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Antibiotics prescribing pattern in private practice

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ANTIBIOTICS PRESCRIBING PATTERN IN PRIVATE PRACTICE

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

Johannesburg 2010

Declaration

I, Javed Ahmad, hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgment has been made in the text. It is being submitted for the degree of Master of Science in Medicine, in the University of Witwatersrand, Johannesburg.

Ethics committee for research on Human Subjects (Medical), University of the Witwatersrand has approved the study and the approval number is 03-07-24

Javed Ahmad

14 day of **February** 2010

Dedicated

To my parents
For their excellent support
To my wife Laima
For always being there
To my daughter Zarish
Whose smile gives me life

Abstract

The purpose of this study is to survey the antibiotics prescribing pattern in private practice. In July, August, September and October of 2003, a cross-sectional study was conducted at Medicross Clinic.The data for 882 patients were collected and analyzed. The study population was comprised of 55.3% females and 44.7% males.

There were 882 patients , of which 22% were diagnosed with bronchitis, 18.4% with URTI (Upper respiratory tract infection), 9.8% with sinusitis and 6.6% with otitis media. The most affected group was between 30 years – 39 years age group. The most commonly prescribed antibiotics were cephalosporines (30.68%), penicillins (17.33%) and quinolones (13.33%).The average duration of treatment was 3-10 days and the average cost (measured in July to October of 2003) per prescription was R103.00 to R188.00.There was no clear strategy or policy in place in prescribing antibiotics for different conditions to different age groups of patients.

It is concluded that lack of clear strategy or policy in prescribing antibiotics is a cause of concern which may lead to emergence and spread of antibiotic resistance. These problems may be solved by educating patients, general community, prescribers and dispensers on the appropriate use of antimicrobials. The clear policy regarding prescribing antibiotics may play a major role in resolving these issues.

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Chapter 1

Introduction

1.1 Rational

Antibiotic resistance is a complex and serious public health problem, which is increasing at alarming rates worldwid[1]. Resistant bacteria are highly transmittable and spread rapidly through inadequacies in public health infrastructure and infection control practices. The steady increase in resistant bacteria increases the cost of therapies[1]. This is particularly a matter of concern in developing countries with already limited public health budgets. Antibiotics are essential to reduce the severity and duration of common infections such as acute respiratory infections, diarrhea, sexually transmitted diseases,hospital acquired infections, tuberculosis, malaria and other tropical diseases. Preserving the effectiveness of antimicrobials by using them conservatively will not only save valuable resources but lives as well. Only two completely new classes of antimicrobials have been developed since 1970 (Streptogramins and Oxazolidinones) [1] other new antimicrobials are the variations of existing drugs and therefore are vulnerable to resistance[2].

Several factors are working to increase the incidence of infections. These include growing urbanization, pollution and environmental change, demographic changes resulting in growing proportion of elderly people needing hospital-based interventions[3].An increased incidence of infection leads to more antimicrobial use and consequently a greater selection pressure in favor of resistant microorganisms[3]. In many regions the prevalence of resistance among common pathogens to readily available cheap antimicrobials is so high that these

1313 agents are now of limited clinical effectiveness[3]. The emergence of antimicrobial resistance is a complex problem driven by numerous interconnected factors, many of which are linked to the misuse of antimicrobials and thus amenable to change. Once resistant strains are widespread, they are difficult to replace by their susceptible counterparts. Early action to optimize prescribing patterns is thus crucial.

Antimicrobial use is influenced by interplay of the knowledge, expectations, and interactions of prescribers and patients, economic incentives, characteristics of the health systems, and the regulatory environment. Patient-related factors are major drivers of inappropriate antimicrobial use. For example, many patients believe that new and expensive medications are more efficacious than older agents. In addition to causing unnecessary health care expenditure, this perception encourages the selection of resistance to these newer agents as well as to older agents in their class. Self-medication with antimicrobials is another major factor contributing to resistance. Self-medicated antimicrobials may be unnecessary, are often inadequately dosed, or may not contain adequate amounts of active drug, especially if they are counterfeit drugs.

Inappropriate demand can also be stimulated by marketing practices. Direct-to-consumer advertising allows pharmaceutical manufacturers to market medicines directly to the public via television, radio, print media, and the Internet. In particular, advertising on the Internet is gaining market penetration yet is difficult to control with legislation due to poor enforceability.Economic hardship can lead to premature cessation of treatment. For example, antimicrobials are purchased in single doses in many developing countries and are taken only until the patient feels better, which may occur before the pathogen has been eliminated .Prescribers' perceptions regarding patient expectations and demands substantially influence prescribing practice [3]. In

some cultural settings, antimicrobials given by injection are considered more efficacious than oral formulations. Such perceptions tend to be associated with the over-prescribing of broad-spectrum injectable agents when a narrow-spectrum oral agent would be more appropriate.In countries with limited resources, the dispensing of antimicrobials by unauthorized persons lacking appropriate knowledge is common. Even relatively well-trained prescribers often lack the up-to-date information required to make appropriate prescribing decisions. This tends to result in the excessive use of newer antimicrobial agents, often with a broader spectrum of action. Prescribing "just to be on the safe side" increases when there is diagnostic uncertainty, lack of prescriber knowledge regarding optimal diagnostic approaches, lack of opportunity for patient follow-up, or fear of possible litigation. In some countries, prescribers profit from both prescribing and dispensing antimicrobials.

Antibiotic resistance typically develops when antibiotics are prescribed in inadequate amounts or for a condition, which does not warrant their usage such as for viral infections[4]. The physicians who are overworked, under informed or feeling other pressures like (Medical Aids or Formularies) to over prescribe are also contributing to the spread of resistance[1].Other problems such as choice of broad-spectrum antibiotics over appropriate narrow spectrum antibiotics or prescribing antibiotics in incorrect doses or the treatment durations are the contributing factors.In other cases, inappropriate prescribing has been attributed to insufficient training in infectious diseases and antibiotic treatment, insufficient use of microbiological information and difficulty of empiric drug choice[5].

The emergence of antimicrobial resistance is regarded as a major future threat to the security and political stability of some regions[6].Although few clones have suggested

that resistant clones can be replaced by susceptible ones, resistance is generally slow to reverse or is irreversible[7].

Following are the most common diseases for which antibiotics are being prescribed.

- Bronchitis: Acute bronchitis is a lower respiratory tract infection that causes reversible bronchial inflammation. In up to 95 percent of cases, the cause is viral. While antibiotics are often prescribed for patients with acute bronchitis, little evidence shows that these agents provide significant symptomatic relief or shorten the course of the illness. In a few small studies, bronchodilators such as albuterol have been found to relieve some symptoms of acute bronchitis. Increased attention is being given to the role of *Chlamydia* species in acute bronchitis and adult-onset asthma. Studies in progress may help to clarify the importance of these organisms in acute bronchitis and to determine whether early treatment can prevent or ameliorate asthma[8].
- Laryngitis: The most common cause of laryngitis is a viral infection of the upper airways, such as the common cold. Laryngitis also may accompany bronchitis or any other inflammation or infection of the upper airways. Excessive use of the voice, an allergic reaction, and inhalation of irritants such as cigarette smoke can cause short-lived (acute) or persistent (chronic) laryngitis. Bacterial infections of the larynx are extremely rare[9].

- Otitis media. It is one of the most common diagnoses to be treated with antimicrobials in the pediatric population, accounting for over 25% of the oral antibiotics prescribed annually[10]. Provider factors (specialty, practice setting or region) and the patient factors (age, race and gender) have been shown to influence antibiotic choice or OM (otitis media) cases[11]. Over the last decade, a few newer, broad-spectrum antibiotics

have become available, expanding the antibiotic choices for treatment of OM (otitis media)[12].

- Pharyngitis: Sore throat is one of the most common reasons for visits to family physicians. While most patients with sore throat have an infectious cause (pharyngitis), fewer than 20 % have a clear indication for antibiotic therapy (i.e., group a beta-hemolytic *streptococcal* infection). Useful, well-validated clinical decision rules are available to help family physicians, for patients who present with pharyngitis[13]. Because of recent improvements in rapid *streptococcal* antigen tests, throat culture can be reserved for patients whose symptoms do not improve over time or who do not respond to antibiotics. It is one of the most common conditions encountered by the family physician[14].
- Sinusitis: It is a very common condition seen in primary care offices however, the management of this condition varies widely in clinical practice, particularly with regard to the use of antibiotics for treatment[15].
- Skin and soft tissue infections: It can be classified as primary infections and secondary infections, primary are usually caused by single bacterial species and the secondary develops in the areas of previously damaged skin, which is normally polymicrobic in nature[16].
- Tonsillitis: Tonsillitis is inflammation of the tonsils. The tonsils are lymph nodes in the back of the mouth and top of the throat. They normally help to filter out bacteria and other microorganisms to prevent infection in the body.

  They may become so overwhelmed by bacterial or viral infection that they swell and become inflamed, causing tonsillitis. Tonsillitis is extremely common, particularly in children.

- Upper respiratory tract infection: Infection with potentially pathogenic bacteria is difficult to determine solely by clinical signs and symptoms, but the clinical judgment is associated with positive culture results[17].
- Urinary tract infection: it is a wide variety of clinical syndromes including urethritis, cystitis, prostatitis and pyelonephritis and it is very common in females[16].

1.2 Aim

The aim of this study is to explore the prescribing pattern of antibiotics by doctors in private practice and to compare the different groups of antibiotics prescribed for any particular illness.

1.3 Objectives

To find out the prescribing pattern of prescribers for the common infections

- To compare the prescribing pattern of different prescribers at study site (Medicross Clinic)
- To compare the pattern of infections (different kind of infections) among the different age groups and gender
- To compare the dosages and duration of antibiotics prescribed by doctors at study site (Medicross Clinic)
- To compare the different groups of antibiotics (e.g.penicillins and macrolides) prescribed for any particular condition (e.g.bronchitis and sinusitis).

- To find out the frequency of antibiotics usage within the past two months (because of limited data availability for a particular patient).
- To compare the standard treatment guidelines and essential drug list (EDL) for South Africa, with the information available regarding prescribing trends.
- The compare the cost of a prescription for different conditions (sinusitis, pharyngitis etc..).
- To compare the patterns according to infection, antibiotics and cost.

Chapter 2

Literature review

2.1 Introduction

In this chapter a brief history of antibiotic prescribing pattern and a critical review of the present literature are given.

2.2 Brief history of study regarding antibiotic prescribing pattern and resistance pattern.

Bloom concluded, the effect of selective treatment of upper respiratory tract infections based on clinical signs and symptoms and patient and family culture results remains to be determined but using clinical judgment could result in more selective antibiotic use than found in current practice patterns[17].

In 2004 , Katende-Kyenda, Dambisya and Spring studied the prescription patterns of antimicrobial drugs in the private sector in Umtata and concluded that the dosage forms and dosing intervals were stated in 99% and 85% of the prescriptions.The most commonly prescribed antimicrobials were amoxicillin,metronidazole and ketoconazole[18].

Brink and his colleagues studied the guidelines for the management of upper respiratory tract infections and concluded that penicillin remains the drug of choice for

tonsillopharyngitis.Amoxicillin remains the drug of choice for AOM (acute otitis media) and suggested guidelines should be updated when new information becomes available[19].

Kozyrskyj studied the role of socioeconomic status and physician characteristics in evidence-based prescribing of antibiotics for children and found the links between no adherence to evidence-based antibiotic prescribing in children and physician specialty and this study also indicated the effect of household income due to which parents also have an important role[20].

Sintchenko did a comparative study on the impact of guidelines, clinical data and decision support on prescribing decisions and results were very impressive because many clinicians chose to use antibiotic guidelines for one third and microbiology reports or the decision support system (DSS) for about two thirds of cases when they were available to assist their prescribing decision[21].

Shlomo, Adi and Eliezer surveyed the expectations of parents about the role of antibiotic treatment in the upper respiratory tract infection and concluded that a quarter of the parents attending the physician with upper respiratory tract infections (URTI) are expecting to get antibiotics. Predictors were lower education, older parental age, receiving antibiotics in the past and the belief that antibiotics help in URTI[22].

Vacherie observed the remarkable differences in antibiotic prescribing between Italy and Denmark and suggested possible overuse and misuse of antibiotics in Italy[23].

Shireman and Kelsey reported that the decision to use antibiotics in the treatment of otitis media was primarily influenced by the type of otitis media diagnosis, amoxicillin and sulpha drugs were the most effective agents[24].

Emmer explained that antibacterial resistance is one of the major public health threats of the next decade. Rising rates of pneumococcal resistance have already had a major impact on our ability to treat common infections such as otitis media, sinusitis and pneumonia, the overuse in addition, misuse of antibiotics for upper respiratory infections contributes to this resistance[25].

Colgan concluded during his study in 2001, a substantial portion of the antibiotics prescribed in the outpatients setting are given for viral infection or bacterial diseases where the benefit of antibacterial therapy is marginal[26].

Walker and her colleagues did a qualitative study of physicians' and nurses' perceptions and their research "Why are antibiotics prescribed for asymptomatic bacteriuria in institutionalized elderly people?" concluded that the presence of nonurinary symptoms and signs is an important factor in the prescription of antibiotics for asymptomatic bacteriurea in institutionalized elderly people[27].

Anderson and Calder compared antibiotic prescribing for dental conditions between general medical practioners and dentists; they concluded that for acute dental problems general medical practioners are more likely to prescribe antibiotics than dentists[28].

A survey was done in Massachusetts to document the factors that may affect the physician decision making and prescribing practices and it was found that 93% prescribers overprescribe the antibiotics[29].

Kozyrskyi surveyed that antibiotic use declined over the late 1990s in the population of Canadian children but the increasing use of broader spectrum macrolides and higher rates of antibiotic use among preschool and low income children may have implications for antibiotic resistance[30].

During March-August 1990 in Zimbabwe, Kasilo,OM.,Nathoo,S. and Nhachi, reviewed the medical records of 500 consecutive patients, 0-12 years old, at Harare Hospital and Parirenyatwa Hospital to learn what the most frequent pediatric diagnoses were and to compare prescribing patterns. Clinicians identified 737 diagnoses. The most common diagnosis included respiratory infections (39.4% of patients), gastroenteritis (16.8%), malnutrition (10.4%), sepsis (9.6%), and AIDS (8.6%).The most frequently prescribed drug type was antibiotics (about 35%), especially penicillin. The recommended duration of antibiotic treatment is 7-14 days, but the mean duration among these children was only 5.1 days. Since the two hospitals served different socioeconomic populations, it was not surprising to find differences in prescription patterns, which were appropriate and tended to abide by the essential drugs list recommendations[34].

Porretta A, Giuliani L, Vegni FE, Larosa M, Privitera G investigated the prevalence and patterns of antibiotic prescribing and expenditures in Italian hospitals. A prevalence survey was performed in 15 Italian hospitals. Data on antimicrobial use and expenditures in the year 2000 and 1-day point prevalence information on antibiotic prescription, type and sources of infections and expenditures were obtained through a review of pharmacy records and charts

of 2,165 inpatients. 45.5% of the patients surveyed were receiving at least one antibiotic: 148 for hospital-acquired infections (HAI), 262 for community-acquired infections (CAI). No active infection was recorded for 575 patients (58.4%). 57.3% of prescriptions for HAI and 65.9% for CAI were based on empiric and presumptive criteria, while 39% of HAI and 15.8% of CAI were oriented by microbiology and susceptibility testing results. Guidelines were followed in choosing the antimicrobial drugs for 22.8% of therapeutic and 46.8% of prophylactic courses. High rates of antibiotic usage were observed in Italian hospitals. Areas for improvement, both for the use of diagnostic resources and the prescribing habits, were identified. The 1-day prevalence survey of antimicrobial use may be a tool of feedback to prescribers for more appropriate drug selection[35].

Edwards M , Dennison J and Sedgwick studied the patients'response to delayed antibiotic prescription for acute upper respiratory tract infection.Upper respiratory tract infections (URTIs) account for approximately 50% of antibiotic prescriptions in the United Kingdom. General practitioners (GPs) frequently issue such prescriptions simply because they believe that the patient expects it. Deferred prescribing (issuing a prescription, but with instructions to wait for no spontaneous improvement before deciding whether to use it) might address patients' expectations, while minimising actual antibiotic consumption. Patients from 13 group practices in the south of England. Patients who had received a delayed antibiotic prescription for URTI from their GP were posted a questionnaire 2 days after their consultation. Three hundred and seventy-four subjects were recruited of whom 256 (68.4%) returned their questionnaires. Just over half (53.1%) of the responders claimed to have consumed their antibiotics. The majority of patients (87.1%) were confident about taking the decision as to whether to use their antibiotics, and 92.5% would choose to receive a delayed prescription again. Most patients were confident in making the decision about whether or not to take their antibiotics when receiving a delayed prescription for URTIs.

Antibiotic consumption is associated with presenting symptoms, and this has implications for future practice[36].

Bjerrum L, Boada A, Cots JM, Llor C, Forés Garcia D, Gahrn-Hansen B,and Munck A compared general practitioners' (GPs') prescribing of antibiotics for respiratory tract infections in a country with a high prevalence of antibiotic resistance (Spain) with a country with a low prevalence of antibiotic resistance (Denmark).Overall, Spanish GPs treated a higher proportion of patients than Danish GPs. After adjusting for unequal distribution of age and sex, they found that Spanish GPs prescribed significantly more antibiotics to patients with focus of infection in tonsils and bronchi/lungs. Narrow-spectrum penicillin was the most used antibiotic in Denmark, representing 58% of all prescriptions issued, followed by macrolide and broad-spectrum penicillin. In Spain, prescriptions were distributed among a great number of compounds, with broad-spectrum penicillins and combinations of amoxicillin plus beta-lactamase inhibitors most frequently used.The substantial difference in the way GPs manage respiratory tract infections in Denmark and Spain cannot be explained by different patterns of RTIs in general practice. The discrepancies indicate variations in national recommendations, different treatment traditions or different impact of pharmaceutical marketing[37].

Mainous AG 3rd, Hueston WJ, Davis MP and Pearson WS examined antimicrobial prescribing patterns for adults and children with bronchitis or upper respiratory infections (URIs) before and after release of nationally disseminated pediatric practice recommendations. Data from the 1993, 1995, 1997, and 1999 National Ambulatory Medical Care Survey were used to evaluate prescriptions for antimicrobials for URIs and bronchitis. From 1993 to 1999, the proportion of children receiving antimicrobials after visits for URIs and bronchitis decreased. However, the use of broad-spectrum antimicrobials rose from

10.6% of bronchitis visits to 40.5%. Prescriptions of antimicrobials for adults with URIs or bronchitis showed a decrease between 1993 and 1999.Although antimicrobial prescribing for URIs and bronchitis has decreased for both children and adults, the prescribing of broad-spectrum antibiotics among children has shown a proportional rise[38].

Orrett FA did study antimicrobial prescribing patterns at a rural hospital in Trinidad.The antibiotic prescribing patterns on 527 case notes of discharged patients over a two-month period at a teaching hospital in southern Trinidad were retrospectively analyzed. Forty four percent of patients had received one or more antibiotics. The greatest exposure rate was on the orthopedic (79.4%), pediatric (70.8%), and obstetric/gynecology (64%) services. Genital tract infections, urinary tract infections, skin/ soft tissue infections and lower respiratory tract infections were the commonest indications for antibiotic prescription. The antibiotics most frequently prescribed were ampicillin (53.4%), chloramphenicol (16.5%) and gentamicin (11.3%). Ninety-six (41.0%) patients were described as being allergic to penicillin, and of these, 5 received ampicillin and 3 received cefaclor. Poor communication and lack of confidence in laboratory technician expertise were identified as possible cofactors partly responsible for most inappropriate antibiotic use in the hospital. The study also revealed that prevailing prescribing patterns at the SFGH might be improved through refresher training of doctors in clinical microbiology and the identification of clinical areas for which targeted antibiotic intervention may be warranted[39].

Brown DW, Taylor R, Rogers A, Weiser R and Kelley M. concluded that prevalence of oral antibiotic treatment among adult Medicaid beneficiaries diagnosed with nonspecific upper respiratory infections, colds, pharyngitis, bronchitis, and influenza is high and

varies significantly across patient demographics and geography. Interventions to reduce antibiotic prescribing are needed to reduce the progression of antimicrobial resistance[40].

Sosa survey showed inconsistent and unclear knowledge on empiric treatment of the most common illnesses, pointing to a need for wider dissemination not only of standard treatment guidelines but also of other forms of information which can be used to inform antibiotic prescriptions[1].

According to my limited survey, this type of study has been done in State owned hospitals but not in private practice, which is the most important avenue to explore because most of the peoples who can afford go to the private practices that is where usage of antibiotics can be found. I wanted to find out what types of antibiotics are being prescribed and for what infection.

Chapter 3

Methodology

3.1 Study design

A cross sectional descriptive study was chosen. Data were collected to access the prescribing pattern and the study was carried out from July 2003 to October 2003.

3.2 Setting of study

The study was conducted at Medicross Clinic (CNR Northrand Rd & Trichard Rd Boksburg). It is a 24-hours clinic equipped with all the modern facilities in casualty and theater. The Medicross Clinic has five regular doctors and four dentists. At the pharmacy section of the clinic, more than 250 prescriptions are processed daily. Medicross is serving a vast area around including Witfield, Van Dyk Park, Farrermere, Bardene, Beyers Park and more than 90% of the patients are on Medical Aids.

3.3 Study population

The study population included adult and children patients visiting Medicross Clinic Boksburg South Africa from 0800 hours to 1600 hours, 5 days a week.

3.4 Sampling

A data collection form was designed after consulting doctors and pharmacists at Medicross.

3.4.1 Sample size

It was expected to collect at random from the medical and pharmacy record and sample size was estimated by using Epi info 6.04 software (statcalc).The study required a sample size of 900 subjects for 13% accuracy and 95% confidence level and sample size of 646 subjects for 13% accuracy and 90% confidence level .The most important variables to be studied were, age and gender of the subject, age and gender of prescriber (experience may prove to be an important factor towards antibiotic prescribing pattern and gender may show some variation as well), infections, dosage regimen, cost, frequency of patient's visits and duration of treatment.

3.5 Criteria for the selection of patients

3.5.1 Inclusion criteria

- All the patients between the ages of 0 to 80 years who were prescribed any type of antibiotics and who gave consent to participate in our study.

3.5.2 Exclusion criteria

- Any patient who was not been prescribed any antibiotic.
- Any patient more than 80 years old.
- Any patient who was on Medicross managed care program (where the prescriber was bound to prescribe according to the specific formulary)
- Any patient who did not sign consent form.
- In case of children who were accompanied by a person other than their parents or legal guardian because only parents or legal guardian can provide medical and drug history for the patient.
- Patients who could not understand English or content of consent form.

3.6 Data collection form

Data collection form (Appendix C) was designed in the following 6 sections.

1. **Patients' information section:** This section comprised of study number (medical file number/pharmacy file number),date, gender (male/female) and age or date of birth
2. **Doctors' information section:** This section comprised of prescribers' study number, gender (male/female) and age or date of birth
3. **Diagnosis:** This section comprised of different diagnosis (bronchitis,laryngitis,otitis media,pharyngitis,sinusitis,skin and soft tissue infection,tonsilitis,upper respiratory tract infection and Urinary tract infection) made by prescribers .

4. **Treatment plan:** This section comprised of antibiotics prescribed by different doctors, dosage and duration of treatment.
5. **Frequency of antibiotics usage:** This section comprised of frequency of previous antibiotics usage.
6. **Cost:** This section comprised of cost per antibiotics prescription.

The time required to explain to the patient about our study and recording all the necessary information was approximately 10 minutes and an extra 5 – 10 minutes per patients' individual file to get all the medical information from the medical section of the clinic.

3.7 Data collection

When a patient entered our clinic, he/she reported at the reception where she / he gave the required information including the allergies, any previous medical history. He/she consulted a doctor, and then went to the casualty to get some injection or any other immediate treatment or for a lab test after which patient proceeded to the pharmacy with a prescription..

At the pharmacy , patients were asked, in privacy, if she/he could speak English (Most of our patients were bilingual) and if she/he would like to participate in the study and sign a consent form.

This selection process continued throughout the day and I selected 10-20 patients (adult males, females, and children) at random who came to the pharmacy with an antibiotic prescription and who fulfilled our inclusion criteria.

The patients who chose not to participate and refused to sign consent form, were thanked . During our study period, only 25 patients declined to give their consent.

Contents of patient information sheet were read and consent forms were given, in privacy, to those who agreed to participate. At the end of the day, all the necessary information regarding the illness was obtained from the patient's files.

Participants were also asked if they had any questions, about our study. The researcher answered their questions.

3.8 Ethical considerations

The Post-Graduate Committee (Appendix D) and the committee for research on Human Subjects (Appendix E), at the University of the Witwatersrand approved the research protocol (Clearance number 03-07-24).

Permission was also obtained from the Head of Medicross Clinic Boksburg (Appendix F)

Written consent was obtained from all the participants including patients and doctors. Each patient and doctor was assigned a specific study number so that the identification of all the participants could be made impossible. No names or any other identification marks were recorded on the consent forms or data collection form.

Before starting conversation, the contents of the patient information sheet were read and a copy was given to the participants. This process was repeated throughout the data collection process. The patients' information sheet explains about the study, about the

privacy, confidentiality, voluntary participation and reassurance of proper service at the pharmacy if they decline to participate.

In case of doctors, a meeting was arranged with the head of clinic and individually with all the doctors to explain the core purpose of our study and all the questions was answered. The doctors' information sheet was also given to the doctors along with consent form. The doctor's information sheet explains about the study, about the privacy, confidentiality, voluntary participation and reassurance of normal working relationship at the clinic if they declined to participate.

3.8.1 Patients' information sheet

A patient information sheet (Appendix A1) which included greetings to the potential participant, introduction, and a brief explanation about the study,, nature of information used during study, reassurance about voluntary participation, confidentiality, contact address and contact phone numbers was given to all patients.

3.8.2 Patients' consent form

Consent form (appendix A1) gave details to the participants about voluntary participation, privacy, confidentiality and the possibility of withdrawing from the study any time without any effects on their normal care at the clinic.

3.8.3 Doctors' information sheet

Doctors' information sheet (Appendix B1) was typed on a separate page. It included greetings to the potential participant, introduction, and a brief explanation about the

study, nature of information used during study, reassurance about voluntary participation, confidentiality, contact address and contact phone numbers

3.8.4 Doctors' consent form

Consent form (appendix B2) gave details to the participants about voluntary participation, privacy, confidentiality and the possibility of withdrawing from the study any time without any effects on working relationship at the clinic.

3.9 Interview and interviewee

The researcher himself conducted the interviews. The researcher is fluent in English
One colleague pharmacist agreed to participate in our data collection task. She is fluent in English and Afrikaans.She is compassionate, sympathetic , soft spoken and well informed .

3.10 Statistical analysis of data

The data were captured and analyzed using Epi info version 3.3.2 (February, 2005) software. Percentages and frequencies were calculated, tabulated and cross tabulated. Association between different variables was calculated.

Following different types of comparison was done

- Antibiotics prescribing pattern among the different prescribers for the same illness.(e.g. bronchitis,sinusitis,otitis media etc)
- Antibiotics prescribing pattern among the different prescribers for the same illness for different age groups
- Dose and duration of antibiotics prescribed by different doctors

- Antibiotics prescribing trends and the standard treatment guidelines (standard treatment guidelines and essential drug list for South Africa).
- The cost of prescription to patient

3.11 Limitations

The limitation could include incomplete information in the patient file. To remove this bias all the contact numbers for the patients were noted so that they could be contacted if necessary.

The population group to be studied comprised predominantly of peoples with median socio-economic and educational background so the people with less educational attainment had less representation.

The population group to be studied comprised of those patients who were not on Medicross Managed care program. So this group of patients had less representation in our study.

The patients who were older than 80 years were excluded. So this group of patients had no representation in our study.

Chapter 4

Result

4.1 Introduction

In this chapter, problems faced during the research and the results of the study are given. The results are related to antibiotics prescribing pattern in private practice in respect of different age groups and gender .The results are discussed under different types of diagnosis made by different prescribers and different types of regimen prescribed by these prescribers and finally cost per antibiotic prescription to the patient is discussed.

4.2 The response rate

It was estimated that there would be 900 patients in the theoretical sample but data for 920 patients were attempted to collect and data for 38 patients was rejected due to lack of required information(n=13) and refusal to sign a consent form (n=25). Actual sample comprised of 882 patients (55.3% females and 44.7% males) and analysis is performed on data obtained for 882 patients. So data was collected for more than 900 patients giving a response rate of 100% but analysis is done on 98% of the estimated sample size.

4.3 Problems during data collection

The consent form was designed to get consent from all the participants but unfortunately

some of the participants refused to sign and some of them took the consent form home and never brought those forms back. To ease this situation, each and every patient was explained the purpose of study and assured them of confidentiality. I had to phone some of the patients at their residence to return their forms and this intervention actually helped a lot. In case of children who came to the clinic with their relatives other than their parents, refused to sign the consent forms. Some of patients were not satisfied and they spoke to doctors in our Clinic (Doctors and Nurses were briefed earlier on even before the start of this study) so that situation was handled successfully.

The pharmacy and Clinic where this study was conducted is very busy. On average 10-15 minutes were spent with each patient and it took 5-10 minutes in explaining about the study, some of the participants became very impatient but such situations were handled with great patience and to the point constructive talk.

Some of the patients were very impatient and did not want to spend even a moment extra in Pharmacy because most of them got frustrated due to the time they spent in corridors of clinic waiting for doctors and then in pharmacy area.

4.4 Demographic data

4.4.1 Age

Age for all the participants was recorded from our local pharmacy database, medical section database and from medical aid card required to be presented to the pharmacist at pharmacy. Age of all the participants was grouped into 12 different age groups as shown in table 4.1 .

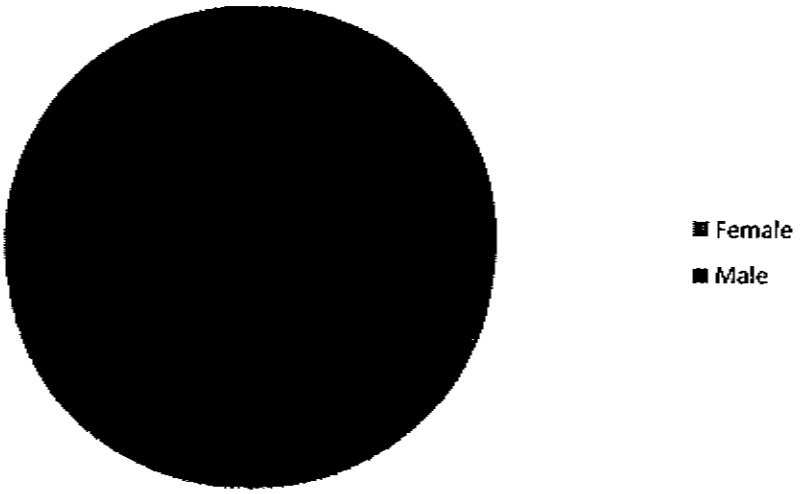
	Female		Male	
Age Group	**Frequency**	**%**	**Frequency**	**%**
1 month - 5 months	0	0	3	0.78
6 months - 11 months	6	1.22	6	1.52
1 Year – 4 Years	42	8.6	47	11.93
5 Years – 9 Years	35	7.17	27	6.86
10 Years – 14 Years	29	5.95	22	5.59
15 Years – 19 Years	30	6.14	28	7.10
20 Years – 29 Years	96	19.67	64	16.24
30 Years – 39 Years	108	22.13	86	21.82
40 Years – 49 Years	79	16.19	54	13.70
50 Years – 59 Years	41	8.40	40	10.15
60 Years – 69 Years	17	3.48	13	3.3
70 Years – 80 Years	5	1.04	4	1.01
Total	488	100	394	100

Table 4.1 Comparison of patients' age groups

The age range was 1 month to 80 years .The mean age for the study population was 29.27 years (Standard deviation: 17.75), the median was 30 and mode was 31.There were 108 Females and 86 males recorded in the age group (30 – 39 Years) and only 6 males and 6 females have been recorded among the babies in the age group (6-11months).

4.4.2 Gender

Our study population comprised of 55.3% females (488) and 44.7% males (394) in total as shown in the graph 4.1.



Graph 4.1 Patient's gender comparison

4.5 Prescribers comparison

There were 7 prescribers who gave their written consent to participate in our study at our Clinic. Prescribers were compared on the basis of number of antibiotics prescriptions written as shown in the table 4.2.

Prescriber's Study Number	Prescriber's age (years)	Prescriber's gender	Number of prescriptions written	Percent of prescriptions written
GP1	47	male	186	21.1%
GP2	45	male	154	17.5%
GP3	64	male	142	16.1%
GP4	44	male	102	11.5%
GP5	54	male	104	11.8%
GP6	39	female	89	10.1%
GP7	40	male	105	11.9%
			882	100.0%

Table 4.2 Prescribers comparison

It is evident from the table 4.2, GP1 wrote 186 prescriptions (21.1%) and GP6 wrote 89 prescriptions (10.1%).

The age and gender comparison of all the prescribers were done to know, whether experience and gender contributes to the prescribing habits. There were only one female prescriber (10.1%) and 6 male prescribers (89.9%) in our study.

4.6 Diagnosis

Data were divided on the basis of different diagnosis (bronchitis,laryngitis,otitis media,Pharyngitis,Sinusitis,Skin and soft tissue infection,Tonsilitis,Upper respiratory tract infection, Urinary tract infection/Cystitis and Others) made by the prescribers and number of cases recorded under these diagnosis are compared hereby in the following table 4.3

Diagnosis	Frequency	Percent
Bronchitis	194	22.0%
Laryngitis	29	3.3%
Otitis Media	58	6.6%
Pharyngitis acute	58	6.6%
Sinusitis	86	9.8%
Skin and Soft Tissue Infection	9	1.0%
Tonsillitis	54	6.1%
Upper Respiratory Tract infection	162	18.4%
Urinary Tract Infection/Cystitis	12	1.4%
Others	220	24.9%
Total	882	100.0%

Table 4.3 Diagnosis comparison

As this study was conducted in July, August, September and October and in these months bronchitis and upper respiratory tract infections were more prevalent . Otitis media was common among children population in these months. Sinusitis and pharyngitis were also common in these months among adults. Few cases of laryngitis were also recorded in these months.

4.7 Frequency of antibiotics usage

Frequency of antibiotics usage was recorded for all the patients in our study to know that how often antibiotics are being used as shown in the table 4.4.

Frequency of Antibiotics Usage	Frequency	Percent
=/< 2 Weeks	73	8.3%
=/< 3 Weeks	31	3.5%
=/< 4 Weeks	50	5.7%
=/< 8 Weeks	54	6.1%
> 8 Weeks	228	25.9%
Not sure	446	50.5%
Total	882	100.0%

Table 4.4 Frequency of antibiotics usage

As mentioned in the table 4.4 that 446 patients (50.5%) were not sure about the last antibiotic usage because of the following reasons.

- Patients wanted to use other pharmacy that is why local database did not have previous medical and antibiotics usage record.

It was recorded that 228 patients (25.9%) had antibiotics 8 weeks previous to the study start date, and only 73 patients (8.3%) used antibiotics less than 14 days previous to the study start date which means previous treatment was not successful and prescriber

wrote a new prescription for a new antibiotics. The patients who had antibiotics less than 8 weeks previous to the study start date but more than 4 weeks previous to the study start date , were only 54 (6.1%). Then 50 patients (5.7%) were recorded to have antibiotics less than 4 weeks and 31 patients (3.1%) used less than 3 weeks ago.

So it is concluded that 23.6% patients used antibiotics between 2-8 weeks and 25.9% more than 8 weeks prior to the start of study date. So 49.5% used antibiotics a month or less than a month before the start of study date which may be one of the reason of antibiotics resistance.

4.8 Different antibiotics groups

Data were further divided among different antibiotic groups as mentioned in the table 4.5

Antibiotics Group	Frequency	Percent (%)
Penicillins	13	17.33
Penicillins and Imidazoles	4	5.33
Penicillins and Macrolides	1	1.33
Cephalosporins	23	30.68
Macrolides	9	12
Quinolones	10	13.33
Tetracyclines and Quinolones	1	1.33
Tetracyclines	1	1.33
Sulfonamides /Trimethoprim	3	4
Sulfonamides / Trimethoprim and Imidazole	2	2.68
Lincosamides	5	6.68
Lincosamides and Imidazoles	1	1.30
Ketoloids	2	2.68
Total	75	100%

Table 4.5 Antibiotics group comparison

In the table 4.5, cepahlosporines is mostly prescribed antibiotic group (30.68%), Penicillin is 2nd (17.33%), quinolones is 3rd (13.33%) and macrolides are 9%.

4.9 Diagnosis and regimen comparison

4.9.1 Bronchitis

The distribution of data among the different age groups and gender in terms of diagnosis (bronchitis) is mentioned in the following table 4.6

	Female		Male	
Age Group	**Frequency**	**%**	**Frequency**	**%**
1 month - 5 months	0	0	1	1.04
6 months - 11 months	0	0	0	0
1 Year – 4 Years	9	9.18	12	12.5
5 Years – 9 Years	5	5.10	5	5.21
10 Years – 14 Years	4	4.08	4	4.17
15 Years – 19 Years	5	5.10	9	9.37
20 Years – 29 Years	19	19.39	12	12.5
30 Years – 39 Years	24	24.49	22	22.92
40 Years – 49 Years	17	17.36	12	12.5
50 Years – 59 Years	8	8.16	12	12.5
60 Years – 69 Years	6	6.12	6	6.25
70 Years – 80 Years	1	1.02	1	1.04
Total	98	100	96	100
	Total			98+96=194
	Percentage (%)			21.99%

Table 4.6 Distribution of data among bronchitis patients.

For discussion purposes age groups are divided into three major groups (1month- 19 years,20 – 49 years,50- 80 years).It is evident from table 4.6, in the age group (1 month – 19 years) 23 females (23.46%) and 31 males (32.29%) were recorded and there was only 1 male baby (1.04%) in the age group (1 month – 11 months) was diagnosed with bronchitis. There were 60 bronchitis female patients (61.24%) and 46 males (47.92%) in the age group

(20-49 years). Only 15 females (15.3%) and 19 males (19.79%) are noted in the age group (50-80 years).Among all the participants in our study only 194 (21.99%) were diagnosed with bronchitis.

The prescribers prescribe different regimen in different age group.

Different GPs are compared in the following table 4.7 in terms of regimen they prescribed for bronchitis patients.

	PRESCRIBER'S STUDY NUMBER							
Antibiotics Prescribed	**GP1**	**GP2**	**GP3**	**GP4**	**GP5**	**GP6**	**GP7**	**TOTAL**
Amoxicillin/clavulanate (Augmentin®)1gm 1 bid For 5 days	1	1	3	0	0	1	3	9
Loracarbef (Lorabid®)) 100mg sus. 5ml bid for 5 days	1	0	0	0	2	0	0	3
Ciprofloxacin (Ciprobay®) 250mg 1 bid for 5 days	0	0	0	1	0	0	0	1
Cefpodoxime (Orelox®)) 50mg/5ml susp 5ml bid for 5 days	1	0	0	0	1	0	2	4
Amoxicillin/clavulanate (Augmentin®) 1gm + Metronidazole (Flagyl®) 200mg 1 bid + 1 tds for 5 days	0	0	0	0	0	0	1	1
Ciprofloxacin (Orpic®) 500mg 1 bid for 5 days	1	0	0	0	0	0	0	1
Ciprofloxacin (Ciprobay®) 500mg 1 bid for 5 days	0	0	1	0	0	0	0	1
Amoxycillin (Moxypen®) 250mg/5ml 5ml tds for 5 days	0	0	0	0	0	0	3	3
Amoxicillin/clavulanate (Augmentin®) 1gm and Metronidazole (Trichazole®) 200mg 1 bid and 1 tds for 5 days	0	0	0	0	0	0	5	5

Amoxycillin/clavulanate (Amoclave®) 375mg 1 tds for 5 days	4	0	2	0	4	3	1	14
Amoxicillin/clavulanate (Ranclave®) 625 mg 1 tds for 5 days	0	2	0	0	0	0	0	2
Clarithromycin XL (Klacid ®) 500mg 1 OD for 5 days	0	0	8	1	0	1	0	10
Amoxycillin/clavulanate (Amoclave®) 375mg I tds for 5 days	2	0	0	0	2	0	0	4
Cefprozil (Procef®) 250mg 1 bid for 5 days	0	0	0	0	2	0	0	2
Erythromycin (Purmycin®) 500mg 1 qid for 5 days	0	0	8	0	0	0	0	8
Cefuroxime (Zinnat®) 250mg 1 bid for 5 days	0	0	17	0	6	0	0	23
Moxifloxacin (Avelon®) 400mg 1 OD for 5 days	1	1	0	1	0	3	0	6
Levofloxacin (Tavanic®) 500mg 1 OD for 5 days	4	5	0	0	0	0	1	10
Amoxicillin (Amoxil®) drops 125mg/1.25ml 1ml tds for 5 days	0	0	1	0	0	0	0	1
Amoxicillin/clavulanate (Amoclave®) SF Susp 5ml tds for 7 days	1	0	2	0	0	0	1	4
Amoxycillin (Moxypen®) 500mg 1 tds for 5 days	0	0	0	0	0	0	1	1
Clindamycin (Dalacin®) C 150mg 2 bid for 5 days	0	0	0	1	0	0	0	1
Amoxycillin (Moxypen®) 500mg + Metronidazole (Trichazole®) 200mg 1 tds each for 5 days	0	0	0	0	0	0	2	2
Clindamycin (Dalacin®) C 150mg 1 qid for 5 days	0	0	1	0	0	0	0	1
Levofloxacin (Tavanic®) 250mg 1 OD for 5 days	0	0	0	0	1	0	0	1

Erythromycin (Purmycin®) 250mg 1 qid for 5 days	0	0 0	2	0	0	0	0	2
Clarithromycin (Klacid®)250mg/5ml 5ml bid for 5 days	0	0	0	1	0	0	0	1
Amoxicillin/clavulanate (Augmentin®) 1gm + Clarithromycin XL (Klacid®) 500mg 1 bid + 1 OD for 5 days	0	0	0	0	0	1	0	1
Telithromycin (Ketek®) 400mg 2 OD for 5 days	1	0	0	0	0	0	0	1
Azithromycin (Zithromax®) 500mg 1 OD for 3 days	0	0	0	0	0	1	0	1
Amoxycillin (Moxypen®) 125mg/5ml 5ml tds for 7 days	1	0	0	0	0	0	4	5
Cefaclor 375mg 1 bid for 5 days	0	0	0	0	0	1	0	1
Erythromycin (Purmycin®) 250mg/5ml 5ml qid for 5 days	1	0	0	0	0	0	0	1
Loracarbef (Lorabid®) 100mg 1 bid for 5 days	3	0	0	0	0	0	0	3
Cefpodoxime (Orelox®)) susp. 7.5ml bid for 7 days	0	1	0	0	0	0	0	1
Erythromycin (Purmycin®) 250mg 2 bid for 5 days	0	0	0	0	1	0	0	1
Gatifloxacin(Tequin®) 400mg 1 OD for 7 days	3	6	1	1	1	1	3	16
Cefaclor 375mg/5ml 5ml bid for 5 days	0	0	0	0	0	1	0	1
Ofloxacin (Tarivid®) 250mg 1 OD for 5 days	0	0	0	0	0	0	0	0
Cefuroxime (Ceroxime®) 250mg 1 bid for 5 days	0	0	0	0	1	0	0	1
Cefpodoxime (Orelox®)) Susp. 10ml bid for 5 days	0	1	0	1	0	0	0	1

TOTAL	30	19	57	19	29	13	27	194

Table 4.7 Comparison among different prescribers in terms of their prescribing pattern among bronchitis patients

It is evident from table 4.7 that cefuroxime is the drug of choice and some doctors prescribed gatifloxacin to 16 patients.

4.9.2 Laryngitis

The distribution of data among the different age groups and gender in terms of diagnosis (laryngitis) is mentioned in the following table 4.8

	Female		Male	
Age Group	**Frequency**	**%**	**Frequency**	**%**
1 month - 5 months	0	0	1	7.69
6 months - 11 months	0	0	0	0
1 Year – 4 Years	1	6.25	2	15.38
5 Years – 9 Years	0	0	1	7.69
10 Years – 14 Years	2	12.5	0	0
15 Years – 19 Years	2	12.5	2	15.39
20 Years – 29 Years	2	12.5	2	15.39
30 Years – 39 Years	4	25	2	15.38
40 Years – 49 Years	3	18.75	1	7.69
50 Years – 59 Years	2	12.50	2	15.39
60 Years – 69 Years	0	0	0	0
70 Years – 80 Years	0	0	0	0
Total	16	100	13	100
		Total		13+16=29
		Percentage %		3.29

Table 4.8 Distribution of data among laryngitis patients.

In the table 4.8 laryngitis was diagnosed the most among the 4 females (25%) and 2 males (15.38%) in 30-39 years age group. In the age group (1 month – 19 years) 5 females (31.25%) and 6 males (46.15%) were recorded and there was only 1 male baby (7.69%) in

the age group (1 month – 11 months) was diagnosed with laryngitis. There were 9 laryngitis female patients (56.25%) and 5 males (38.46%) in the age group (20-49 years). Only 2 females (12.50%) and 2 males (15.39%) were noted in the age group (50-80 years).Among all the participants in our study only 29 (3.29%) were diagnosed with laryngitis.

Prescribers prescribe different regimen in different age groups as given below in table 4.9

Different GPs are compared in the following table 4.9 in terms of regimen they prescribed for laryngitis patients.

	PRESCRIBER'S STUDY NUMBER							
Antibiotics Prescribed	**GP1**	**GP2**	**GP3**	**GP4**	**GP5**	**GP6**	**GP7**	**TOTAL**
Amoxicillin/clavulanate (Augmentin®)1gm 1 bid For 5 days	0	2	1	0	1	0	0	1
Loracarbef (lorabid®) 100mg susp. 5ml bid for 5 days	1	0	0	0	0	0	0	1
Amoxicillin/clavulanate (Amoclave®) 375mg 1 tds for 5 days	1	0	0	0	0	0	0	1
Clarithromycin XL (Klacid®) 500mg 1 OD for 5 days	0	0	6	3	0	0	0	9
Amoxycillin/clavulanate (Clavumox®) 375mg 1 tds for 5 days	0	0	0	0	0	1	0	1
Erythromycin (Purmycin®) 500mg 1 qid for 5 days	0	0	3	0	0	0	0	3
Cefuroxime (Zinnat®) 250mg 1 bid for 5 days	0	0	3	0	0	0	0	3
Moxifloxacin (Avelon®) 400mg 1 OD for 5 days	0	0	0	0	0	1	0	1
Amoxycillin/clavulanate (Amoclave®) SF susp. 5ml tds for 7 days	0	0	0	1	0	0	0	1
Amoxicillin/clavulanate (Clamentin®) S susp. 5ml tds for 7 days	0	0	1	0	0	0	0	1
Amoxycillin (Moxypen®) 500mg 1 tds for 5 days	0	0	0	1	0	0	0	1

Cefpodoxime (Orelox®)) 100mg 1 bid for 5 days	1	0	1	1	0	0	0	3
Cefprozil (Procef®) 125mg/5ml 5ml bid for 7 days	0	0	0	1	0	0	0	1
Erythromycin (Purmycin®) 250mg 1 qid for 5 days	0	0	1	0	0	0	0	1
Cefaclor (Vercef®) 187 susp. 5ml bid for 5 days	0	1	0	0	0	0	0	1
TOTAL	3	1	16	7	0	2	0	29

Table 4.9 Comparison among different prescribers in terms of their prescribing pattern among laryngitis patients

Table 4.9 indicates that clarithromycin is the drug of choice and some doctors prescribed cefuroxime and erythromycin.

4.9.3 Otitis media

The distribution of data among the different age groups and gender in terms of diagnosis (otitis media) is mentioned in the following table 4.10.

	Female		Male	
Age Group	**Frequency**	**%**	**Frequency**	**%**
1 month - 5 months	0	0	1	3.12
6 months - 11 months	1	4	2	6.25
1 Year – 4 Years	5	20	9	28.12
5 Years – 9 Years	3	12	4	12.5
10 Years – 14 Years	2	8	1	3.12
15 Years – 19 Years	0	0	1	3.12
20 Years – 29 Years	4	16	3	9.37
30 Years – 39 Years	3	12	8	25
40 Years – 49 Years	4	16	1	3.12
50 Years – 59 Years	3	12	2	6.25
60 Years – 69 Years	0	0	0	0
70 Years – 80 Years	0	0	0	0
Total	25		32	
	Total			25+32=57
	Percentage %			6.46

Table 4.10 Distribution of data among otitis media patients.

In the table 4.10 , otitis media was diagnosed the most among the 5 females (20%) and 9 males (28.12%) in 1-4 years age group. In the age group (1 month – 19 years) 11 females (44%) and 18 males (56.23%) were recorded and there was only 4 babies in the age group (1 month – 11 months) was diagnosed with otitis media. There were 11 otitis media female patients (44%) and 12 males (37.49%) in the age group (20-49 years). Only 3 females (12%) and 3 males (9.37%) are noted in the age group (50-80 years).Among all the participants in our study only 57 (6.46%) were diagnosed with otitis media.

Different GPs are compared in the following table 4.11 in terms of regimen they prescribed for otitis media patients.

PRESCRIBER'S STUDY NUMBER								
Antibiotics Prescribed	**GP1**	**GP2**	**GP3**	**GP4**	**GP5**	**GP6**	**GP7**	**TOTAL**
Amoxicillin/clavulanate (Augmentin®)1gm 1 bid For 5 days	0	2	0	0	1	3	0	6
Loracarbef (Lorabid®) 100mg susp. 5ml bid for 5 days	0	0	0	0	1	0	0	1
Cefpodoxime (Orelox®)) 50mg/5ml susp. 5ml bid for 5 days	0	0	1	1	3	1	0	6
Amoxycillin (Moxypen®) 250mg/5ml 5ml tds for 5 days	0	0	0	0	0	0	2	2
Amoxycillin/clavulanate (Amoclave®) 375mg 1 tds for 5 days	0	1	0	1	1	1	0	4
Amoxicillin/clavulanate (Ranclave®) 625 mg 1 tds for 5 days	0	1	0	0	0	1	0	2
Clarithromycin XL (Klacid®)500mg 1 OD for 5 days	0	0	2	0	0	1	0	3
Amoxycillin/clavulanate (Clavumox®) 375mg I tds for 5 days	0	0	0	0	0	1	0	1

Cefprozil (Procef®) 250mg 1 bid for 5 days	2	0	0	0	2	0	0	4
Erythromycin (Purmycin®) 500mg 1 qid for 5 days	0	0	1	0	0	0	0	1
Cefuroxime (Zinnat®) 250mg 1 bid for 5 days	4	0	0	0	0	0	0	4
Clindamycin (Clindahexal®) 150mg 2 bid for 5 days	0	0	0	0	0	1	0	1
Levofloxacin (Tavanic®) 500mg 1 OD for 5 days	0	2	0	0	0	0	0	2
Amoxicillin/clavulanate (Amoclave®) SF Susp 5ml tds for 7 days	0	1	0	0	0	1	0	2
Amoxicillin/clavulanate (Clamentin®) S Susp 5ml tds for 7 days	0	0	0	1	0	0	0	1
Sulphamethoxazole/trimethoprim (Bactrim®) DS and Metronidazole (Trichazole®) 400mg 1 bid and 1 tds for 5 days	0	0	0	1	0	0	0	1
Cefpodoxime (Orelox®)) 100mg 1 bid for 5 days	0	1	1	0	0	0	0	2
Amoxycillin (Moxypen®) 500mg + Metronidazole (Trichazole®) 200mg 1 tds each for 5 days	0	0	0	0	0	0	2	2
Clindamycin (Clindahexal®) 150mg 1 qid for 5 days	0	0	1	0	0	0	0	1
Cefprozil (Procef®) 250mg 1 bid for 5 days	0	0	0	0	1	0	0	1
Cefprozil (Procef®) 125mg/5ml 5ml bid for 7 days	0	0	0	0	2	1	0	3
Amoxycillin (Moxypen®) 125mg/5ml 5ml tds for 7 days	1	0	0	0	0	1	0	2
Cefaclor 375mg 1 bid for 5 days	0	0	0	0	0	1	0	1
Clarithromycin (Klacid®)125/5ml 5ml bid for 5 days	0	0	0	1	0	0	0	1
Cefaclor 250mg 1 tds for 5 days	0	0	0	0	0	0	0	0
Cefuroxime (Zinnat®) 500mg 1 bid for 5 days	1	0	0	0	0	0	0	1

Cefpodoxime (Orelox®)) Susp 10ml bid for 5 days	0	0	0	2	0	0	1	3
TOTAL	8	8	6	7	11	13	5	58

Table 4.11 Comparison among different prescribers in terms of their prescribing pattern among otitis media patients

Table 4.11 shows that cefpodoxime and amoxicillin/clavulanate 1gm are the drugs of choice.

4.9.4 Pharyngitis

The distribution of data among the different age groups and gender in terms of diagnosis (pharyngitis) is mentioned in the following table 4.12.

	Female		**Male**	
Age Group	**Frequency**	**%**	**Frequency**	**%**
1 month - 5 months	0	0	0	0
6 months - 11 months	1	3.12	1	4.16
1 Year – 4 Years	2	6.25	1	4.16
5 Years – 9 Years	2	6.25	1	4.16
10 Years – 14 Years	5	15.62	0	0
15 Years – 19 Years	1	3.12	1	4.16
20 Years – 29 Years	6	18.7	10	41.6
30 Years – 39 Years	10	31.2	7	29.3
40 Years – 49 Years	2	6.25	2	8.3
50 Years – 59 Years	3	9.49	1	4.16
60 Years – 69 Years	0	0	0	0
70 Years – 80 Years	0	0	0	0
Total	32	100	24	100
	Total			32+24=56
	Percentage %			6.35

Table 4.12 Distribution of data among Pharyngitis patients.

In the table 4.12, pharyngitis was most common among the 10 females (31.20%) in 30-39 years age group and 10 males (41.6%) in 30-39 years age group. In the age group (1 month – 19 years) 11 females (34.36%) and 4 males (16.64%) were recorded and there were only 1

male and 1 female baby in the age group (1 month – 11 months) diagnosed with pharyngitis. There were 18 pharyngitis female patients (56.15%) and 19 males (79.2%) in the age group (20-49 years). Only 3 females (9.49%) and 1 males (4.16%) are noted in the age group (50-80 years).Among all the participants in our study only 56 (6.35%) were diagnosed with pharyngitis.

Different GPs are compared in the following table 4.13 in terms of regimen they prescribed for pharyngitis patients.

	PRESCRIBER'S STUDY NUMBER							
Antibiotics Prescribed	**GP1**	**GP2**	**GP3**	**GP4**	**GP5**	**GP6**	**GP7**	**TOTAL**
Amoxicillin/clavulanate (Augmentin®)1gm 1 bid For 5 day	1	0	0	0	0	0	5	6
Cefpodoxime (Orelox®)) 50mg/5ml susp. 5ml bid for 5 days	0	0	1	5	0	0	0	6
Amoxicillin/clavulanate (Augmentin®) 1gm and Metronidazole (Flagyl®) 200mg 1 bid and 1 tds for 5 days	0	0	0	0	0	0	1	1
Amoxycillin (Moxypen®) 250mg 1 tds for 5 days	0	0	0	0	0	1	0	1
Ciprofloxacin (Ciprobay®) 500mg 1 bid for 5 days	0	0	0	0	0	0	1	1
Amoxycillin/clavulanate (Amoclave®) 375mg 1 tds for 5 days	1	0	0	1	1	0	0	3
Clarithromycin XL (Klacid®) 500mg 1 OD for 5 days	1	0	0	1	0	1	0	3
Amoxycillin/clavulanate (Clavumox®) 375mg I tds for 5 days	1	0	0	1	1	0	0	3
Cefprozil (Procef®) 250mg 1 bid for 5 days	1	0	0	0	0	0	0	1
Erythromycin (Purmycin®) 500mg 1 qid for 5 days	0	0	1	0	0	0	0	1

Cefuroxime (Zinnat®) 250mg 1 bid for 5 days	1	0	0	0	0	0	0	1
Clindamycin (Clindahexal®) 150mg 2 bid for 5 days	1	0	0	0	0	2	0	3
Levofloxacin (Tavanic®) 500mg 1 OD for 5 days	1	0	0	0	0	0	1	2
Amoxicillin/clavulanate (Amoclave®)SF Susp 5ml tds for 7 days	0	0	0	0	1 1	0	0	1
Amoxicillin/clavulanate (Clamentin®) S Susp 5ml tds for 7 days	0	0	0	1	0	0	0	1
Amoxycillin (Moxypen®) 500mg 1 tds for 5 days	1	0	0	0	0	0	0	1
Cefpodoxime (Orelox®)) 100mg 1 bid for 5 days	0	0	1	12	0	0	0	13
Cefprozil (Procef®) 250mg 1 bid for 5 days	0	0	0	1	0	0	0	1
Sulphamethoxazole trimethoprim (Purbac®) susp 5ml bid for 10 days	0	0	0	1	0	0	0	1
Azithromycin (Zithromax®) 500mg 1 OD for 3 days	0	1	0	0	0	1	0	2
Cefprozil (Procef®) 500mg 1 bid for 5 days	1	0	0	0	0	0	0	1
Gatifloxacin (Tequin®) 400mg 1 OD for 7 days	0	0	2	0	0	0	2	4
Cefpodoxime (Orelox®) Susp 10ml bid for 5 days	0	0	0	1	0	0	0	1
TOTAL	10	1	5	24	3	5	10	58

Table 4.13 Comparison among different prescribers in terms of their prescribing pattern among Pharyngitis patients

It is evident from table 4.13,cefpodoxime is prescribed to 13 patients and the 2nd favorite is amoxicillin/clavulanate.Some patients get clarithromycin.

4.9.5 Sinusitis

The distribution of data among the different age groups and gender in terms of diagnosis (sinusitis) is mentioned in the following table 4.14.

	Female		Male	
Age Group	**Frequency**		**Frequency**	
1 month - 5 months	0	0	0	0
6 months - 11 months	0	0	0	0
1 Year – 4 Years	0	0	3	8.9
5 Years – 9 Years	7	14	0	0
10 Years – 14 Years	2	4	3	8.9
15 Years – 19 Years	0	0	3	8.9
20 Years – 29 Years	12	24	6	17.6
30 Years – 39 Years	12	24	9	26.4
40 Years – 49 Years	13	26	4	11.7
50 Years – 59 Years	4	8	6	17.6
60 Years – 69 Years	0	0	0	0
70 Years – 80 Years	0	0	0	0
Total	50	100	34	100
	Total		50+34=84	
	Percentage %		9.53	

Table 4.14 Distribution of data among sinusitis patients.

In the table 4.14 , sinusitis was diagnosed among the 13 females (26%) in 40-49 years age group and 9 males (26.4%) in 30-39 years age group. In the age group (1 month – 19 years) 9 females (18%) and 9 males (26.7%) were recorded. There were 37 sinusitis female patients (74%) and 19 males (55.7%) in the age group (20-49 years). Only 4 females (8%) and 6 males (17.6%) were noted in the age group (50-80 years).Among all the participants in our study only 84 (9.53%) were diagnosed with sinusitis.

Different GPs are compared in the following table 4.15 in terms of regimen they prescribed for sinusitis patients.

PRESCRIBER'S STUDY NUMBER								
Antibiotics Prescribed	**GP1**	**GP2**	**GP3**	**GP4**	**GP5**	**GP6**	**GP7**	**TOTAL**
Amoxicillin/clavulanate (Augmentin®)1gm 1 bid For 5 days	3	3	0	1	0	0	2	9
Loracarbef (Lorabid®) 100mg susp. 5ml bid for 5 days	0	0	0	0	1	0	0	1
Ciprofloxacin (Ciprobay®) 250mg 1 bid for 5 days	0	0	0	1	0	0	0	1
Cefpodoxime (Orelox®)) 50mg/5ml susp 5ml bid for 5 days	0	0	1	0	0	0	0	1
Amoxicillin/clavulanate (Augmentin®) 1gm and Metronidazole (Flagyl®) 200mg 1 bid and 1 tds for 5 days	0	0	0	0	0	0	1	1
Ciprofloxacin (Orpic®) 500mg 1 bid for 5 days	0	0	0	1	0	0	0	1
Amoxycillin (Moxypen®) 250mg/5ml 5ml tds for 5 days	0	0	0	0	0	0	3	3
Amoxicillin/clavulanate (Augmentin®)1gm + Metronidazole (Trichazole®) 200mg 1 bid + 1 tds for 5 days	0	0	0	0	0	0	5	5
Amoxycillin/clavulanate (Amoclave®) 375mg 1 tds for 5 days	0	0	0	0	2	0	0	2
Clarithromycin XL (Klacid®) 500mg 1 OD for 5 days	0	0	3	0	0	0	0	3
Clarithromycin XL(Klacid®) 500mg 2 OD for 5 days	0	0	3	0	0	0	0	3
Amoxycillin/clavulanate (Clavumox®)375mg I tds for 5 days	1	0	0	1	1	0	0	3
Cefprozil (Procef®) 250mg 1 bid for 5 days	1	0	0	0	3	0	0	4
Sulphamethoxazole/trimethoprim (Purbac®) DS 1 bid for 5 days	0	0	0	1	0	0	0	1
Erythromycin (Purmycin®)	0	0	1	0	0	0	0	1

500mg 1 qid for 5 days								
Cefuroxime (Zinnat®) 250mg 1 bid for 5 days	0	0	2	0	0	0	0	2
Moxifloxacin (Avelon®) 400mg 1 OD for 5 days	0	0	0	1	0	0	0	1
Levofloxacin (tavanic) 500mg 1 OD for 5 days	1	1	0	0	0	0	2	4
Amoxicillin/clavulanate (Amoclave®)SF Susp 5ml tds for 7 days	3	0	0	0	0	0	1	4
Sulphamethoxazole/trimethoprim (Purbac®) DS and Metronidazole (Trichazole®) 400mg 1 bid each for 5 days	0	0	0	2	0	0	0	2
Amoxycillin (Moxypen®) 500mg 1 tds for 5 days	0	0	0	0	0	0	2	2
Cefpodoxime (Orelox®)) 100mg 1 bid for 5 days	0	0	1	8	4	0	0	13
Amoxycillin (Moxypen®) 500mg and Metronidazole (Trichazole®) 200mg 1 tds each for 5 days	0	0	0	0	0	0	1	1
Clindamycin (Clindahexal®) 150mg 2 bid for 6 days	0	0	0	0	0	1	0	1
Levofloxacin (Tavanic®) 250mg 1 OD for 5 days	1	0	0	0	1	0	0	2
Ciprofloxacin (Cifloc®) 250mg /Ciprofloxacin (Orpic®) 250mg 1 bid for 3 days	1	0	0	0	0	0	0	1
Cefaclor 375mg 1 bid for 5 days	0	0	0	0	0	1 0	0	1
Erythromycin (Purmycin®) 250mg/5ml 5ml qid for 5 days	0	0	1	0	0	0	0	1
Gatifloxacin (Tequin®) 400mg 1 OD for 7 days	1	0	1	2	0	0	5	9
Cefpodoxime (Orelox®)) Susp 10ml bid for 5 days	0	1	0	2	0	0	0	3
TOTAL	12	5	13	20	12	2	22	86

Table 4.15 Comparison among different prescribers in terms of their prescribing pattern among Sinusitis patients.

It is evident from table 4.15 that most of the doctors prescribed cefpodoxime to their patients (*n*=13).Some doctors prescribed amoxicillin/clavulanate to their patients (*n*=9).

4.9.6 Skin and soft tissue infection

The distribution of data among the different age groups and gender in terms of diagnosis (skin and soft tissue infection) is mentioned in the following table 4.16.

	Female		Male	
Age Group	**Frequency**	**%**	**Frequency**	**%**
1 month - 5 months	0	0	0	0
6 months - 11 months	0	0	0	0
1 Year – 4 Years	0	0	0	0
5 Years – 9 Years	0	0	0	0
10 Years – 14 Years	0	0	0	0
15 Years – 19 Years	0	0	0	0
20 Years – 29 Years	1	16.7	1	33.33
30 Years – 39 Years	3	50	0	0
40 Years – 49 Years	0	0	1	33.33
50 Years – 59 Years	1	16.7	1	33.33
60 Years – 69 Years	1	16.7	0	0
70 Years – 80 Years	0	0	0	0
Total	6	100	3	100
	Total		6+3=9	
	Percentage %		1.02	

Table 4.16 Distribution of data among patients with skin and soft tissue infections

The skin and soft tissue infections were recorded among the patients from age 20 years to 69 years (n=9).

Different GPs are compared in the following table 4.17 in terms of regimen they prescribed for patients with skin and soft tissue infections.

PRESCRIBER'S STUDY NUMBER								
Antibiotics Prescribed	**GP1**	**GP2**	**GP3**	**GP4**	**GP5**	**GP6**	**GP7**	**TOTAL**
Amoxicillin/clavulanate (Augmentin®)1gm 1 bid For 5 days	0	0	0	0	1	0	0	1
Ciprofloxacin (Ciprobay®) 250mg 1 bid for 5 days	0	1	0	0	0	0	0	1
Clarithromycin XL(Klacid®) 500mg 1 OD for 5 days	0	0	1	0	0	0	0	1
Erythromycin (Purmycin®) 500mg 1 qid for 5 days	0	0	1	0	0	0	0	1
Levofloxacin (Tavanic®) 500mg 1 OD for 5 days	1	0	0	0	0	0	0	1
Clindamycin (Dalacin®) C 150mg 2 bid for 5 days	0	1	0	0	0	0	0	1
Levofloxacin (Tavanic®) 250mg 1 OD for 5 days	0	0	0	0	1	0	0	1
Tetracycline 250mg 1 qid for 6 days	0	0	0	0	0	0	1	1
Amoxicillin/flucloxacillin (Macropen®) 500mg/ Amoxicillin/flucloxacillin (Megapen®) 500mg 1 tds for 5 days	0	0	0	0	0	0	1	1
TOTAL	1	2	2	0	2	0	2	9

Table 4.17 Comparison among different prescribers in terms of their prescribing pattern among patients with skin and soft tissue infection

It is evident from table 4.17 that there is no specific antibiotic prescribed in this regard.Doctors prescribed 9 different kind of antibiotics to their patients.

4.9.7 Tonsillitis

The distribution of data among the different age groups and gender in terms of diagnosis (tonsillitis) is mentioned in the following table 4.18

	Female		Male	
Age Group	**Frequency**	**%**	**Frequency**	**%**
1 month - 5 months	0	0	0	0
6 months - 11 months	0	0	1	4.16
1 Year – 4 Years	10	33.3	6	25
5 Years – 9 Years	2	6.6	3	12.5
10 Years – 14 Years	2	6.6	2	8.3
15 Years – 19 Years	2	6.6	1	4,16
20 Years – 29 Years	7	23.3	2	8.3
30 Years – 39 Years	6	20.27	8	33.42
40 Years – 49 Years	1	3.33	1	4.16
50 Years – 59 Years	0	0	0	0
60 Years – 69 Years	0	0	0	0
70 Years – 80 Years	0	0	0	0
Total	30	100	24	100
	Total		30+24=54	
	Percentage %		6.13	

Table 4.18 Distribution of data among tonsillitis patients.

In the above mentioned table .4.19 tonsillitis was diagnosed among the 10 females (33.3%) in the 1-4 years age group and 8 males (33.42%) in 30-39 years age group. In the age group (1 month – 19 years) 16 females (53.1%) and 13 males (54.12%) were recorded and there was only 1 male baby (4.16%) in the age group (1 month – 11 months) was diagnosed with tonsillitis. There were 13 tonsillitis female patients (46.9%) and 11 males (45.88%).

Different GPs are compared in the following table 4.19 in terms of regimen they prescribed for tonsillitis patients.

PRESCRIBER'S STUDY NUMBER								
Antibiotics Prescribed	**GP1**	**GP2**	**GP3**	**GP4**	**GP5**	**GP6**	**GP7**	**TOTAL**
Amoxicillin/clavulanate (Augmentin®) 1gm 1 bid For 5 days	1	1	0	1	1	4	0	8
Cefpodoxime (Orelox®)) 50mg/5ml susp 5ml bid for 5 days	0	0	2	0	1	0	0	3
Amoxycillin/clavulanate (Amoclave®) 375mg 1 tds for 5 days	3	0	0	0	6	3	0	12
Clarithromycin XL(Klacid®) 500mg 1 OD for 5 days	0	0	1	0	0	0	0	1
Cefpodoxime (Orelox®)) susp 5ml bid for 5 days	0	0	0	0	1	0	0	1
Amoxycillin/clavulanate (Clavumox®)375mg I tds for 5 days	0	0	0	0	2	1	0	3
Cefuroxime (Zinnat®) 250mg 1 bid for 5 days	0	0	1	0	0	0	0	1
Clindamycin (Clindahexal®) 150mg 2 bid for 5 days	0	0	0	0	0	2	0	2
Amoxicillin/clavulanate (Amoclave®) SF Susp 5ml tds for 7 days	0	0	6	0	2	0	0	8
Amoxicillin/clavulanate (Clamentin®) S Susp 5ml tds for 7 days	0	1	1	2	0	0	0	4
Cefpodoxime (Orelox®)) 100mg 1 bid for 5 days	0	0	2	1	0	0	0	3
Cefprozil (Procef®) 250mg 1 bid for 5 days	1	0	0	0	0	0	0	1
Cefprozil (Procef®) 125mg/5ml 5ml bid for 7 days	0	0	0	0	1	0	0	1
Erythromycin (Purmycin®) 250mg 1 qid for 5 days	0	0	0	0	0	1	0	1
Clarithromycin (Klacid®) 250mg/5ml 5ml bid for 5 days	0	1	0	0	0	0	0	1

Azithromycin (Zithromax®) 500mg 1 OD for 3 days	0	0	0	0	0	1	0	1
Amoxycillin (Moxypen®) 125mg/5ml 5ml tds for 7 days	0	0	0	0	0	1	0	1
Loracarbef (Lorabid®) 100mg 1 bid for 5 days	1	0	0	0	0	0	0	1
Cefpodoxime (Orelox®)) Susp 10ml bid for 5 days	0	0	0	0	1	0	0	1
TOTAL	6	3	13	4	15	13	0	54

Table 4.19 Comparison among different prescribers in terms of their prescribing pattern among tonsillitis patients

It is evident from table 4.19 , amoxicillin/clavulanate is the drug of choice for patients suffering from tonsillitis.

4.9.8 Upper respiratory tract infection

The distribution of data among the different age groups and gender in terms of diagnosis (upper respiratory tract infection) is mentioned in the following table 4.20.

	Female		Male	
Age Group	**Frequency**	**%**	**Frequency**	**%**
1 month - 5 months	0	0	0	0
6 months - 11 months	2	2.56	1	1.47
1 Year – 4 Years	7	7.5	8	11.7
5 Years – 9 Years	9	9.6	6	8.8
10 Years – 14 Years	11	11.8	4	5.8
15 Years – 19 Years	9	9.6	4	5.8
20 Years – 29 Years	18	19.3	13	19.11
30 Years – 39 Years	22	23.6	14	20.15
40 Years – 49 Years	8	8.6	11	16.66
50 Years – 59 Years	5	5.3	4	5.8
60 Years – 69 Years	1	1.07	2	2.9
70 Years – 80 Years	1	1.07	1	1.47
Total	93	100	68	100
	Total		93+68=161	
	Percentage %		18.25	

Table 4.20 Distribution of data among patients with upper respiratory tract infection.

Different GPs are compared in the following table 4. 21 in terms of regimen they prescribed for UTRI patients.

PRESCRIBER'S STUDY NUMBER								
Antibiotics Prescribed	**GP1**	**GP2**	**GP3**	**GP4**	**GP5**	**GP6**	**GP7**	**TOTAL**
Amoxicillin/clavulanate (Augmentin®)1gm 1 bid For 5 days	0	7	0	0	0	2	0	9
Loracarbef (Lorabid®) 100mg susp. 5ml bid for 5 days	2	0	0	0	2	0	0	4
Ciprofloxacin (Ciprobay®) 250mg 1 bid for 5 days	0	0	0	1	0	0	0	1
Cefpodoxime (Orelox®)) 50mg/5ml susp. 5ml bid for 5 days	0	1	0	0	0	0	0	1
Amoxycillin (Moxypen®) 250mg 1 tds for 5 days	2	0	0	0	0	1	0	3
Amoxycillin (Moxypen®) 250mg/5ml 5ml tds for 5 days	1	0	0	0	1	0	0	2
Amoxycillin/clavulanate (Amoclave®) 375mg 1 tds for 5 days	5	2	1	0	3	1	0	12
Amoxicillin/clavulanate (Ranclave®) 625 mg 1 tds for 5 days	1	14	0	0	0	0	0	15
Clarithromycin XL (Klacid®) 500mg 1 OD for 5 days	1	2	0	0	0	1	0	4
Amoxycillin/clavulanate (Clavumox®) 375mg I tds for 5 days	2	0	0	0	0	4	0	6
Cefprozil (Procef®) 250mg 1 bid for 5 days	2	1	0	0	2	2	0	7
Cefuroxime (Zinnat®) 250mg 1 bid for 5 days	1	8	1	0	1	0	0	11
Levofloxacin (Tavanic®) 500mg 1 OD for 5 days	1	8	0	0	0	0	0	9

Amoxicillin/clavulanate (Amoclave®) SF Susp 5ml tds for 7 days	2	7	1	0	0	0	0	10
Amoxicillin/clavulanate (Clamentin®) S Susp 5ml tds for 7 days	1	0	0	0	1	0	0	2
Amoxycillin (Moxypen®) 500mg 1 tds for 5 days	3	0	0	0	0	0	0	3
Cefpodoxime (Orelox®)) 100mg 1 bid for 5 days	8	25	0	1	1	0	0	35
Cefaclor 187mg/5ml 5ml bid for 5 days	0	2	0	0	0	0	0	2
Cefprozil (Procef®) 250mg 1 bid for 5 days	1	0	0	0	0	0	0	1
Clindamycin (Clindahexal®) 150mg 2 bid for 6 days	0	0	0	0	0	1	0	1
Cefprozil (Procef®) 125mg/5ml 5ml bid for 7 days	2	1	0	0	0	0	0	3
Ciprofloxacin (Cifloc®) 250mg /Ciprofloxacin (Orpic®) 250mg 1 bid for 3 days	0	2	0	0	0	0	0	2
Clarithromycin (Klacid®) 250mg/5ml 5ml bid for 5 days	0	1	0	0	0	0	0	1
Cefuroxime (Zinnat®) 125/5ml 5ml bid for 5 days	1	0	0	0	0	0	0	1
Azithromycin (zithromax) 500mg 1 OD for 3 days	0	0	0	0	0	2	0	2
Cefaclor 375mg 1 bid for 5 days	0	1	0	0	1	0	0	2
Clarithromycin (Klacid®)125/5ml 5ml bid for 5 days	1	1	0	0	0	0	0	2
Loracarbef (Lorabid®) 100mg 1 bid for 5 days	1	0	1	0	0	0	0	2
Cefprozil (Procef®) 500mg 1 bid for 5 days	1	0	0	0	0	0	0	1
Cefaclor 250mg 1 tds for 5 days	0	0	0	0	1	0	0	1

Gatifloxacin (Tequin®) 400mg 1 OD for 7 days	1	4	0	0	0	0	0	5
Cefpodoxime (Orelox®)) Susp. 10ml bid for 5 days	0	2	0	0	0	0	0	2
TOTAL	40	89	4	2	13	14	0	162

Table 4.21 Comparison among different prescribers in terms of their prescribing pattern among URTI patients

Table 4.21 clearly shows that most of the prescribed antibiotic in this regard is cefpodoxime (n=35).Some doctors prescribed amoxicillin/clavulanate to their patients.

4.9.9 Urinary tract infection (UTI)/Cystitis

The distribution of data among the different age groups and gender in terms of diagnosis (UTI) is mentioned in the following table 4.22

	Female		Male	
Age Group	**Frequency**	**%**	**Frequency**	**%**
1 month - 5 months	0	0	0	0
6 months - 11 months	0	0	0	0
1 Year – 4 Years	0	0	0	0
5 Years – 9 Years	0	0	0	0
10 Years – 14 Years	0	0	0	0
15 Years – 19 Years	0	0	0	0
20 Years – 29 Years	3	42.8	2	40
30 Years – 39 Years	0	0	0	0
40 Years – 49 Years	3	42.8	3	60
50 Years – 59 Years	0	0	0	0
60 Years – 69 Years	0	0	0	0
70 Years – 80 Years	1	14.4	0	0
Total	7	100	5	100
	Total		7+5=12	
	Percentage%		1.37	

Table 4.22 Distribution of data among UTI and cystitis patients.

In the table 4.22, UTI and cystitis were diagnosed among the 7 females and 5 males (n=12) in the 20-80 years age group which is 1.37% of the total number (n=882) of patients.

Different GPs are compared in the following table 4.23 in terms of regimen they prescribed for UTI/cystitis patients.

	PRESCRIBER'S STUDY NUMBER							
Antibiotics Prescribed	**GP1**	**GP2**	**GP3**	**GP4**	**GP5**	**GP6**	**GP7**	**TOTAL**
Ciprofloxacin (Ciprobay®) 250mg 1 bid for 5 days	0	1	0	0	0	0	0	1
Cefaclor 375mg 1 bid for 5 days	0	0	0	0	0	1	0	1
Ciprofloxacin (Orpic®) 500mg 1 bid for 5 days	0	0	0	1	0	0	0	1
Ciprofloxacin (Ciprobay®) 500mg 1 bid for 5 days	0	0	0	0	0	0	1	1
Levofloxacin (Tavanic®) 500mg 1 OD for 5 days	0	0	0	0	1	0	0	1
Ciprofloxacin (Cifloc®) 250mg /Ciprofloxacin (Orpic®) 250mg 1 bid for 3 days	2	0	0	2	0	2	0	6
Doxycycline (Doxycyl®) 100mg 1 bid for 5 days	0	0	0	0	0	0	1	1
TOTAL	2	1	0	3	1	3	2	12

Table 4.23 Comparison among different prescribers in terms of their prescribing pattern among UTI/cystitis patients

Table 4.23 indicates that ciprofloxacin is the drug of choice for this particular condition.Some doctors also tried cefaclor and levofloxacin .

4.9.10 others (medical conditions diagnosed other than those mentioned above

The distribution of data among the different age groups and gender in terms of diagnosis (others) is mentioned in the following table 4.24.

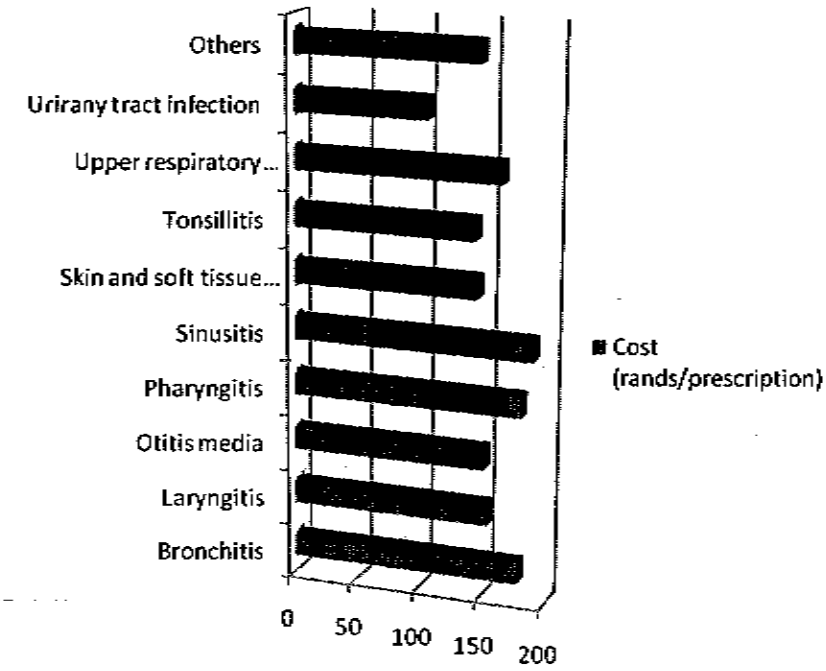
	Female		Male	
Age Group	**Frequency**	**%**	**Frequency**	**%**
1 month - 5 months	0	0	0	0
6 months - 11 months	2	1.76	1	1.07
1 Year – 4 Years	10	7.9	6	6.4
5 Years – 9 Years	7	5.5	7	7.5
10 Years – 14 Years	2	1.76	7	7.5
15 Years – 19 Years	10	7.9	9	9.6
20 Years – 29 Years	24	19	11	11.8
30 Years – 39 Years	24	19	16	17.37
40 Years – 49 Years	21	16.6	16	17.37
50 Years – 59 Years	15	11.9	12	12.9
60 Years – 69 Years	9	7.1	6	6.4
70 Years – 80 Years	2	1.58	2	2.1
Total	126	100	93	100
	Total		126+93=219	
	Percentage %		24.83	

Table 4.24 Distribution of data among patients with other infection.

In the table 4.25 different types of regimens were prescribed by different prescribers and most of the antibiotics were prescribed in the 20-49 years age group among the males and females. There were 126 females and 93 males which is about 24.83% of the total number of patients prescribed with different types of antibiotics.

4.10 Cost per prescription (South African Rands)

The cost per prescription (measured from July to October of 2003) to the patients diagnosed with different infections are given in the following graph 4.2.



Graph 4.2 Cost comparison

This price includes only cost of antibiotic prescribed to a patient. Usually each prescription contains more than 4 different items (antipyretics/analgesics, decongestants etc).

4.11 Duration of treatment

Duration of treatment (days) for different regimen prescribed by different prescribers are grouped in the following table 4.25.

Duration of Treatment (Days)	Frequency	Percent
3	12	1.4%
4	2	0.2%
5	725	82.3%
6	3	0.3%
7	119	13.4%
10	21	2.4%
Total	882	100.0%

Table 4.25 Comparison among the different duration of treatments

It is evident from the table, 725 regimens were prescribed for 5 days, 119 for 7 days, 21 for 10 days and 12 for 3 days. Duration is discussed at the very end because number of days of treatment affects cost per prescription.

Chapter 5

Discussion

This study sets out to explore the antibiotics prescribing pattern in private practice. This study aimed at understanding the antibiotics prescribing pattern among different doctors who prescribed different antibiotics for different infections at our clinic. This chapter is a discussion of the findings of the study. Topics discussed in this chapter are response rate, demographics of the study population, diagnosis made by doctors, regimens prescribed among different age groups, comparison of antibiotic groups, and frequency of antibiotic usage, comparison with essential drug list (EDL), and cost per antibiotic prescription.

5.1 The response rate

The response rate was almost 100%.as ,920 patients were attempted for our study, 38 patients was rejected due to lack of required information(n=13) and their refusal to sign a consent form (n=25). Actual sample comprised of 882 patients (55.3% females and 44.7% males) and analysis performed on data obtained for 882 patients. So data was collected for more than 900 patients giving a response rate of 100% but analysis is done on 98% of the estimated sample size.

5.2 Demographics of the study population

5.2.1 Patients' Age

The age range was 1month to 80 years .The mean age for the study population was 29.06 years, the median was 30 and mode was 31. In the age group (1 month – 11 months),there were only 6 females (1.22% of total female participants) and 9 males (2.3% of the total male participants).In the age group (1 year – 19 years),there were 136 females (27.86% of the total female participants) and 124 males (31.48% of the total male participants).In the age group (20 years – 49 years),there were 283 females (57.99% of the total female participants) and 204 males (51.76% of the total male participants).In the age group (50 years – 80 years),there were 63 females (12.92% of the total female participants) and 57 males (14.46% of the total male participants).

5.2.2 Patients' Gender

In our study population, there were 488 females (55.3%) and 394 males (44.7%).This means females respondents were more than males by 10.6%.

5.2.3 Prescribers' age

There were 7 prescribers who gave their consent to participate in our study and their age ranges from 39 years – 64 years. So mean is 48.1 years, mode 47 years and median is 45 years.

5.2.4 Prescribers' gender

There was only one female prescriber and 6 male prescribers who gave us consent to participate in our study.

5.3 Diagnosis

The study was conducted under 9 different types of diagnosis made by prescribers. There were 194 patients diagnosed with bronchitis (22%),29 patients with laryngitis (3.3%),58 patients with otitis media (6.6%),58 patients with pharyngitis (6.6%),86 patients with sinusitis (9.8%),9 patients with skin and soft tissue infection (1.0%),54 patients with tonsillitis (6.1%),162 patients with upper respiratory tract infection (18.4%),12 with urinary tract infection (1.4%) and 220 patients were diagnosed with ailments other than mentioned above (24.9%) and they were prescribed antibiotics. This study was started in the last week of July 2003 and ended in the last week of November 2003.So bronchitis and upper respiratory tract infections were more common among the adult patients.

5.4 Regimens

There were 75 different types of regimens prescribed by different doctors for different conditions. Prescribers requested the pharmacists to dispense as prescribed only. So no substitution was made unless authorized by prescriber. The study also concluded that the cepahlosporins (30.68%) was the most prescribed group among different antibiotics groups prescribed by the doctors. The 2nd popular group was penicillins (17.33) and 3rd was quinolones (13.33%).

5.4.1 Bronchitis

There were about 24 females (24.49% of the total female bronchitis patients) and 22 males (22.92% of the total male bronchitis patients) in the age group (30 years – 39 years).There were about 19.39% females and 12.5% males in the age group (20 years –

29 years) .In the age group (40 years – 49 years) there were 17.36% females and 12.5% males. So bronchitis was most common in age group (20 years -49 years) without much difference between males and females.GP3 (age 64) prescribed cefuroxime (Zinnat®) 250mg (1 tablet bid for 5 days) 17 times.GP4(age 44) prescribed cefpodoxime (Orelox®)) 100mg (1 tablet bid for 5 days) to 12 patients.GP7 (age 40) was the only doctor who prescribed combination of metronidazole with other antibiotics. So penicillins, cephalosporins, quinolones macrolides were the prevalent groups. According to EDL, the antibiotics suggested in the following order doxycycline>amoxicillin>erythromycin (only for those patients who are allergic to penicillin)[31]. According to antibiotic prescribing policies used in the south east region of England,the antibiotics are suggested in the following order amoxicillin>amoxicillin with clavulanic acid>tetracycline[32].

5.4.2 Laryngitis

There were 4 females (25% of the female laryngitis patients) and 2 males (15.38% of the male laryngitis patients) In the age group (30 years – 39 years).In total there were only 29 patients (3.29%) diagnosed with laryngitis .GP3 (age 64) prescribed clarithromycin XL 500mg (1 tablet bid for 5 days) to 6 patients, erythromycin (purmycin) 500mg (1 capsule qid for 5 days) to 3 patients and cefuroxime (zinnat) 250mg (1 tablet bid for 5 days) to 3 patients.Penicillins,cephalosporins,quinolones and macrolides were the dominant groups. Most common laryngitis is caused by virus,antibiotics may not help.[33]

5.4.3 Otitis media

There were 5 females (20% of the females prescribed with otitis media) and 9 males (28.12% of the males prescribed with otitis media) in the age group (1 year – 4

years).There were 57 patients (6.46%) prescribed with otitis media. Many patients were diagnosed with otitis media in the different age groups (6 months – 59 years).It is believed that otitis media is very rare in adults but in our study, many adults were diagnosed with otitis media and antibiotics were prescribed. Among the children amoxicillin and cefpodoxime (Orelox®)) suspension were the most prescribed antibiotics and among adults amoxicillin/clavulanate 1gm,cefuroxime (Zinnat®) 250mg and amoxycillin/clavulanate (Amoclave®) 375mg were prescribed.GP5 (age 54)and GP6 (age 39) were the main prescribers.Penicillins,cephalosoprins,macrolides,lincosamides and quinolones.GP7 was the only doctor who prescribed Sulphamethoxazole/trimethoprim (Bactrim®) DS in combination with metronidazole. Standard treatment guidelines for primary health care suggests, amoxicillin or sulphamethoxazole/trimethoprim (If patient is allergic to penicillin) [31] for the children but in our study none of the doctor prescribed sulfmethoxazole/trimethoprim alone.In 2002 , Shireman and Kelsey concluded that amoxicillin should continue to be used as first line therapy[24].

5.4.4 Pharyngitis

There were 10 females (31.2% of the females prescribed with pharyngitis) in the age group (30 years -39 years) and 10 males (41.6% of the males prescribed with pharyngitis) in the age group (20 years – 29 years).There were 56 patients (6.35%) diagnosed with pharyngitis from the age (6 months – 59 years).In the children cefpodoxime (Orelox®)) suspension was prescribed by most of the doctors. Amoxicillin/clavulanate 1gm, cefpodoxime (Orelox®)) 100mg and gatifloxacin (Tequin®) 400mg were prescribed for adults.GP4 (age 44) prescribed cefpodoxime (Orelox®)) 100mg to 12 patients and cefpodoxime (Orelox®)) suspension to 5 children.

5.4.5 Sinusitis

There were 13 females (26% of the females prescribed with sinusitis) in the age group (40-49 years) and 9 males (26.4% of the males prescribed with sinusitis) in the age group (30-39 years).There were 84 patients (9.53%) in total diagnosed with sinusitis. Sinusitis was diagnosed in the age group (1 year -59 years).Among the children, the drugs of choice were cefpodoxime (Orelox®)) suspension and amoxicillin/clavulanate Sf suspension. There were different regimens prescribed by different doctors but the most common were amoxicillin/clavulanate 1gm (1 tablet bid for 5 days), cefpodoxime (Orelox®)) 100mg (1 tablet bid for 5 days) and gatifloxacin (Tequin®) 400mg (1 OD for 7 days) and once again GP7 (age 40) was the only doctor who prescribed different combinations with metronidazole.GP4 (age 44) prescribed cefpodoxime (Orelox®)) 100 mg to 20 patients. EDL suggests amoxicillin or sulfamthoxazole/trimethoprim (only if patient is allergic to penicillin)[31] but none of the doctor prescribed sulphamethoxazole/trimethoprim to any of their patient however one doctor kept on prescribing metronidazole in combination with other antibiotics.In 2002, Emmer and Besser concluded that among children, the most narrow-spectrum agent active against likely pathogens should be the drug of choice[23].

5.4.6 Skin and soft tissue infection

There were only 9 patients (1.02%) in total ,6 females and 3 males in this category who were diagnosed with skin and soft tissue infection in the age group (20 years – 69 years).There were 9 different types of regimen equally prescribed.Penicillins, cephalosporins,quinolones , lincosamides,macrolides and tetracyclines were the dominant groups.Orett FA concluded that genital tract infections,urinary tract infections,skin/soft tissue infections and lower respiratory infections were the commonest

indications for antibiotic prescriptions.The antibiotics most commonly prescribed were ampicillin (53.4%),chloramphenicol(16.5%) and gentamicin(11.3%)[39].

5.4.7 Tonsillitis

There were 10 females (33.3% of the females prescribed with tonsillitis) in the age group (1-4years) and 8 males (33.42% of the males prescribed with tonsillitis) in the age group (30-39years).There were 54 patients (6.13%) in total who were diagnosed with tonsillitis. Tonsillitis was diagnosed among different age groups (1 year – 49 years).Amoxicillin/clavulanate SF suspension and cefprozil (Procef®) suspension were most commonly prescribed among the children. Again amoxicillin/clavulanate 1gm and amoxicillin/clavulanate 375mg were commonly prescribed among the adults. EDL suggests phenoxymethylpenicillin or for penicillin-allergic patients· erythromycin [31] but none of the doctor followed this regimen

5.4.8 Upper respiratory tract infection (URTI)

There were 22 females (23.6% of the females diagnosed with URTI) and 14 males (20.15% of the males diagnosed with URTI) in the age group (30-39 years).There were 161 patients (18.25%) who were diagnosed with URTI.URTI was diagnosed among different age groups (1 month – 80 years).Among children, cefpodoxime (Orelox®) suspension, Moxyopen® suspension, amoxicillin/clavulanate (Clamentin®) suspension and clarithromycin 25mg/5ml suspension were mostly prescribed regimens. Among adults amoxicillin/clavulanate 375mg, amoxicillin/clavulanate (Ranclave®) 625mg and cefpodoxime (Orelox®)) 100mg were commonly prescribed.GP2 (age 45) prescribed cefpodoxime (Orelox®)) 100mg to 25 patients. Emmer and Besser concluded in their

study that antibiotic treatment of adults with nonspecific upper respiratory tract infection does not enhance illness resolution or prevent complications and is therefore not recommended[23].Kasilo,OM.,Nathoo,S. and Nhachi, CF., compared the prescribing pattern between two hospitals and stated that the most common diagnosis included respiratory infections (39.4%),gastroenteritis(16.8%), malnutrition(10.4%),sepsis(9.6%) and AIDS (8.6%).The most frequently drug type was penicillin[34].Bjerrum L and colleagues compared general practioners' prescribing of antibiotics for respiratory tract infections in Spain and stated that the drugs of choice were penicillins and amoxicillin/clavulanate[37].

5.4.9 Urinary tract infection/cystitis

There were only 12 patients (7 females and 5 males) diagnosed with UTI/cystitis which is 1.37% of the total participants. Most of the patients were in the age group (20-49years) and there was only 1 patient in the age group (70-80years).Ciprofloxacin 250mg (1 bid for 3 days) was the most commonly prescribed regimen. Although some of the doctors prescribed cefaclor 375mg and doxycycline 100 mg to some of their patients. Wiffen and Mayon White made the recommendations in the following order, trimethoprim>nitrofurantoin>cephalosporins[32].Orett FA concluded that genital tract infections,urinary tract infections,skin/soft tissue infections and lower respiratory infections were the commonest indications for antibiotic prescriptions.The antibiotics most commonly prescribed were ampicillin (53.4%),chloramphenicol(16.5%) and gentamicin(11.3%)[39].

5.4.10 Others

There were 219 patients who were diagnosed with some infection but other than mentioned above .Many different types of regimens were prescribed and amoxicillin/clavulanate 1gm was the most popular regimen prescribed.

5.5 Duration of treatment

More than 82.3% antibiotics prescribed by different doctors were for 5 days duration and 13.4% for 7 days and only 2.4% for 10 days and most of the patients with UTI used antibiotics for only 3 days.

5.6 Frequency of antibiotics usage

According to our survey 8.3% patients used antibiotics less than 2 weeks before the start of study date, 3.5% less than 3 weeks before the start of study date, 5.7% less than 4 weeks before the start of study date, 6.1% less than 8 weeks before the start of study date and 25.9% more than 8 weeks before the start of study date. This may appear to be one of the causes of drug resistance. There were 50.5% participants who were not sure about this question. There were two possible reasons, they were using other pharmacies or they were visiting Medicross pharmacy for the very first time. So there was no record on local database.

5.7 Cost

The cost was measured during July,2003 to October,2003).Among sinusitis patients, the average cost was R188.00 , for pharyngitis it was R179.00,for bronchitis it was

R178.00,for URTI it was R162.00,for laryngitis it was R154.00,for Otitis media it was R151.00,for tonsillitis it was R142.00,for skin and soft tissue infection it was R144.00 and for UTI ,it was R103.00.So all the antibiotics prescribed by doctor were on average more than R100.00 per prescription which is very expensive if someone is not on any medical plan.

Chapter 6

Conclusion and recommendations

In the previous chapters, introduction to the study, literature review, methodology and results are discussed. In this chapter conclusions and recommendations are discussed briefly.

6.1 Conclusion

The use of very professional language to convince the people regarding the study and name of my University (Witwatersrand Johannesburg) played a major role in collecting data for more than 900 patients. Before starting my study at the Clinic, discussion with all the doctors played a major role to get my study done without any major problem.

During this study, bronchitis and upper respiratory tract infection was found very common during the period from July 2003- October 2003 and most affected age group was between 30-39years .There was no specific pattern followed by doctors at the clinic. One doctor prescribed metronidazole in combination with other antibiotics in most of his prescription. According to EDL, antibiotics are suggested in the following order doxycycline>amoxicillin>erythromycin (only for those patients who are allergic to penicillin).[31] among the children amoxicillin and cefpodoxime(orelox)) were the most commonly prescribed antibiotics.

Laryngitis is most commonly caused by virus but can be caused by bacteria as well[33].

In our study laryngitis was almost equally distributed among the different age groups (1year -59 years), Again there was no specific pattern followed by different doctors. One of the doctor liked clarithromycin XL 500mg tablets only.

Otitis media is most common among children but in our survey it was diagnosed among adults as well. Cefpodoxime (Orelox®)) suspension and clarithromycin suspension were most commonly prescribed and for adults amoxicillin/clavulanate 1gm and cepahlosporins were prescribed. Standard treatment guidelines for primary health care suggests, amoxicillin or sulphamethoxazole/trimethoprim (If patient is allergic to penicillin) for the children but in our study none of the doctor prescribed sulfmethoxazole/trimethoprim.

Pharyngitis is most commonly caused by virus and should not be treated with antibiotics [31] but it can also be caused by bacteria (Group A *streptococcus*) [33].In our study this was found most common in the age group (20 years – 39 years).Different types of antibiotics were prescribed by different doctors.

Sinusitis refers to inflammation of the sinuses. This is generally caused by a viral or bacterial infection[16] .This was found more common among the patients in the age group (5 years- 59 years).EDL suggests amoxicillin or sulfamthoxazole/trimethoprim (only if patient is allergic to penicillin) but none of the doctor prescribed sulphamethoxazole/trimethoprim to any of their patient however one doctor kept on prescribing metronidazole in combination with other antibiotics.

Tonsillitis is extremely common, particularly in children but in our study it was also among adults most commonly in the age group (30-39 years).EDL suggests

phenoxymethylpenicillin or for penicillin-allergic patients· erythromycin but none of the doctor followed this regimen. Cefpodoxime (Orelox®)) and amoxicillin/clavulanate 1gm were the most commonly prescribed antibiotics among adults.

Different regimens were used for different types of infection other than mentioned above and average cost per prescription was about R140.00.This cost included only antibiotics. If we would have included analgesics, antipyretics, decongestants and others, it might go above R300.00 which was not affordable for a patient who could not afford any medical plan. This cost did not include medical tests and consultation at the doctors' office.

So in conclusion, our study resulted in many important findings.

- The study revealed that some of the patients might have been misdiagnosed.
- There was no clear strategy or policy in place in prescribing antibiotics to the different age groups of the patients.
- Some of the patients were found using antibiotics too often leading to antibiotics resistance (as per patient, a particular kind of antibiotic is not working anymore) .

6.2 Recommendations of the study

While going through data of this survey, many recommendation emerged which might be of help in promoting proper antibiotics usage among the study population and others like this one.

6.2.1 Patients and the general community education

- Educate patients and the general community on the appropriate use of antimicrobials.
- Educate patients on the importance of measures to prevent infection, such as immunization etc.
- Educate patients on simple measures that may reduce transmission of infection in the household and community, such as hand washing, food hygiene, etc.
- Encourage appropriate and informed health care seeking behavior.
- Educate patients on suitable alternatives to antimicrobials for relief of symptoms and discourage patient.

6.2.2 Presribers and dispensers education

- Educate all groups of prescribers and dispensers (including drug sellers) on the importance of appropriate antimicrobial use and containment of antimicrobial resistance.
- Educate all groups of prescribers on disease prevention (including immunization) and infection control issues.
- Promote targeted undergraduate and postgraduate educational programs on the accurate diagnosis and management of common infections for all health care workers, veterinarians, prescribers and dispensers.
- Encourage prescribers and dispensers to educate patients on antimicrobial use and the importance of adherence to prescribed treatments.
- Educate all groups of prescribers and dispensers on factors that may strongly influence their prescribing habits, such as economic incentives, promotional activities and inducements by the pharmaceutical industry.

6.2.3 Management, guidelines and formularies

- Improve antimicrobial use by supervision and support of clinical practices, especially diagnostic and treatment strategies.
- Audit prescribing and dispensing practices and utilize peer group or external standard comparisons to provide feedback and endorsement of appropriate anti-microbial prescribing.
- Encourage development and use of guidelines and treatment algorithms to foster appropriate use of antimicrobials.
- Empower formulary managers to limit antimicrobial use to the prescription of an appropriate range of selected antimicrobials.
- Link professional registration requirements for prescribers and pharmacists to requirements for training and continuing education.

6.3 Recommendations for further study

Many participants reported that they did not finish the last antibiotic course because they were feeling perfect after few days. So survey on compliance can also be done

Many participants were using different doctors, so there is a communication gaps between the doctors. A survey can further be conducted to know the actual number of antibiotics prescription per patient by communicating with the other doctors.

A specific antibiotics prescribing formulary may be made mandatory to follow and then survey about the compliance with formulary can be conducted.

Continuing education (CE) with special reference to prescribing antibiotics can be arranged and then a comparative study can be conducted to know the antibiotics prescribing pattern before CE and after CE.

Patients can be educated about the proper and safe usage of antibiotics and then study can be conducted about the patient's compliance.

A survey about the outcome of a pharmaceutical representative visit to a doctor's office can be arranged to know the effect of this meeting over the antibiotics prescribing pattern.

On the basis of information on antibiotic resistance pattern, an antibiotic formulary may be drafted for the sample population.

This study should be extended for a full year analysis of antibiotic prescribing because antibiotic prescribing may differ in protocol every year and then a comparative research may be conducted.

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Appendices

APPENDIX A1
Department of Pharmacy and Pharmacology
Medical School
University of Witwatersrand

Antibiotics prescribing pattern in private practice. **June 2003**

Dear patient,

I am a pharmacist at Medicross Family Clinic and a student of Masters of Science in Medicine (Pharmacotherapy) at the University of Witwatersrand. I am doing this survey to fulfill the requirements of my Master's degree. You are being invited to take part in this study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully. This study is to explore the prescribing pattern of antibiotics in private practice. Take time to decide whether you wish to take part or not.

If you do decide to participate in this study, data related to the diagnosis made and antibiotics prescribed by your doctor will be collected. The information may help us to understand the antibiotics prescribing pattern for a particular illness.

Participation is completely voluntary. You are still free to withdraw at any time and without giving any reason. This will not affect the standard of care you receive here. This study will take approximately four months.

This study will be privately funded and you will not be paid to participate in this study.

Please note that your name will never be disclosed, only the study number will be used during the data collection. All information which is collected during the course of study will be kept strictly confidential. Any information about you, which leaves the Medicross Clinic, will have your name and address removed so that you cannot be recognized from it. You will also be asked to sign a consent form.

If you would like more information on this study, please contact me.

Thank you very much for your assistance

Javed Ahmad (B.Pharm; M.Phil.)

Working at: Pharmacross dispensary Medicross Family Clinic Boksburg.
Student at: Department of Pharmacy and Pharmacology Wits Medical School

Telephone numbers:
(w) 011-918-4046
(H) 011-826-5835
(Cell) 083-733-8036

APPENDIX A2

CONSENT FORM FOR SURVEY ON ANTIBIOTICS PRESCRIBING PATTERN

Study number: ---------- **Date ----------**

- I confirm that I have read and understand the information sheet for the above study and have had the opportunity to ask questions.

- I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.

- I also understand that the information given during this study will be used for the purpose of this study only.

- I agree to take part in the above study.

Signed ---------- Signed ----------

Participant Researcher: Javed Ahmad

Date _____ Date _____

APPENDIX B1

Department of Pharmacy and Pharmacology
Medical School
University of Witwatersrand

Antibiotics prescribing pattern in private practice. **June 2003**

Dear doctor,

I am a pharmacist at Medicross Family Clinic and a student of Masters of Science in Medicine (Pharmacotherapy) at the University of Witwatersrand. I am doing this survey to fulfill the requirements of my Master's degree. You are being invited to take part in this study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully. This study is to explore the prescribing pattern of antibiotics in private practice. Take time to decide whether you wish to take part or not.

If you do decide to participate in this study, data related to the diagnosis made and antibiotics prescribed by you for a patient, will be collected. The information may help us to understand the antibiotics prescribing pattern for a particular illness. This study does not base on any type of judgment.

Participation is completely voluntary. You are still free to withdraw at any time and without giving any reason. This will not affect our working relationship in any way. This study will take approximately four months.

This study will be privately funded and you will not be paid to participate in this study.

Please note that your name will never be disclosed; only the names like doctor a, doctor B will be used during the data collection. All information which is collected during the course of study will be kept strictly confidential. Any information about you, which leaves the Medicross Clinic, will have your name and address removed so that you cannot be recognized from it. You will also be asked to sign a consent form.
If you would like more information on this study, please contact me.

Thank you very much for your assistance

Javed Ahmad (BPharm; M.Phil.)

Working at: Pharmacross dispensary Medicross Family Clinic Boksburg.
Student at: Department of Pharmacy and Pharmacology Wits Medical School

Telephone numbers:

(w) 011-918-4046
(H) 011-826-5835 (Cell) 083-733-8036

APPENDIX B2

CONSENT FORM FOR SURVEY ON ANTIBIOTICS PRESCRIBING PATTERN

Doctor's identification number: ---------- Date ----------

- I confirm that I have read and understand the information sheet for the above study and have had the opportunity to ask questions.

- I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.

- I also understand that the information given during this study will be used for the purpose of this study only.

- I agree to take part in the above study.

Signed ---------- Signed ----------
Dr.ABCD Researcher: Javed Ahmad
Qualification: ----------

Date _____ Date _____

APPENDIX C

Data Collection Form

Antibiotics Prescribing Pattern. **Study number**	
Date	
Gender	**Male / Female**
Age	
Prescriber's Study number	
Gender	**Male / Female**
Age	
Diagnosis	**Bronchitis** **Sinusitis** **Otitis Media** **Skin & Soft Tissue infection** **Other**
Antibiotics Prescribed	
Dosage	
Duration of treatment	
Frequency of antibiotics usage	**Two weeks before** **Three weeks before** **Four Weeks before** **Eight weeks before**
Cost per script	

Appendix D (Postgraduate committee approval letter)

Faculty of Health Sciences
UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

7 York Road PARKTOWN Johannesburg 2193 Telegrams WITSMED Telex 4-24655 SA
FAX 643-4318 TELEPHONE 717-2075/2076
E-MAIL healthpg@health.wits.ac.za

MR J AHMAD
P O BOX 14690
WITFIELD
BOKSBURG
1407

APPLICATION NUMBER 0214770R
STATUS (DEG 1.9) (MM1044) PZZ

2003-07-01

Dear Mr Ahmad

Approval of protocol entitled Antibiotics prescribing pattern in private practice

I should like to advise you that the protocol and title that you have submitted for the degree of Master Of Science In Medicine (Part-Time).(Coursework) have been approved by the Postgraduate Committee at its recent meeting. Please remember that any amendment to this title has to be endorsed by your Head of Department and formally approved by the Postgraduate Committee.

Prof AGS Gous has/have been appointed as your supervisor/s. Please maintain regular contact with your supervisor who must be kept advised of your progress.

Please note that approval by the Postgraduate Committee is always given subject to permission from the relevant Ethics Committee, and a copy of your clearance certificate should be lodged with the Faculty Office as soon as possible, if this has not already been done.

Yours sincerely

S Benn (Mrs)
Faculty Registrar
Faculty of Health Sciences

Telephone 717-2075/2076

Copies - Head of Department_____Supervisor/s

Plus your career and first year curriculum online - square our website: www.wits.ac.za/c62
The University seeks to serve South Africa by furthering access to equal opportunity while [illegible]

Appendix E (committee for research on Human Subjects)

16-MAR-2006 12:18 [illegible]

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Division of the Deputy Registrar (Research)

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
R14/99 Ahmad

CLEARANCE CERTIFICATE	PROTOCOL NUMBER 03-07-28
PROJECT	Antibiotics Prescribing Patterns in Private Practice
INVESTIGATORS	Mr J Ahmad
DEPARTMENT	School of Clinical Medicine
DATE CONSIDERED	03-07-25
DECISION OF THE COMMITTEE*	Approved unconditionally

DATE 03.07.31 CHAIRPERSON [signature] (Professor P B Cassel-Jones)

*Guidelines for written "informed consent" attached where applicable

cc: Supervisor: Prof A Goss
School of Clinical Medicine

DECLARATION OF INVESTIGATOR(S)
To be completed in duplicate and ONE COPY returned to the Secretary at Room 10005, 10th Floor, Senate House, University.
I/We fully understand the conditions under which I/we are authorized to carry out the above-mentioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. I agree to a completion of a [illegible] report.

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

[illegible]

Appendix F (Permission from Medicross Clinic Boksburg)

BOKSBURG FAMILY MEDICAL CENTRE

Dr J Greyling and Associates No 9 Incorporated
Company registration number 95/09647/21
Trading As Boksburg Family Medical Centre
PR. No 1537660
Cnr Trichardt & North Rand Rd
BOKSBURG
P.O. Box 26077 EAST RAND 1462
Tel: (011) 918 4040/7
Fax: (011) 918-4048/918-5775
Managed by Mediscross Healthcare Group (Pty) Ltd
Company Registration no. 92/02328/07.

05/06/003

To whom it may concern.

*Mr. Javed Ahmed employed at Medicross Boksburg as Pharmacist has been granted permission to conduct his study titled "**Antibiotic Prescribing pattern in Private Practice**" at our Medicross Family Clinic Boksburg*

This decision has been taken after receiving the protocol and other supportive material. We hope this study will have a positive effect in the future patient care program in our organization.

This is a great pleasure to host this study in our clinic.

Dr FM Coetsee	*E wil Pierse*	*Erik de Jager*
Managing Med. Practitioner	*Pharmacy Manager*	*Practice Manager*

Dr FM Coetsee M.B.Ch.B (Pret) Dr JC Oosthuizen M.B.Ch.B (Pret)
Dr WJE Smit M.B.Ch.B.M.Sc. (Sports)(Pret) Dr U Buckstey M.B.B.Ch. (Wits)
Dr JE du Toit M.B.Ch.B. (Pret) Dr MF Jordaan M.B.B.Ch. (Wits)