of the study requirements.

Post March 2002:

The data capture sheets were collected from each participating GP at the end of the study. Although the data sheets were kept separately, their unique number could identify the participating doctor (however, in the study report, no one GP could be identified).

The data capture started after collecting all the data sheets from all the participating GPs.

REFERENCES

1. National Department of Health. 2011. National Health Insurance in South Africa Policy Paper. http://www.doh.gov.za/docs/notices/2011/not34523.pdf (accesses September 2011)

2. Gilson L, et al. The dynamics of policy change: Health care financing in South Africa, 1994 – 1999. Johannesburg and Cape Town: Centre of Health Policy (University of Witwatersrand) and Health Economics Unit (University of Cape Town).

3. Mark Blecher, Aparna Kollipara, Pieter DeJager and Nomkhosi Zulu. Health Financing. In: Padarath A, English R, editors. South African Health Review 2011. Durban: Health Systems Trust; 2011. http://www.hst.org.za/publications/south-african-health-review-2011

4. Harrison D. An Overview of Health and Health care in South 1994 – 2010: Priorities, Progress and Prospects for New Gains. http://www.doh.gov.za/docs/reports/2010/overview1994-2010.pdf (accessed March 2011)

5. Central Statistical Services. 2004. Census 2001. Pretoria: Central Statistical Service. http://www.statssa.gov.za/census01/html/default.asp (accessed 14 October 2012)

6. Lee KJ, Lee ME. Universal Healthcare: A Bold Proposal. Conn Med. 2000 Sep;64(9):576

7. U.S. Department of Health and Human Services. Overview of the Uninsured in the United States: A Summary of the 2011 Current Population Survey. September 2011. http://aspe.hhs.gov/health/reports/2011/CPSHealthIns2011/ib.shtm (accessed 30 March 2013).

8. Weiner S. “I cannot afford that!”: Dilemma in the care of the uninsured and the underinsured. J Gen Intern Med. 2001 Jun;16(6):419-21

9. Aukerman GF. Access to Healthcare for the Uninsured. JAMA, June 5, 1991;265:21

10. Jackson P. The Impact of Health Insurance status on Emergency Room Services. J Health Soc Policy. 2001;14(1):61-74

11. Cecere D. New study finds 45000 deaths annually linked to lack of health coverage. Harvard Gazette. September 2009. http://news.harvard.edu/gazette/story/2009/09/new-study-finds-45000-deaths-annually-linked-to-lack-of-health-coverage/ (accessed 30 March 2013).

12. Gardner L, Vishwasrao S. Physician Quality and Health Care for the Poor and Uninsured. December 2007. http://home.fau.edu/svishwas/web/Physician%20Quality%20and%20Outcomes2.pdf (accessed 29 March 2013).

13. Hadley J. Sicker and Poorer: The consequences of being uninsured. Kaiser Commission on Medicaid and the Uninsured. May 2002. http://www.kf.org/content/2002/20020510/4004.pdf (accessed 30 March 2013).

14. Brennan DS, Spencer AJ, Szuster FS. Service provision patterns by main diagnosis and characteristics of patients. Community Dent Oral Epidemiol. 2000 Jun;28(3):225-33

15. Kipling R. Doctors find ways to treat uninsured people. September 2011. http://usatoday30.usatoday.com/news/health/medical/health/medical/story/2011-09-12/Doctors-find-ways-to-treat-uninsured-patients/50376350/1 (accessed 30 March 2013).

16. Dobie S, Hagopian A, Kirlin BA, Hart LG. Wyoming Physicians Are Significant Providers of Safety Net Care. J Am Board Fam Med. November-December 2005; 18(6): 470-477

17. Chabikuli N, Schneider H, Blaauw D, Zwi AB, Brugha R. Quality and equity of private sector care for sexually transmitted diseases in South Africa. Health Policy and Planning 2002;17(suppl 1): 40-46.

18. City of Johannesburg. 2012. Interpreting the Figures. http://www.joburg.org.za (accessed 14 October 2012)

19. Daniel WW. Biostatistics: A Foundation for Analysis in the Health Sciences. 1999 USA: Quebecor Printing, Fairfield. Page 613.

20. Central Statistical Services. 2006. October Household Survey, 2005. Pretoria: Central Statistical Service.

21. Costa, J. and Garcia, J. Demand for private health insurance: how important is the quality gap? Health Econ. 2003;12: 587–599

22. Palmer N. Patient choice of primary care provider. South African Health Review. 1999. Health Systems Trust. Page 95.

23. McWhinney IR. A Textbook of Family Medicine. 1989 Oxford: Oxford University Press. Page 40.

24. Zhang X, Geiss L, Cheng YJ, Beckles GL, Gregg EW, Kahn HS. The missed patient with diabetes. Diabetes Care. 2008 Sep; 31:1748–1753.

25. Doyle J Jnr. Health Insurance, Treatment and Outcomes: using Auto Accidents as Health Shocks. National Bureau of Economic Research. Feb 2005. http://www.nber.org/papers/w1109.pdf (accessed 30 March 2013).