EVALUATION OF PRIMARY NON-COMPLIANCE WITH DISCHARGE MEDICATION AT A PRIVATE HOSPITAL

A dissertation submitted by

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DECLARATION

I, Daniel Frederik Kruger, hereby declare that Evaluating Primary Non-Compliance at a Private Hospital and all the work on which this dissertation is based, is original, except where acknowledgements indicate otherwise.

This dissertation is submitted for the degree MSc (Med) in Pharmacy at the University of Limpopo, Medunsa Campus. Neither the whole document nor any part of it has been submitted for any other degree or examination, at this or any other University.

Signed: _____ on the _____ day of _____ 2009.

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ABSTRACT

Background: When a patient is discharged from the hospital, the doctor may prescribe medication to be used at home which is called TTO (To Take Out) medication. Failure by the patient to collect TTO medication might be intentional or may indicate a lack of appropriate structures and procedures at the hospital to provide such care on discharge, and/or failure by the health care professionals to reach concordance with the patient to ensure that he/she continues to take medications as prescribed.

Objectives: The purposes of this study were to examine the prevalence of primary non-compliance with medication in this private hospital and to explore its association with various factors contributing to its existence.

Methodology: The study was conducted at a private hospital in Gauteng, South Africa. The study focused on discharged patients who did not redeem their TTO medication. Thus only patients discharged from the hospital within a thirty day period between 25 May 2009 and 23 June 2009 were included in the study. For each subject the discharge medication prescription was reviewed and the following determined: number of items prescribed, number of items dispensed at the hospital pharmacy, whether any items were non-dispensed, whether any items were partially dispensed and reason for any item non-dispensed or partially dispensed. A telephone call was made to those subjects for whom a discharge medication script was prescribed, but no medication was dispensed at discharge. Information was collected from the patients to identify possible reasons for not redeeming discharge medication.

Results: In total 1365 records were evaluated. TTO medication was prescribed for 1161 (85%) patients discharged. All items were redeemed in full by 854 (74%) of the patients, 118 (10%) patients redeemed no discharge medication, 101 (9%) patients redeemed only some items prescribed, 74 (6%) patients redeemed all items partly, 14 (1%) patients redeemed some items partly and some not at all and for seven

patients details were not known. Four reasons and five types of medication together accounted for 54% of the total value not redeemed. The four reasons include the following: medical aid TTO rules, patient unaware of TTO being prescribed, ward stock given, patient still had stock at home, and the types of medication included: blood and haematopoietic agents, analgesics, antimicrobials, agents of the gastrointestinal tract and unclassified.

Conclusion: Some patients reported that they took own decision not to redeem the medication and some still had stock at home, a fact that should lead healthcare providers to ensure that they reach concordance with their patients.

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ABBREVIATIONS

HC - High Care Unit

NN - Neonatal

WA - Ward A

WB - Ward B

WC - Ward C

WD - Ward D1 and D2

WE - Ward E

WF - Ward F

WJ - Ward J

WK - Ward K

WL - Ward L

IC - Intensive Care Unit

TTO - To Take Out

PAB - Physician Advisory Board

MREC – Medunsa Research and Ethics Committee

CHAPTER 1: INTRODUCTION AND STATEMENT OF THE PROBLEM

1.1 Background

Hippocrates described the importance of patient compliance over 2000 years ago, but the issue continues to generate intense debate (Bell, 2007: 710). Hippocrates advised the physician, "… to be alert to the faults of the patient which make them lie about their taking of the medicines prescribed and when things go wrong, refuse to confess that they have not been taking their medicines". (Murphy, 2007, p. 239).

Clinicians spend a great deal of time designing what they believe to be the best plan of care for their patients. However, even the best intervention plans will fail in the absence of patient participation (Hall & Brody, 2005: 36).

After a consultation with a health professional, patients may behave in very different ways. Some will follow all the instructions to the letter, some will follow some instructions for some time, and some will ignore the instructions all together. Patients may not collect prescriptions once they go home. Some patients may never return and drop out of treatment after the first consultation. This causes a problem for health professionals, but it should be seen as part of the therapeutic process to understand the reasons why this non-compliance occurs (Alder, 1999).

Compliance or lack thereof affects us all. One of the most understated problems in the delivery of health services is patient non-compliance, its occurrence and impact on the health services and its associated outcomes if allowed to continue without intervention. Health professionals need to see influenced patient compliance as a required role of obligation (Fincham, 2007).

Compliance and adherence relate to the medicine-taking behaviour of the patient. Compliance and adherence can be estimated using prescription claims records, pharmacy dispensing data, validated survey instruments or electric pill counters, as well as direct measures such as serum drug levels (Bell, 2007: 710).

The terms compliance, adherence, and therapeutic alliance are often used to discuss the extent to which a patient's behaviour coincides with the medical advice. Some feel that the term compliance is too dictatorial on the part of the caregiver, and seems to neglect the philosophy of "patient as partner" in determining the plan of care (Hall & Brody, 2005: 36).

On the other hand the term concordance is not synonymous with either compliance or adherence. Concordance does not refer to a patient's medicine-taking behaviour, but rather the nature of the interaction between clinician and patient. It is based on the notion that consultations between clinicians and patients are a negotiation between equals. How individual patients value the risks and benefits of a particular medicine may differ from the value assigned by their clinicians. In adopting a concordant approach clinicians should respect the rights of patients to decide whether or not to take prescribed medicines. The aim of concordance is the establishment of a therapeutic alliance between the clinician and patient. Concordance is synonymous with patient-centred care. Non-concordance may occur if a therapeutic partnership is not established and therefore may denote failure of the interaction (Bell, 2007: 710).

Understanding the reasons for non-compliance is not always so simple. Patient-related reasons for non-compliance may include forgetfulness, the decision to omit doses, lack of information and emotional factors. Clinician-related reasons may include prescription of complex regimens, failing to explain the benefits and side-effects of treatment, not giving consideration to a patient's lifestyle or the cost of medicines, and having a poor therapeutic relationship with the patient. Most traditional methods of assessing medicine taking do so quantitatively, and provide little insight into the reasons for non-compliance. These methods may lead clinicians to attribute non-compliance to patient-related reasons. Greater use of qualitative research techniques may reveal that the reasons for non-compliance also lie in the way clinicians work and the healthcare system operates. The use of a concordant

approach in clinical practice may be one mechanism by which non-compliance can be better understood and addressed (Bell, 2007: 710).

Patient non-compliance with medication may be divided into primary non-compliance, where the patient for some reason fails to have the medicine dispensed, and secondary non-compliance, where the patient does not take the medication as prescribed. Most studies have focused on secondary non-compliance. However, it is crucial to determine whether patients actually redeem their prescriptions from the pharmacy, because this is the first step in the complex phenomenon of compliance. When non-compliance is recognized, the pharmacist is in a good position to offer support to the patient. There are several types of non-compliance, as well as degrees or levels of compliance (Murphy, 2007, p. 241).

1.2 Types of Non-Compliance

- Unintentional non-compliance
- Erratic non-compliance
- Intentional non-compliance

Unintentional non-compliance is when the patient may want to take a medicine but is prevented from doing so by barriers (Murphy, 2007, p. 243).

Erratic non-compliance is where medication use alternates between fully compliant (when patient is symptomatic) and under-use or total non-use (when patient is asymptomatic) (Murphy, 2007, p. 243).

Some patients purposely discontinue or change the dose of their medication. This deliberate non-compliance is called intentional non-compliance, reflecting a reasoned choice by the patient. Research has shown that these 'to-take-or-not-to-take' decisions are influenced by patient beliefs. Patients who are asymptomatic may decide not to take the prescribed medication. Intentional non-compliance is where the move from compliance to concordance may lead to improved management for individual patients (Murphy, 2007, p. 243).

Primary non-compliance is often overlooked as a potential contributor to failed therapy, and this aspect of non-compliance deserves further study (Jackevicius, Li, & Tu, 2008, p. 1028).

1.3 Patterns and Reasons for Medication Non-Compliance

The World Health Organization has published five categories of non-compliance:

- Patient factors--physical impairments (e.g., visual problems, impaired dexterity, cognitive impairment, psychological/behavioural issues, younger age)
- Conditions that are asymptomatic and chronic in nature, mental health disorders
- Therapy-related factors (e.g., complexity of regimen, side effects)
- Socioeconomic factors (e.g., low literacy, higher medication costs, poor social support)
- Health system problems--poor provider-patient relationship, poor communication, lack of access to care, lack of continuity of care (Ho, Bryson, & Rumsfeld, 2009)

Medication compliance is a pervasive problem resulting in significant morbidity and mortality. Compliance with medication is a complex health behaviour and there are many risk factors associated with decreased compliance. Improved medication compliance results in improved humanistic, clinical and economic outcomes (Tabor, 2004).

Although medication compliance has been studied widely, little is known about primary non-compliance (Wroth & Pathman, 2006).

1.4 Research Rationale

Pharmacy as a profession has re-orientated its practice from a clinical service model to a pharmaceutical care model, a practice philosophy with parallels to the concept and goals of the patient centred care model adopted by medicine: Both models

proclaim a commitment and responsibility to enhance outcomes for patients through developing an alliance between the profession and the patient. Pharmaceutical care is uniquely focused on the pharmacist's responsibility for the patient's drug related needs. Those needs are not limited to specific clinical problems and goals but to all of the patient's medications, medical conditions, and outcome parameters. (Ballantyne, 2007).

When a patient is discharged from the hospital, the doctor may prescribe medication to be used at home which is called TTO (To Take Out) medication. This medication plays a vital role in the patient's recovery process and helps to prevent complications and provide relief after hospitalization.

Failure by the patient to collect TTO medication might be intentional or may indicate a lack of appropriate structures and procedures at the hospital to provide such care on discharge, and/or failure by the health care professionals to reach concordance with the patient to ensure that he/she continues to take medications as prescribed.

Non-compliance is considered as a widespread but often neglected problem all over the world. In order to promote compliance, it is essential to first know the current drug use situation (Arslan & Semin, 2006)

This study was based on the observation that some patients failed to redeem their discharge medication after hospital discharge.

1.5 Aim of the Study

The purposes of this study were to examine the prevalence of primary non-compliance with discharge medication in a Private Hospital and to explore its association with various factors contributing to its existence.

1.6 Objectives of the Study

The objectives for the study were as follow:

1. To determine the number of patients discharged, the percentage of patients with TTO prescriptions, and the percentage of TTO prescriptions collected during the study period
2. To determine the average value of a discharge prescription
3. To determine the value of TTO prescriptions not collected
4. To determine the types of TTO medication for which primary non-compliance was observed most frequently
5. To determine possible problems with TTO prescriptions and possible reasons for primary non-compliance

CHAPTER 2: LITERATURE REVIEW

Medication non-compliance may occur at different points in a patient's decision-making process. It may occur at the start of therapy if a patient receives the initial prescription but does not fill it, or it may occur after therapy has started if the patient fails to follow the instructions or fails to refill the prescription. Both types of non-compliance are important. Primary non-compliance may be seen as a more severe form of non-compliance in that the patient fails to comply with the physician's treatments plan from the outset by not filling the initial prescription (Jackevicius, Li, & Tu, 2008).

Patient's compliance with medication is a prerequisite for effective drug therapy. Non-compliance is a major public health problem that imposes a considerable financial burden on the health care system. Despite the comprehensive research on compliance during the last decades, non-compliance remains a concern in health care. There is still a need for studies on correlates of non-compliance because the complex phenomenon of non-compliance is far from understood. It has been suggested that the social context in which non-compliance occurs should not be ignored (Johnell, Lindstrom, Sundquist, Eriksson, & Merlo, 2006).

2.1 Patient Related Factors and Non-Compliance

Patient characteristics have been the focus of numerous investigations of compliance. Non-compliance can be of an initial, intentional or unintentional type or of premature discontinuation. Initial non-compliance (primary non-compliance) rates of about 13 to 25 percent are reported in terms of never filling a prescription. The variations in patient compliance are a function of methodological and contextual factors in compliance research. It is important to examine the enabling patient attributes, which is the first step to designing effective interventions (Fincham, 2007).

Socioeconomic status has not consistently been found to be an independent predictor of compliance. Some factors that are reported significant are: poor

socioeconomic status, poverty, illiteracy, low level of education, unemployment, lack of effective social support networks, unstable living conditions, distance from treatment centre, high cost of transportation, high cost of medication, changing environment situations as well as culture and lay beliefs about illness and treatment. Income specifically and not general socioeconomic status has a positive and significant effect on patient compliance (Fincham, 2007).

Patient related factors affecting compliance are forgetfulness, psychosocial stress, misunderstanding and non-acceptance of the disease, disbelief in the diagnosis, lack of perception of the health risks related to the disease, misunderstanding of the treatment instructions, lack of acceptance of monitoring, low treatment expectations, lack of self perceived need for treatment, lack of perceived effect of treatment, negative beliefs regarding the efficacy of the treatment, anxieties about possible adverse effects, low motivation, inadequate knowledge of treatment, low attendance at counselling, frustration with health care providers, fear of dependence and over complexity of the drug regimen (Fincham, 2007).

Perceptions of personal need for medication are influenced by symptoms, expectations, experiences and by illness cognitions. Though it is a waste to the health care system, non-compliance also represents a rational choice as patient's attempts to maintain their personal identity, achieve their goals and preserve their quality of life (Fincham, 2007).

2.2 Health Professionals Attributes to Compliance

Poor compliance is a remedial problem in health care quality and its improvements and accountability offer shared opportunities for providers and patients. Physician communication style and patient satisfaction have both been shown to be predictive of better medication compliance. The quality of the interactive process has also been reported to be critical to the establishment and shaping of the therapeutic patient-physician relationship (Fincham, 2007).

Healthcare providers do not frequently suspect that their patients are not taking their medication as prescribed, and patients rarely volunteer this information to their doctors, so compliance often goes undetected (Fincham, 2007).

Pharmacists and other non-physicians have always been part of the system of checks and balances in the healthcare delivery. As the provision of health services changes, pharmacists are well positioned to intervene in patient care and have documented and demonstrated that the value of pharmacy services goes beyond dispensing. These include provision of cognitive services such as compliance programs. Pharmacy practice and provider characteristics may be facilitators or barriers to providing effective compliance enhancing interventions to patients (Fincham, 2007).

2.3 Factors Affecting Compliance

- Satisfaction with care:

  The more the care provided in a patient centred approach, the greater the patients satisfaction and likelihood of compliance.

- Communication:

  Communication (regardless of the type) must be seen as the key component for increasing compliance.

- Age:

  The age of the patient has been shown to positively affect, negatively affect or to have no effect upon compliance. The vast majority of studies have shown no significant correlation between age and compliance.

- Gender:

  Gender has not been shown to be a reliable predictor of compliance. Compliance is a major problem for all regardless the gender.

- Cost:

  Patient compliance has been shown to be negatively affected by the cost of prescription drugs. As coverage for prescription drugs by insurance plans diminishes, compliance can be expected to diminish.

- Knowledge of the disease:

  Knowledge of a particular disease (causation, prognosis, cure possibilities) has been shown to be positively related to compliance.
- Income:

  Income has been shown to have a direct relationship with patient compliance.
- Continuity of Physician-patient relationship:

  The presence of a continuous physician-patient relationship has been shown to have a positive influence on patient compliance.
- Medication errors:

  Medication errors have been reported to have a devastating effect upon patients and certainly compliance (Fincham, 2007).

2.4 Prevalence of Primary Non-Compliance

According to Wroth & Pathman (2006) little is known about primary non-compliance. Only a few studies have focused on this topic and different approaches are followed in accessing its existence.

The following studies related to primary non-compliance in the literature are briefly discussed below.

Wright *et al.* (2003) studied the prevalence of primary non-compliance in children discharged from a paediatric ward in a regional hospital over a 14 week period from April to July 2000. According to the results only 75% of prescriptions were filled. According to the study there was no difference in sex, number of drugs prescribed, diagnosis of infection or age between the filled and unfilled prescriptions. The majority of unfilled prescriptions were antibiotics. They concluded that a remedial cause of treatment failure might be primary non-compliance with medication in a regional setting.

In another study conducted in a paediatric emergency department of a regional children's hospital, Matsui *et al.* (2000) found a primary compliance rate of 92.7%. The non-filling rate in children prescribed more than one drug was 4.7%. The most

common reasons for not having the prescription filled included medication unnecessary (27%), financial (6.8%), and not enough time (6.8%). Dissatisfaction with the explanation of the medical problem, instructions for treatment, and instructions for follow-up were all significantly associated with non-compliance.

Johnell *et al*. (2006) did a survey in central Sweden using data of a random sample of 70044 people, aged between18-79 years. They used a postal questionnaire to determine the prevalence of primary non-compliance and asked the question "During the last 3 months, have you received a prescription for medicine, but not redeemed the medicine?" A total of 46 636 (67%) returned the questionnaire. The prevalence of primary non-compliance with medication was 7.6% for women and 6.5% for men in the study sample. Their results indicate that the individual characteristics younger age, financial strain, low self-rated health, and low trust in the health care system were associated with primary non-compliance. Younger age was associated with higher primary non-compliance, correlation between education and compliance was inconclusive, and neither did they find any association between educational level and primary non-compliance. However, there was a relation between financial strain and primary non-compliance, and they also observed an association between low self-rated health and primary non-compliance. Furthermore, they found a relation between low trust in the health care system and primary non-compliance (Johnell *et al*., 2006).

According to a study by Loong (1999) in a Singapore polyclinic to determine the rate of patients not collecting their medication despite being given a prescription (primary non-compliance), the primary non-compliance rate was 4%. Patients who were less than 30 years old or who consulted for an acute complaint were significantly more likely to be non-compliant. While the overall non-compliance rate was similar to that of studies done in the UK, the number of non-compliant patients with chronic illnesses was markedly lower in the local population (Loong, 1999).

According to Kripalani *et.al.* (2008) only 40% of patients filled their discharge prescriptions on the day of discharge. They conducted follow-up interviews 12 days after discharge and found 22% of patients still have not filled their discharge

prescriptions. High medication costs, lack of transportation and long waiting times at the pharmacy were associated with primary non-compliance in this study.

Saunders (1987) has undertaken a study to determine the prevalence of and reasons for non-compliance in filling prescriptions among patients discharged from the emergency department and to determine if differences in compliance exist among various socioeconomic groups. Patients had been contacted by telephone the following day to determine if their prescription had been filled and if not the reason for not filling them. Socioeconomic differences between the groups in this study were not significant. The reasons given by the patients for not filling the prescription included the following: insufficient funds, lack of transportation and negligence. Analgesics and muscle-relaxants accounted for 45% of prescriptions not filled, followed by antibiotics 41% and miscellaneous 14% (Saunders, 1987).

2.5 Primary Non-Compliance – Related to Specific Medical Conditions

The following studies evaluated primary non-compliance for specific medical conditions.

A study on pain management after discharge (Mcintosh & Leffler, 2004) found that 13% of patients did not fill their prescriptions.

According to a study to determine if patients actually fill their prescriptions for proven life-saving medication after suffering a coronary event the following was found in the literature.. Braun (2008) used retrospective data from charts of Miocardial Infarction patients from 104 acute care hospitals in Ontario between 1999 and 2000. Primary non-compliance was divided into three categories: patients who filled all, some, and none of their prescriptions within 120 days post-discharge. Seventy-four percent of patients filled all of their prescriptions by 120 days post-discharge; however, 10% filled no prescriptions. Not all patients fill their prescriptions upon discharge, and primary non-compliance was associated with increased mortality at 1 year. Patients who filled none of their discharge medications within 120 days post-discharge had an 80% increased risk of death, and those who filled only some of their medications had

a 44% increased risk of death. Most impressive in this study, the receipt of discharge medication counselling was associated with not only greater medication compliance upon discharge, but also reduced mortality at 1 year. Certainly, hospital stays are short, and it is difficult for clinicians to accomplish all that they should do prior to a patient's discharge. However, the study shows that medication counselling has a significant impact on compliance and reduced mortality. Given their continuous contact with patients, nurses typically are responsible for medication counselling. Whether nurses, clinical pharmacists, or physicians inform patients about their medications, it is important that this aspect of discharge teaching is not neglected (Braun, 2008).

2.6 Hospital Discharge Planning

Post hospital home medication management begins with discharge planning (Frey, 2005, p. 106). The day of hospital discharge is a vitally important yet potentially unsafe time to prepare patients to manage their medications at home. For professionals, there are several key steps that include: choosing the correct medication, writing an accurate prescription, providing patient with the prescription, determining whether the patient will be able to obtain the prescription in a timely manner, making sure that changes form previous regimens are clear, noting major potential adverse reactions and sometimes communicating the new regimen accurately to professional post hospital care providers who will assume responsibility for the patient's ongoing care (Frey, 2005, p. 108).

The quality of the discharge planning is an important determinant of patient outcomes following hospital discharge (Calkins, *et al*., 1997)

Discharge medication teaching is an important process that passes the responsibility from professionals to patients. Additionally, patients and families, who may be stressed or exhausted after hospitalization, must implement medication regimens at home within their available resources and abilities. This situation is open to human error at many levels (Frey, 2005, p. 108).

Physicians, nurses and pharmacists whose roles vary with hospital policies, local and individual practice patterns and available resources should share this activity. (Frey, 2005, p. 108)

2.7 Role of the Pharmacist

Compliance can be a very difficult problem which may go undetected. When non-compliance is recognized, the pharmacist is in a good position to offer support to the patient. The approach should be to attempt to remove obvious barriers to compliance. The compliance for the patient will be more likely increased if a concordant approach is adopted. However in order for the pharmacist to provide counselling that is consistent with the decision of the prescriber, mechanisms will need to be developed for the sharing of information. Depending on the nature of the problem, effective counselling by the pharmacist may assist with improving compliance. In other situations it may require a concerted effort by the whole health care team to help patients understand their treatment and the personal value of compliance for them (Winfield & Richards, 2004).

2.8 Identifying Non Compliance

A reasonable first step in the process would be to recognize the presence of a compliance problem, the second step for health care providers is to engage in a dialogue with patients in open-ended questions that allow the patient to yield the necessary information to inform health providers about patient's medication taking behaviour and compliance (Fincham, 2007, p. 157).

2.9 Addressing Non-Compliance

The oath taken by health professionals requires them to dedicate their lives to the services of their patients. Congruent with this service is the commitment to act in the best interest of the patient in ways to improve the chance of positive health outcomes. Patient compliance with medication and advice is viewed as a vital, multifaceted aspect of this care which can influence their well-being. While the scope of non-compliance and its associated costs are important considerations, the soundest justification or understanding the reasons people take or do not take

medicines resides in our professional and moral responsibilities to our patients (Fincham, 2007, p. 155).

Plans for medication compliance should consider modifiable predictors of medical condition, medication, patient, provider and system related factors of non-compliance. A stronger co-ordinated commitment to a multidisciplinary multi-level approach targeting many factors is needed from patients, health professionals, researchers, health-planners and policymakers in healthcare systems. This will effectively improve medication compliance, to reduce costs and improve health outcomes (Fincham, 2007, p. 155).

Although eliminating all unclaimed prescriptions is a worthy goal, it is simply not realistic. By understanding the reasons contributing to primary non compliance and by addressing the factors that contribute to its existence, primary non-compliance could be minimized.

CHAPTER 3: METHODOLOGY

3.1 Study Design

The design of the study was retrospective and mainly quantitative with some qualitative aspects with regards to understanding the various reasons why the patients did not redeem their medication.

3.2 Study Setting

The study was conducted at a private hospital in Gauteng, South Africa. The hospital is located in an upper-class area but does not only serve the surrounding population. Patients from other areas and neighbouring countries visit this hospital.

The Hospital has 358 beds. It has a day ward, 4 general wards, a children's ward, a labour ward, maternity ward, three orthopaedic wards, two high care units and two intensive care units. The Pharmacy is located at the main entrance and issues medication to patients in the wards, discharge medication and out-patients.

3.3 Sample and Size

The study focused on discharged patients who did not redeem their medication. Thus only patients discharged from the hospital within a thirty day period between 25 May 2009 and 23 June 2009 were included in the study. The sample size was determined by the amount of patients discharged from the Hospital within this 30 day period. All patients discharged between 25 May 2009 and 23 June 2009 formed the cohort for the study. The sample size was designed to obtain the right quality and quantity of information needed to determine the various objectives for the study.

3.4 Data Collection and Consolidation

The Hospital Information System (HIS) was accessed daily via e-reporting. The data was collected over a period of 30 days starting on the 25 May 2009 and ending on the 23 June 2009. For each of these days the corresponding day and month was selected on e-reporting and an electronic listing was obtained from HIS for all

patients discharged on the specific day. A shortcut was created for the electronic listing on a desktop computer and the file was saved according to date in text file format (*txt*).

The file was imported into Excel (2007) by setting the margins and was saved in the dummy worksheet page of the main data-collection workbook. The file contained the following information : a list of all patients discharged on the selected day, it also contained the following demographic information for each patient on the list: patient number, patient surname, initials, title, medical aid, membership number, date admitted, date discharged, ward and bed-number.

A unique subject number was assigned for each patient on the discharge listing. For each subject the HIS was accessed by using the patient number and the following information was collected: the patient's gender, date of birth and age. The data were recorded on the patient data collection record. To maintain patient confidentiality the subject number was used to represent the patient. Only the researcher had access to the patient's personal details.

A copy of the patient's discharge medication chart was obtained from the pharmacy filing system and the corresponding subject number was indicated. The discharge medication chart was reviewed to determine the following for each subject:

- Number of items prescribed
- Number of items dispensed at hospital pharmacy
- Whether any items were non-dispensed
- Whether any items were partially dispensed
- The reason for any item non-dispensed or partially dispensed as indicated by the dispensing pharmacist.

For each subject the HIS and the retail Unisolve system was accessed and the value of the dispensed medication was calculated in Rand value.

If a copy of the discharge medication chart could not be obtained from the pharmacy prescription filing system, the patient's original hospital file was accessed. The

hospital file was reviewed to determine whether any discharge medication was prescribed. The number of items and the detail of items was recorded on the second portion of the patient data collection record.

The patient summary worksheet was completed consolidating the information collected for each subject into the following headings: subject number, copy of TTO, patient number, patient name, initials, title, gender, discharge date, ward, medical aid, medical aid code, member number, date of birth, age, TTO prescribed, number of items on TTO, number of items dispensed, value of medication dispensed on HIS (in rand value), value of medication dispensed on Unisolve (in rand value), total value of medication dispensed, any items non-dispensed, any items partially dispensed and whether no medication was dispensed at time of discharge from the pharmacy. **(See Annexure A for Patient Summary Worksheet)**

For the medical aids a pre-coded list was designed and the corresponding code for each of the medical aids was used in the patient summary worksheet.

Every item that was either partially or non-dispensed was recorded on the item summary sheet next to the corresponding subject number. The product name, nappicode, active ingredient, MIMS classification, MIMS classification code, dosage form, strength, quantity, value and reason for non-redemption was obtained and recorded on the item summary sheet.

A recorded telephone call was made to those subjects for whom a discharge medication script was prescribed, but no medication was dispensed at discharge. Verbal consent was obtained and the patients informed of the following:

- The aims and objectives of the study
- That the study was approved by the MREC of the University of Limpopo (Medunsa Campus)
- that they may terminate their participation without any adverse consequences,
- that the results may be published
- and that their anonymity is guaranteed

Information was collected from the patients from whom consent was obtained in an attempt to identify possible reasons for not redeeming discharge medication.

Although the telephonic conversation was mainly a structured open ended interview, information was mainly collected with regards to the following:

- Whether the patient or guardian was aware that medication was prescribed to be used after discharge from the hospital.
- Whether the patient or guardian was properly informed about the procedure to be followed after discharge and whether a lack of communication contributed to discharge medication not being redeemed.
- Whether the patient's confidence in the doctor, prescribed regimen, nursing staff or satisfaction with care played a role in the patient's decision not to redeem the prescribed discharge medication.
- Whether the location of the pharmacy in the hospital, signage towards the pharmacy or waiting times at the pharmacy contributed to the patient not redeeming medication from the hospital pharmacy.
- Whether the patient for any financial reason did not redeemed the discharge medication.
- Whether the patient at own discretion or for personal reasons decided not to redeem the prescribed discharge medication.

The patient feedback worksheet was completed using the information above for each of the subjects for whom a discharge medication script was prescribed, but no medication was dispensed at discharge.

3.5 Statistical Analysis of Data

The data was analysed by a statistician. Descriptive statistics were used to analyse the data as described in Objectives 1-4. The frequency of primary non-compliance was compared between patients of different age groups, genders, members of different medical aid schemes, and patients discharged from different wards in the hospital, as well as different types of TTO medicines.

In terms of Objective 5, reasons given by patients for not collecting medication at the hospital pharmacy on discharge were grouped and used to evaluate the discharge process and to determine the various problems related to collecting discharge medication.

3.6 Ethical Considerations

Permission to conduct the study was obtained from Hospital Management and the hospitals Physician Advisory Board (PAB). **(See Annexure B for Approval Letter from Hospital)**

Approval to conduct the study was also obtained from the Research, Ethics and Publication Committee (MREC), of the Faculty of Medicine, University of Limpopo, Medunsa Campus. **(See Annexure C for Approval Letter from MREC to conduct the study)**

Verbal consent to participate in the study was obtained from each patient contacted telephonically during the course of this study. The aims and objectives of the study were explained to the participants. They were also informed that the results may be published but that their anonymity will be guaranteed. Participants were not pressurised to volunteer and were informed that they may terminate their participation without any adverse consequences.

CHAPTER 4: RESULTS

4.1 Patient population

4.1.1 Age and Gender

Records for a total of 1365 patients were examined. Table 4.1 shows demographic data of the patient group included in the study.

Table 4.1: Patient demographics

	Female	Male	**All patients**
N	798 (58%)	567 (42%)	**1365**
Average age (years) (+SD)	38.7 ± 20.5	37.1 ± 23.3	**38.0 ± 21.7**
Median age (years)	36 years	40 years	**37 years**
Range	2 days - 94 years	2 days - 95 years	**2 days - 95 years**

Figure 4.1 shows numbers of male and female patients in different age groups. Age was recorded in whole years except for infants less than 1 year of age.

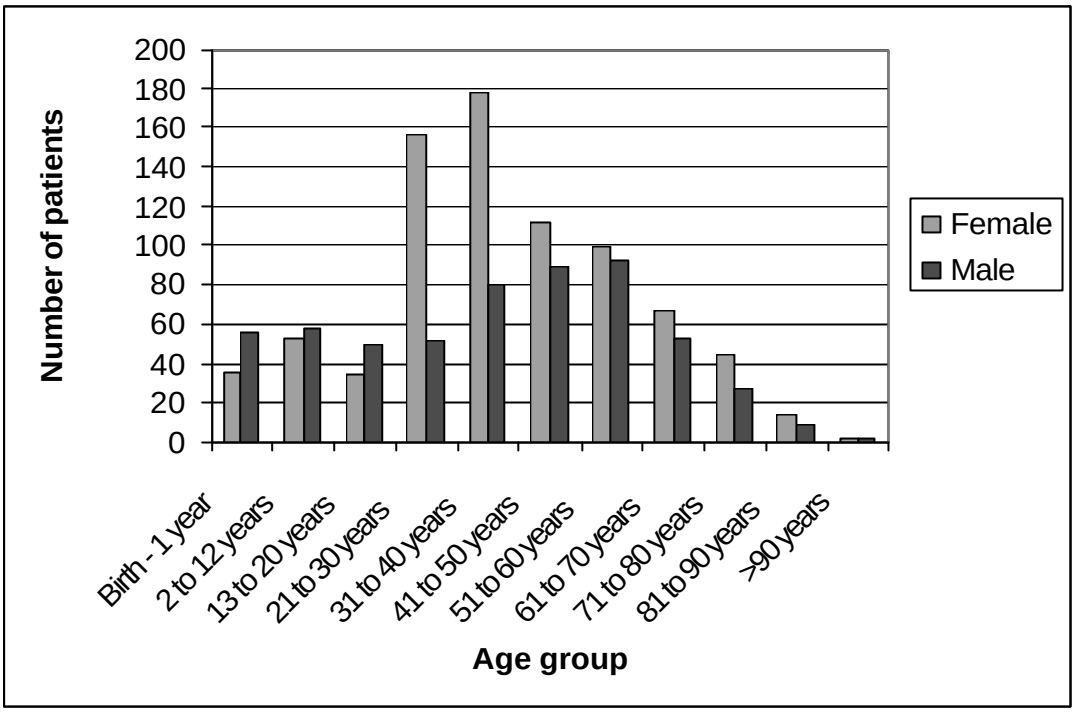


Figure 4.1: Demographic overview

4.1.2 Duration of Hospital Stay

The period of stay in hospital ranged from 1 day to 63 days, with a median duration of stay of 3 days. Proportions of patients with different lengths of stay are shown in Figure 4.2.

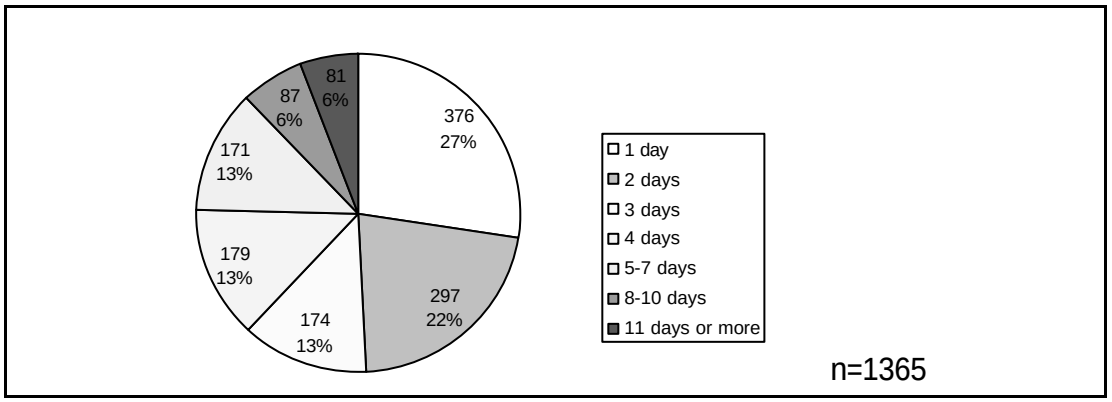


Figure 4.2: Duration of hospital stay

The median duration of stay in the different wards is shown in Table 4.2

Table 4.2: Duration of stay in different hospital wards

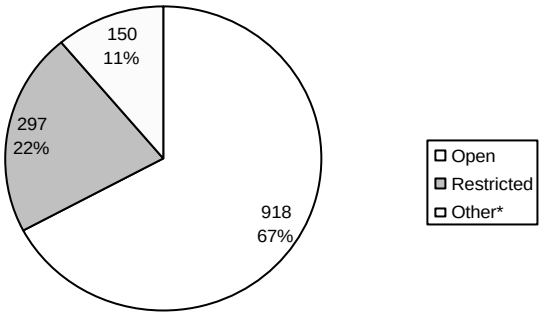
Ward from which discharged	Number of patients		Median duration of stay (days)	Range (days)	
				From	To
(HC)	2	(0%)	2.5	2	3
(NN)	1	(0%)	25	25	25
(WA)	126	(11%)	1	1	7
(WB)	134	(12%)	2	1	16
(WC)	90	(8%)	5	1	62
(WD)	290	(25%)	3	2	44
(WE)	98	(9%)	3	1	15
(WF)	121	(11%)	4	1	9
(WJ)	61	(5%)	8	1	25
(WK)	85	(7%)	4	1	19
(WL)	130	(11%)	2	1	22
Total	**1138**	**(100%)**	**3**	**1**	**62**

4.1.3 Medical Aid

Seventy-eight different medical insurance options were specified in the data. The top ten are shown in Table 4.3. Figure 4.3 shows the numbers of patients belonging to open-access and restricted-access schemes.

Table 4.3: Medical aid schemes

Medical aid scheme (Top 10)2	Number of patients	Percent
1. Discovery	444	33%
2. Medihelp	108	8%
3. Private scale of benefit (no med. aid)	68	5%
4. Government employees medical scheme (GEMS)	51	4%
5. Bestmed	48	4%
6. Polmed-(MCO)	42	3%
7. Fedhealth	42	3%
8. Bonitas	41	3%
9. Keyhealth	37	3%
10. Netcare Medical Scheme	31	2%
Subtotal	912	67%
Other	453	33%
Total	**1365**	**100%**



*Other: Private (68), compensation for injury on duty (25), Government employees' medical scheme (51) Botswana medical aid (3), BUPA Int'l expatriate insurance (2), Air International (1)

Figure 4.3: Membership in open-access and restricted-access schemes

4.2 TTO Prescriptions given at Discharge

4.2.1 Overview

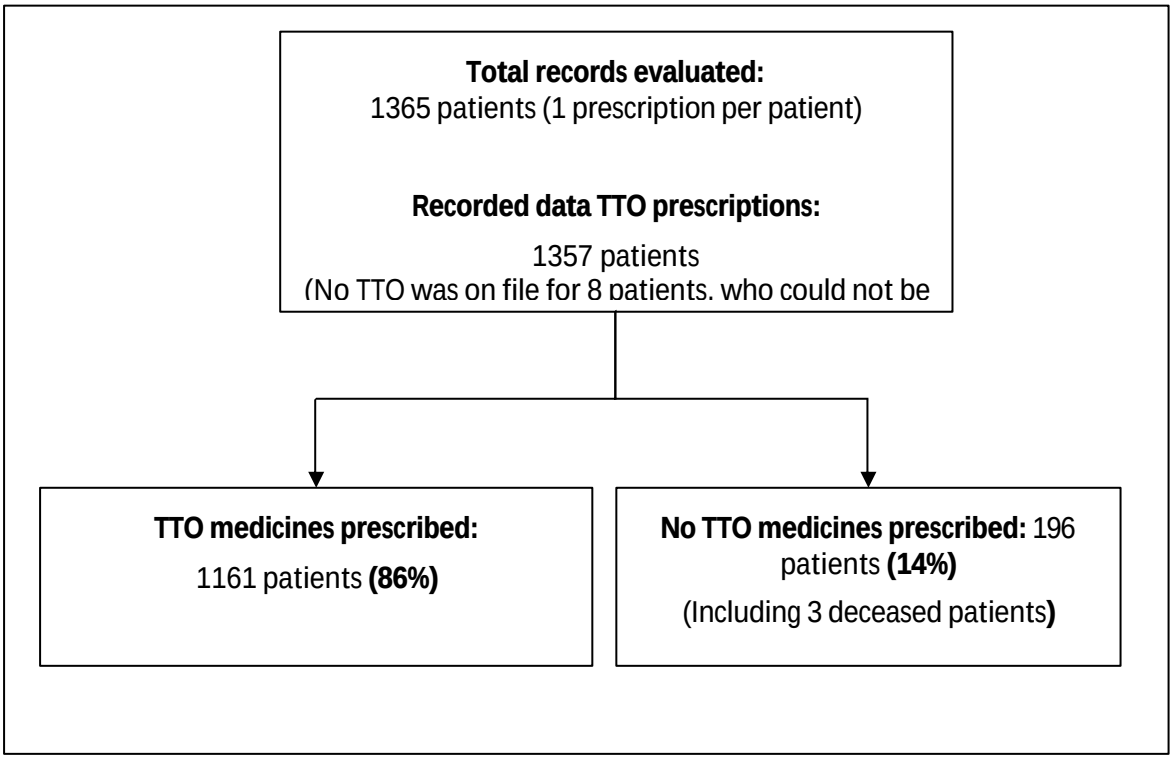


Figure 4.4: Overview of prescription records evaluated

4.2.2 TTO's given at Discharge from Different Wards

Table 4.4 shows numbers of patients with and without TTO prescriptions on discharge from the different wards.

Table 4.4: Percentages of patients who received TTO prescriptions at the different hospital wards

Ward	TTO medicines prescribed		No TTO medicines prescribed	**Total**	No data	Grand total
HC	2			**2**		2
IC			4	**4**		4
NN	1	(5%)	19	**20**		20
WA	127	(75%)	43	**170**		170
WB	137	(87%)	21	**158**	1	159
WC	94	(84%)	18	**112**	2	114
WD	301	(87%)	46	**347**	1	348
WE	99	(85%)	17	**116**		116
WF	122	(97%)	4	**126**		126
WJ	61	(85%)	11	**72**	2	74
WK	85	(93%)	6	**91**	2	93
WL	132	(95%)	7	**139**		139
Total	**1161**	**(86%)**	**196 (14%)**	**1357**	**8**	**1365**

* Percentages are shown where the total number of patients was <10

4.2.3 Number of Items per TTO Prescription

Of the 1161 patients who had TTO medicines prescribed on discharge, 23 non-compliant patients did not consent to participate when they were contacted for a

telephone interview. The number of prescribed items ranged from 1 to 12, with an average of 2.8 items (standard deviation: 1.6 items). The median number of items was two. A breakdown by hospital wards is shown in Table 4.5.

Table 4.5: Number of items on TTO prescriptions on discharge from different wards

Ward	Patients (=prescriptions)	Items on TTO	Average number of items per prescription
HC	2	7	3.5
WA	127	437	3.5
WB	137	392	2.9
WC	94	313	3.5
WD	301	705	3.4
WE	99	352	3.6
WF	122	282	2.3
WJ	61	147	2.4
WK	85	240	2.8
WL	132	350	2.7
Neonatal	1	1	1.0
Total	**1138**	**3226**	**2.8**

4.3 Compliance to TTO Prescriptions

4.3.1 Overview

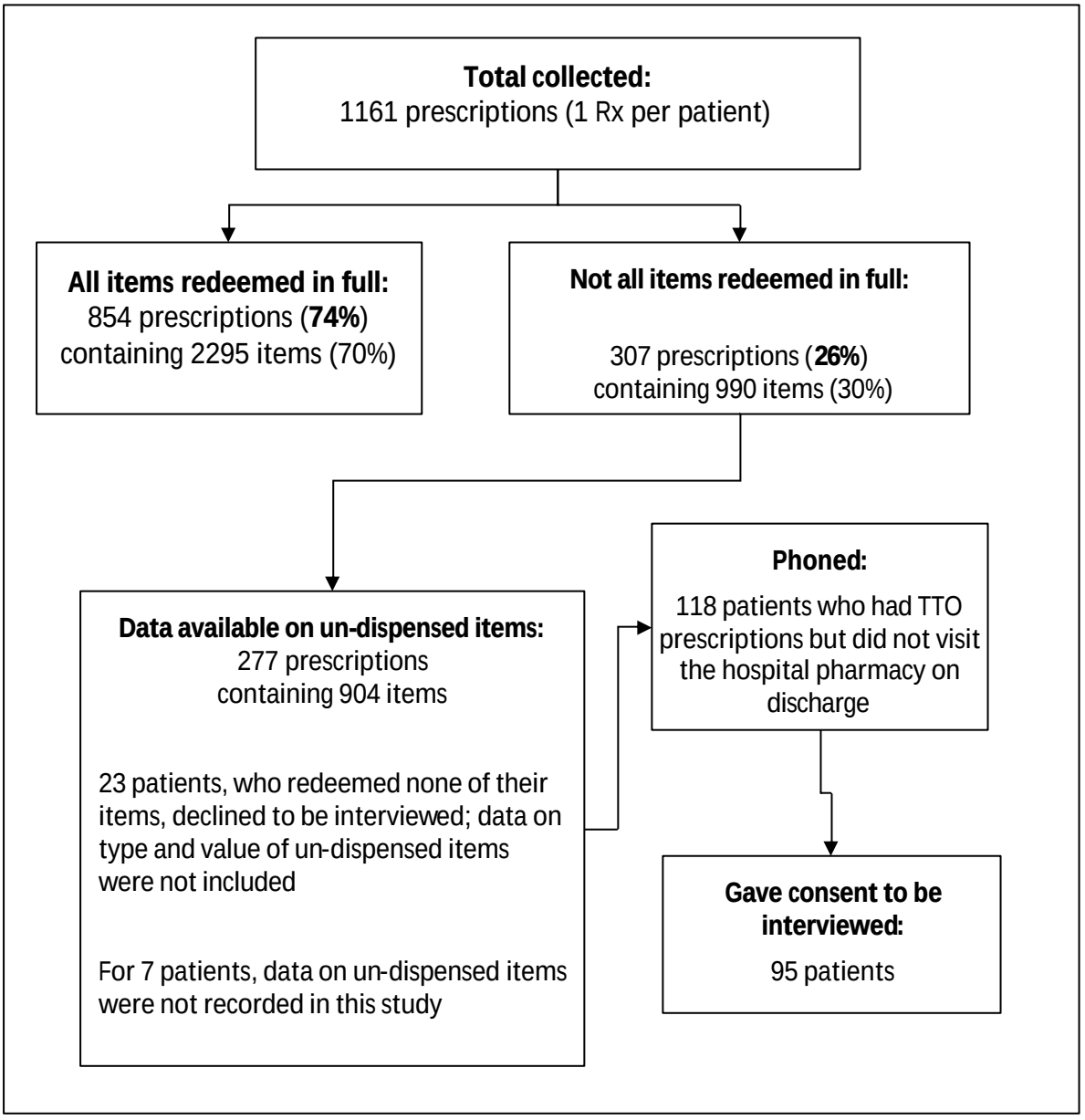


Figure 4.5: Prescriptions and items redeemed and not redeemed on discharge

4.3.2 Overview of Compliant and Non-Compliant Patient Groups

Table 4.6 shows comparisons of demographic and other data for the patient groups who redeemed all items in full, compared with those who did not:

Table 4.6: Comparison of compliant and non-compliant patient groups

Parameter		All TTO medicines redeemed in full	Not all TTO medicines redeemed in full	P
		854	307	
Gender:		Female: 510 (60%) Male: 344 (40%)	Female: 182 (59%) Male: 125 (41%)	0.894
Age (years):	Average (± SD)	38.5 (± 19.5)	37.3 (± 24.6)	
	Median	37	38	0.772
Hospital stay (days):	Average (± SD)	3.7 (± 4.2)	4.5 (± 5.0)	
	Median	2.5	3	<0.001**
Insurance		Yes: 810 (95%) No: 44 (5%)	Yes: 297 (97%) No: 10 (3%)	0.176
Number of items on TTO prescription	Average (±SD)	2.7 (±1.5)	3.3 (±1.9)	
	Median	2	3	<0.001*

4.3.3 Compliance and Number of Items Prescribed

Patients who did not redeem all their medication had significantly more items on their TTO prescriptions than those who did. Details are shown in Figure 4.6.

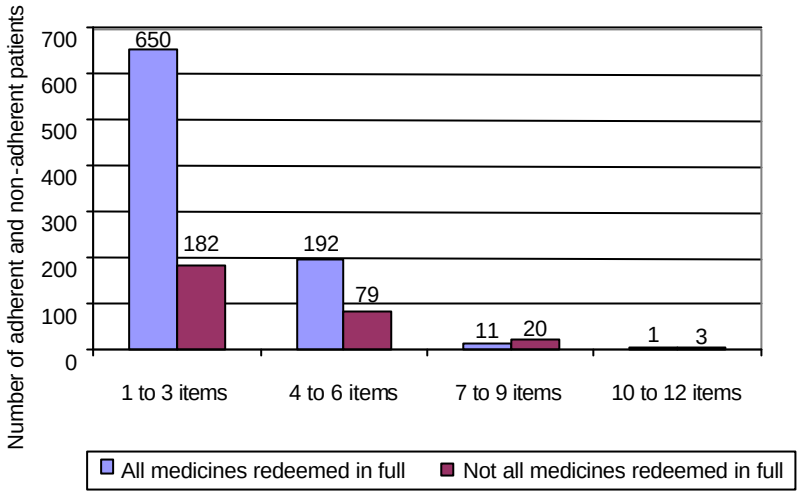


Figure 4.6: Numbers of items on TTO prescriptions for compliant and non-compliant patients

4.3.4 Compliance and Duration of Hospital Stay

Patients who did not collect all their prescribed items at discharge had significantly longer durations of hospital stay than those who did (see Figure 4.7).

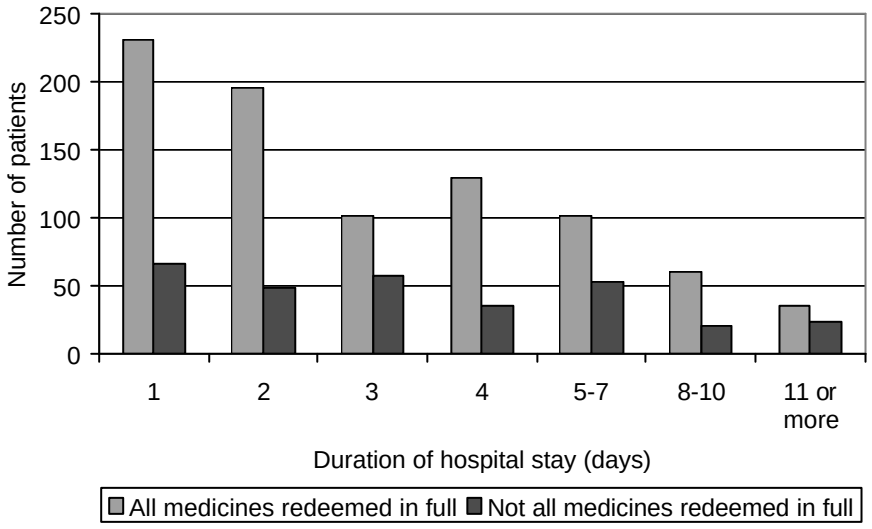


Figure 4.7: Duration of hospital stay for compliant and non-compliant patients

Non-compliant patients accounted for 22% in the group of patients with prescriptions of up to 3 items, 29% in the group of patients with 4 to 6 items and 66% of patients with more than six items (Figure 4.6). In the categories with longer durations of stay, the proportion of non-compliant patients tends to increase (Figure 4.7).

4.4 Number of Items Redeemed

Table 4.7: Numbers of items redeemed, not redeemed and partly redeemed

	Prescriptions	Items	Items			
Group	Total prescriptions	Total items prescribed	Fully redeemed	Partly redeemed	Not redeemed	Not known
Fully adherent	**854**	**2295**	**2295**	**0**	**0**	**0**
Not fully adherent						
Nothing redeemed	118	278	0	0	278	
Some items not redeemed	101	370	152	0	218	0
Some or all items partly redeemed	74	237	109	128	0	0
Some items partly redeemed, some not redeemed	14	78	32	26	20	0
Details not known	7	27	n/d	n/d	n/d	27
Total	**307**	**990**	**293**	**154**	**516**	**27**
Grand total	**1161**	**3285**	**3285**			

n/d = not determined

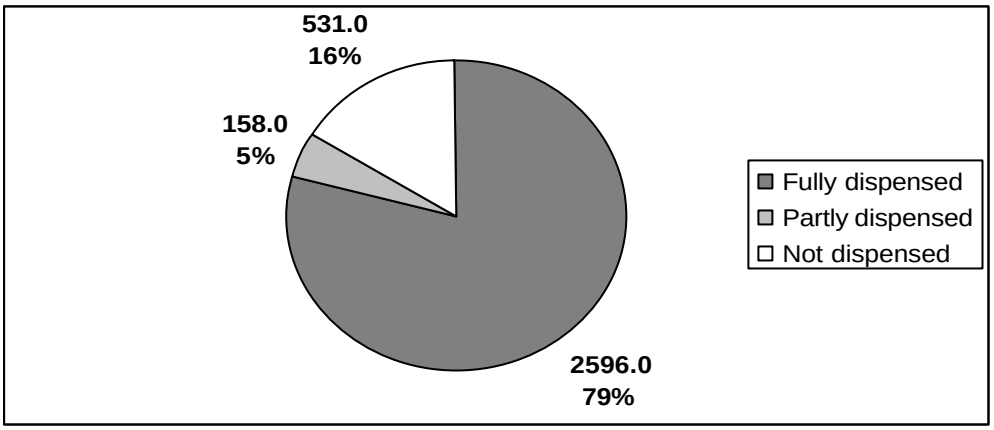


Figure 4.8: Percentages of prescribed items fully, partly or not redeemed at the hospital pharmacy

4.4.1 Numbers of Items Redeemed, by Age Groups

Figure 4.8 shows a breakdown of numbers of percentages of items dispensed, partly dispensed and not dispensed for each age group.

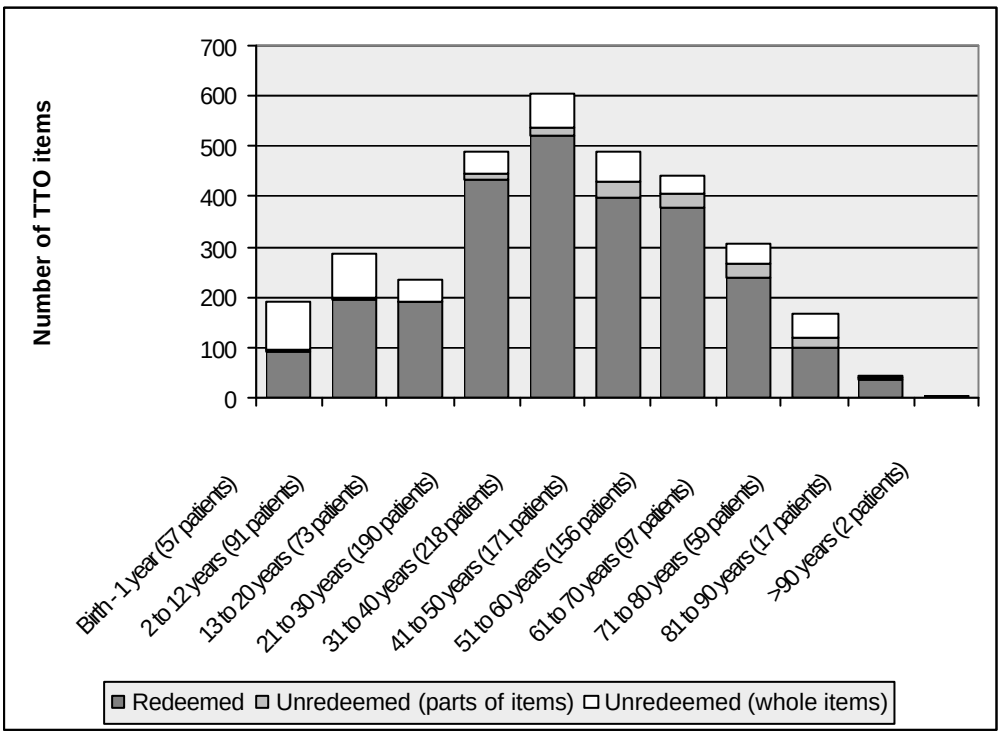


Figure 4.9: Number of TTO items redeemed, partly redeemed and not redeemed, by age groups

The percentage of items dispensed in full was highest in the 21-30 years age group (88%). It was lowest for infants under 1 year of age (48%), followed by patients aged 71-80 years (59%) and children aged 2-12 (69%).

4.4.2 Numbers of Items Redeemed, by Gender

Table 4.8 shows a breakdown of percentages of items dispensed, partly dispensed and not dispensed for male and female patients.

Table 4.8: Number of TTO items redeemed, partly redeemed and not redeemed, by gender

Gender	Patients*	Total TTO items	TTO items dispensed in full	TTO items partly dispensed	TTO items not dispensed
Female	687	1856	1 462 79%	119 6%	275 15%
No data	7	27			
Male	467	1402	1 126 80%	35 2%	241 17%
Total	1161	3285	2 588 79%	154 5%	516 16%

4.5 Value

Table 4.9: Value of items dispensed on Hospital Information System (HIS) and Unisolve system

Adherence behaviour	Prescrip-tions	Dispensed on HIS	Dispensed on Unisolve system	Total
All items Redeemed	854	R113 188.67 (39%)	R177 363.42 (61%)	R290 552.09
a)Some or all items not redeemed	214	R 3 771.09 (20%)	R 15 088.66 (80%)	R18 859.75
b) Some or all items partly redeemed	73	R21 659.76 (89%)	R 2 751.35 (11%)	R24 411.11
c) Both a) and b) above	13	R 3 976.76 (65%)	R 2 110.60 (35%)	R 6 087.36
Non-compliance, but no information on missing items	7	R 454.06 (22%)	R 1 597.02 (78%)	R 2 051.08
Total	**1161**	**R143 050.34 (42%)**	**R198 911.05 (58%)**	**R341 961.39**

Table 4.10: Value of items redeemed and not redeemed

Group	Total pre-scriptions	Items pre-scribed	Redeemed		Not redeemed	
			Number of Items	Value	Number of Items	Value
Fully compliant patients	**854**	**2295**	**2295**	**R290 52.09**	**0**	**0**
Non-compliant patients						
a) Some or all items not redeemed	191	589	152	R18 859.75	437	R48 645.18
b) Some or all items partly redeemed	73	237	109 fully 128 partly	R24 411.11	128 partly	R21 826.98
c) Both a) and b) above:	13	78	32 fully 26 partly 20 not at all	R6 087.36		R8 314.34
Subtotal 1	**277**	**904**		**R 49 58.22**		**R78 786.50**

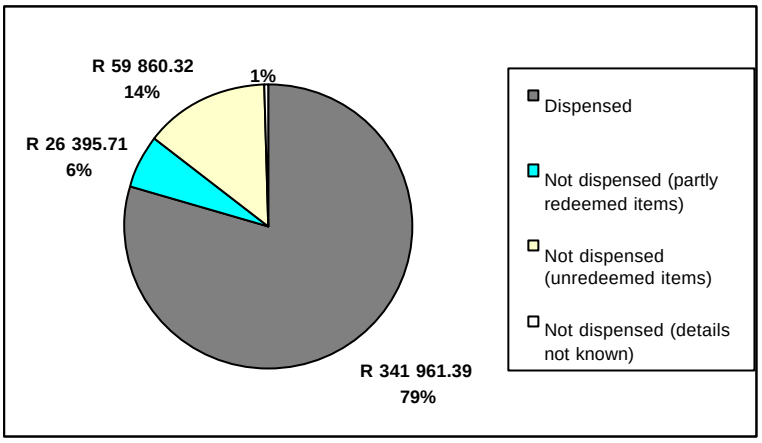


Figure 4.10: Proportionate value of items fully redeemed, partly redeemed and not redeemed at the hospital pharmacy

4.5.1 Value of Items Redeemed, by Age Groups

A breakdown of percentages of value redeemed and not redeemed for each of the age groups – excluding the 23 patients who redeemed none of their items and the 7 patients with unknown data – appears in Figure 4.11.

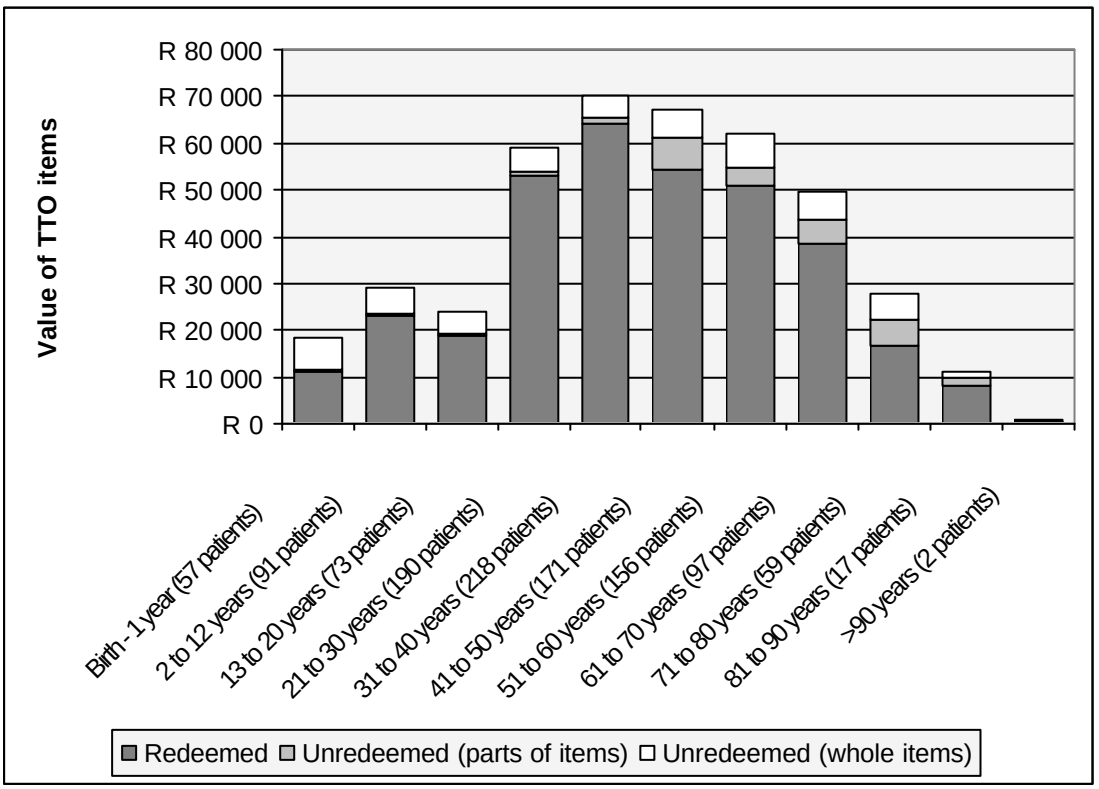


Figure 4.11: Value of TTO items dispensed, partly dispensed and not dispensed, by age groups

4.5.2 Value of Items Redeemed, by Gender

Table 4.11: Value of TTO items dispensed, partly dispensed and not dispensed, by gender

Gender	Patients*	Total value of TTO items	Value of TTO items dispensed in full	Unredeemed part of TTO items partly dispensed	Value of TTO items not dispensed
Female	673	238 494.06	188 079.47 79%	21 030.06 9%	29 384.52 12%
Male	458	180 202.75	151 830.84 84%	5 365.65 3%	23 006.27 13%
Total	**1131**	**418 696.81**	**339 910.31 81%**	**26 395.71 6%**	**52 390.79 13%**

* Excluding the 23 patients who redeemed none of their items and the 7 patients with unknown data.

Male patients redeemed 84% of the value of TTO's prescribed for them, as compared with female patients who redeemed only 79% of the total value, with a relatively high unredeemed value of items partly dispensed.

4.6 Items Not Redeemed

Table 4.12: Types and value of items not redeemed or partly redeemed

	Not redeemed		Partly redeemed		Total	
Classification	Items	Value (R)	Items	Value (R)	Items	Value (R)
Blood and haematopoietic	15	6 148.19	22	10 393.66	37	16 541.85
Analgesics	134	9 412.33	15	1 231.01	149	10 643.34
Antimicrobials	45	6 666.78	9	1 895.88	54	8 562.66
Not classified	62	6 592.55	16	1 104.20	78	7 696.75
Musculo-skeletal agents	46	4 369.97	21	2 291.43	67	6 661.39
Gastrointestinal tract	22	2 364.19	15	3 058.42	37	5 422.61
Respiratory system	38	4 123.42	9	1 260.15	47	5 383.57
Endocrine system	20	3 831.13	12	1 274.43	32	5 105.56
CNS	22	1 907.33	22	2 139.86	44	4 047.18
Urinary system	5	2 337.00	8	1 261.72	13	3 598.73
Cardiovascular agents	10	1 858.03	4	458.64	14	2 316.67
Ear, nose and throat	22	1 566.13			22	1 566.13
Antihistamines	3	482.73			3	482.73
Ophthalmics	5	288.72			5	288.72
Dermatologicals	5	235.88			5	235.88
Vitamins, tonics, minerals, electrolytes	3	206.42			3	206.42
Sympathomimetics			1	26.30	1	26.30
Total	**457**	**52 390.79**	**154**	**26 395.71**	**611**	**78 786.50**

* Unclassified items: Probiotics (R3,307.43); Dressings and needles (R2,003.92); Supplements (R1,452.02); Ointments, lotions, sprays, disinfectants (R395.97); Cough syrup (R306.50); Antacid (R201.10); Mixture (R29.81)

Figure 4.12 shows the percentage values for the different types of medication as part of the total value of items not redeemed.

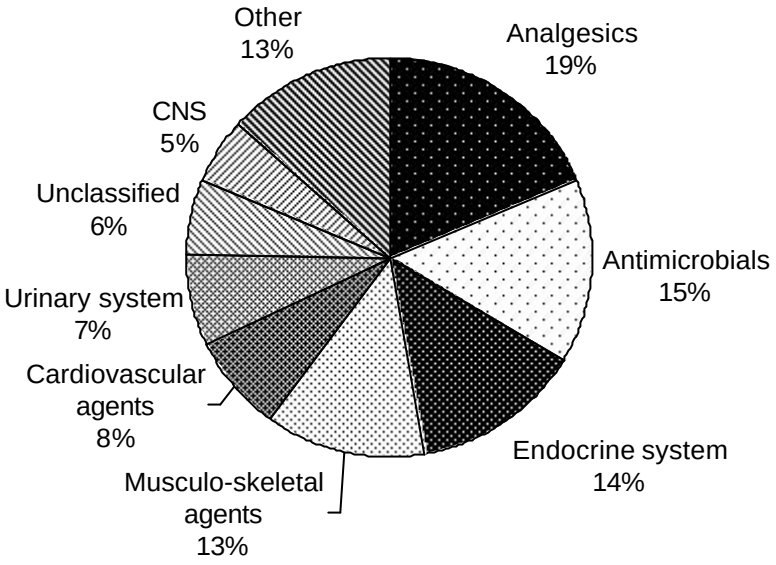


Figure 4.12: Proportion of medication types not redeemed at the hospital pharmacy, by value

4.6.1 Types of Unredeemed Items, by Age Groups

The types of items not fully redeemed were different in the various age groups. In value terms, the top three types of items not redeemed in each age group were as follows:

- Infants up to 1 year: Unclassified items, leukotriene receptor antagonists, combinations: bronchodilators (47% of total unredeemed value)
- Children and young adults aged 2 to 20 years: Unclassified items, analgesic combinations, anti-coagulants (32% of total unredeemed value)
- Adults 21 to 50 years: Anti-coagulants, quinolones, analgesic combinations (48% of total unredeemed value)
- Adults 51 to 70 years: Anti-coagulants, analgesic combinations, specific cyclo-oxygenase 2 inhibitors (48% of total unredeemed value)
- Adults over 70 years of age: Anti-coagulants, haematinics, urinary antiseptics (43% of total unredeemed value)

A more detailed breakdown is shown in **Annexure D**.

4.7 Reasons for Not Redeeming Items in Full

4.7.1 Overview

When patients visited the hospital pharmacy on discharge but did not redeem all of their medication, the reasons for this were recorded for each item. Patients who did not visit the pharmacy were phoned (see Section 3.4).

Table 4.13: Reasons for not redeeming TTO items at the hospital pharmacy after discharge

Reason for not redeeming items at the hospital pharmacy	Recorded by telephone interview		Recorded at pharmacy		All	
	Items	%	Items	%	Items	%
Item redeemed at another pharmacy	133	61%	36	9%	169	28%
TTO rules of medical aid			142	36%	142	23%
Ward stock given			125	32%	125	20%
Have stock at home	15	7%	33	8%	48	8%
Unaware of TTO	44	20%		0%	44	7%
Financial/med. aid-related (other than TTO rules)	15	7%	18	5%	33	5%
Patient's decision not to take medication	7	3%	16	4%	23	4%
Reason not determined	5	2%	11	3%	16	3%
Item out of stock			6	2%	6	1%
System error			5	1%	5	1%
Total	**219**	**100%**	**392**	**100%**	**611**	**100%**

4.7.2 Items Redeemed at Other Pharmacies

Some patients redeemed their prescriptions at other pharmacies. These patients could still be considered compliant, since they did redeem their medication. Details are shown in Table 4.14.

Table 4.14: Numbers, value and types of items redeemed at other pharmacies

	Redeemed in full at other pharmacy		Partly redeemed at other pharmacy		Total	
Therapeutic class	Items	Value (R)	Items	Value (R)	Value (R)	
Analgesics	42	4 037.18			42	4 037.18
Antimicrobials	25	3 214.27			25	3 214.27
Endocrine system	11	2 965.47			11	2 965.47
Musculo-skeletal agents	24	2 744.68			24	2 744.68
Cardiovascular agents	8	1 592.36	1	116.67	9	1 709.03
Urinary system	3	1 586.67			3	1 586.67
Unclassified	13	1 298.32			13	1 298.32
CNS	16	1 187.20			16	1 187.20
Respiratory system	6	922.75			6	922.75
Gastrointestinal tract	7	787.93			7	787.93
Blood and hematopoietic	5	725.98	1	28.31	6	754.29
Antihistamines	1	169.85			1	169.85
Ear, nose and throat	3	111.45			3	111.45
Vitamins, tonics, minerals, electrolytes	2	72.65			2	72.65
Dermatologicals	1	41.23			1	41.23
Total	**167**	**21 458.00**	**2**	**144.98**	**169**	**21 602.98**

As shown in Table 4.7, 74% of prescriptions (854 of 1161) were redeemed fully at the hospital pharmacy. Taking into account that 59 patients collected all their

medicine at another pharmacy[1], and that for 30 (23 and 7) patients it was not recorded whether they collected their medicine, the proportion of compliant patients overall can be estimated at 913/1131 (81%). Tables 4.15 and 4.16 show the numbers of items and the values involved.

Table 4.15: Percentages of items redeemed, partially redeemed and not redeemed by the patient

Items redeemed		Partly redeemed		Not redeemed	Total items
At the hospital pharmacy	At another pharmacy	At the hospital pharmacy	At another pharmacy		
2 596	167	158	2	362	3 285
2 763 **(84%)**		160 **(5%)**		362 **(11%)**	(100%)

Table 4.16: Value of items redeemed and not redeemed by the patient

Redeemed		Total redeemed	Not redeemed	Total value of prescriptions
At the hospital pharmacy	At another pharmacy			
R341 961.39	21 602.98	R 363 564.37 **(84%)**	R 67 356.55 **(16%)**	R 430 920.93

[1] Five patients (622, 843, 846, 1297, 1299) redeemed only some of their items at another pharmacy.

4.7.3 Reasons for Failing to Redeem Medication

An overview of reasons for not redeeming the different type's medication is given in Table 4.17. Four reasons and five types of medication together accounted for 30 781 or 54% of the total value not redeemed.

Table 4.17: Reasons for not redeeming different types of TTO medication

Reason why not redeemed at hospital pharmacy	Med. aid TTO rules	Unaware of TTO	Ward stock given	Have stock at home	Financial (other than TTO rules)	Reason not determined	Patient's own decision	Dispensing or prescribing error	Out of stock	**Total value (R)**
Type of medication	Value (R) (the shaded area accounts for 53.8% of total value)									
Blood and haematopoietic	10 365	4 755	67		600					**15 788**
Analgesics	1 032	1 259	634	1 361	1 022	23	1 276			**6 606**
Unclassified	1 083	237	1 673	739	1 038	1 548	51		30	**6 398**
Antimicrobials	1 640	675	1 129			551		1 354		**5 348**
Gastrointestinal tract	2 964	383	279	509	196	56	56	95	98	**4 635**
Respiratory system	1 166	78	1 442	968	560	184			63	**4 461**
Musculo-skeletal agents	2 215	469	142	310	382	68	258	72		**3 917**
CNS	2 013	165		150	334		37	108	53	**2 860**
Endocrine system	1 274		866							**2 140**
Urinary system	1 262	696	54							**2 012**
Ear, nose and throat		105	929	158		53	210			**1 455**
Cardiovascular agents	342		133		132					**608**
Antihistamines			313							**313**
Ophthalmics			289							**289**
Dermatologicals			92	102						**195**
Vitamins, tonics, minerals, electrolytes									134	**134**
Sympathomimetics	26									**26**
Total	**25 382**	**8 822**	**8 042**	**4 297**	**4 264**	**2 483**	**1 887**	**1 630**	**377**	**57 184**

4.8 Telephone Interviews

A total of 118 patients who were given prescriptions on discharge but did not redeem any of their medication at the hospital pharmacy were contacted telephonically. Of these, 23 (19%) declined to be interviewed, and one could not be reached as she had returned to Botswana. Telephonic interviews were thus conducted with 94 (80%) of 118 patients.

Reasons why this subgroup of patients did not redeem any of their medication on discharge from the hospital are summarized in Table 4.18.

Table 4.18: Reasons for not redeeming TTO items at the hospital pharmacy after discharge: Telephone interviews

Reason	Number of patients (n=118)	Percent of patients *	Number of items	Value
Medication redeemed at another pharmacy	48	45%	113	R15 984
Patient took own decision not to fill the prescription	20	19%		
Have stock at home			15	R1 097
Did not want medication			7	R512
Lack of confidence in doctors' ability, prescribed regimen and/or quality of care	2	2%	included in above	included in above
Patient was not aware of a prescription for medicine to take home	18	17%	44	R8 822
Insufficient communication of nursing staff regarding discharge procedure	11	10%		
Financial/ medical aid-related problem	8	7%	15	R2 207

*Percentages add up to more than 100% because some patients indicated more than one reason.

The different explanations given by patients on the phone are briefly summarized below.

4.8.1 Patient's Decision Not to Redeem the Item

Eighteen of the 20 patients who decided not to redeem their medications had been prescribed analgesics. Thirteen patients did not redeem the items as they still had stock at home; one of them did not want suppositories, another thought that the

medication was not strong enough. Five patients did not redeem their analgesics because they did not experience pain. One patient decided not to fill a prescription for mupirocin ointment because she still had stock at home, another was married to a doctor and said that he would prescribe the medications needed.

4.8.2 Patient Not Aware of Prescription, Communication

Eighteen patients were unaware of their prescriptions on discharge; in ten cases there were also communication problems with the staff in the ward. Of these ten, one did not realize that the pink form was a discharge prescription, one did not speak to the doctor on discharge herself, and one was generally dissatisfied with the care.

Eight patients did not mention communication problems. In one of these cases, no copy of a TTO prescription was on file, but the nursing notes indicated that a prescription had been issued. One patient was dissatisfied with the care and tore up the prescription in the ward.

4.8.3 Financial Reasons

Eight patients mentioned that their medical aid was depleted or did not cover the medication. One said that the family still had medication for fever at home. TTO rules, which were a major reason in the patient group as a whole, were not mentioned in the telephone conversations. All the patients to whom this reason applied had visited the pharmacy and redeemed at least one item.

CHAPTER 5: DISCUSSION

The first objective of the study was to determine the number of patients discharged, the percentage of patients with TTO prescriptions, and the percentage of TTO prescriptions collected during the study period.

According to the study 1365 patients were discharged from this private hospital during the 30 day period (median age 37 years), of which 798 (58%) of the patients were female (median age 36 years) and 567 (42%) of the patients male (median 40 years). According to the demographic overview in Figure 4.1 the number of female patients for the age groups 21-30 years and 31-40 years is significantly more than male patients for these age groups and it is also significantly more than the number of female patients for the other age groups. This could be related to a specialized maternity unit offered by the hospital.

Of the 1365 patient records evaluated, discharge prescriptions were prescribed for 1161 (85%) of the patients. All items prescribed on the discharge medication chart were redeemed by 854 (74%) of the patients of which 510 (60%) was female and 344 (40%) male.

Of the remaining 307 (26%) of patients for who discharge medication was prescribed but who did not or partly redeem the medication, 182 (59%) were female and 125 (41%) male.

Although there is much controversy in the literature regarding gender and compliance, some studies also reported that gender was no significant predictor of compliance (Kane & Shaya, 2007).

According to the results there were no significant differences in redeeming medication after hospitalization between different gender types. Non filling of prescribed items was also not observed to be more specific to a gender type.

The second objective of the study was to determine the average value of a discharge prescription. The average value of a discharge prescription at this private hospital can be calculated at R294.54 (R341 961.39, N = 1161, the average value per item at R126.60 (290 552.09, N = 2293) and the average items per TTO were calculated at 2.8 items with a median number of 2 items.

The third objective was to determine the value of TTO prescriptions not collected. According to the results the following proportions of items was redeemed (84%), partly redeemed (5%) and not redeemed (11%). The total value of items redeemed was calculated at R363564.37 and the total value of not redeemed was calculated at R67356.55.

The fourth objective was to determine the types of TTO medication for which primary non-compliance was observed most frequently. Four reasons and five types of medication together accounted for 30 781 or 54% of the total value not redeemed, these medication types included blood and haematopoietic agents, analgesics, antimicrobials and gastrointestinal tract agents.

The next purpose of the study was to determine possible problems with TTO prescriptions and possible reasons for primary non-compliance. Patients interviewed could give more than one reason for not redeeming their prescriptions.

The following reasons for not redeeming prescriptions were identified from the explanations given by patients: 48 patients redeemed the medication at another pharmacy, 18 patients did not know a prescription had been prescribed, 20 patients took own decision not to fill the prescription, 11 patients thought that there was insufficient communication from nursing staff regarding discharge procedures, 8 did not redeem the medication due to financial reasons and only 2 indicated that they had a lack of confidence in the doctors ability, prescribed regimen and or quality of care.

According to the literature similar reasons for not claiming prescriptions were observed. Reasons observed in the literature included: patients did not know a prescription had been ordered, patients had some of the medicine at home, patients forgot the prescription and patients thought the wait in the pharmacy was too long (Papke, 1999).

According to a recent study Södergard (2008) also reported that one of the reasons for primary non-compliance is that patients feel that there is no need for the drug prescribed. According to Södergard some of the interviewed patients also reported that they were not aware that a prescription was issued and sent to the pharmacy.

According the results there was however an association between the amount of items prescribed and whether all discharge medication was redeemed in full. It was found that patients who did not redeem all items prescribed had significantly more items on their TTO prescriptions than those who redeemed all the medication prescribed.

According to a study by Taylor & Harding, (2001) some patients may fail to redeem prescriptions because they can not afford to pay the prescription charge or co-payment. Their study on primary non-compliance involved nearly 5000 patients attending a large general practice in England and showed that non-exempt patients redeemed significantly fewer prescriptions than those who were exempt from charges. This suggests that costs may be a barrier to compliance for certain patients. Further research is needed to clarify the impact of prescription cost on compliance.

Although financial reasons were given by eight patients for not redeeming discharge medication, the subjects without medical insurance were more likely to redeem all items on the discharge prescription in full. This observation might be related to the location of the hospital being situated in an upper-class residential area.

A correlation between hospital stay and proportion of non-compliant patients was observed in this study. The longer duration of hospital stay, the proportion of non-

compliant patients tends to increase. This observation does not seem to be significant but further research regarding this observation is needed.

Eighteen of the twenty patients whom decided not to redeem their discharge medication had been prescribed analgesics. This seems to be the same in the literature as Saunders (1987) also found analgesics and muscle-relaxants accounted for 45% of prescriptions not filled.

No literature could be found regarding studies done on primary non-compliance in Africa or South Africa.

Health care workers should be aware of the existence of primary non-compliance. Every hospital should evaluate the extent of primary non-compliance and the reasons leading to its existence in their setting. For private hospitals financial gain could be used as a motivator for change, as there is a mutual benefit for both patient and provider the private hospital could allocate resources and appoint pharmacists to ensure primary non-compliance is minimized, this will in return ensure patients are more primary compliant and better outcomes is achieved.

Every hospital should also evaluate the reasons for primary non-compliance in their setting and ensure preventable measures and care is taken to eliminate these factors and find possible solutions for lowering the current primary non-compliance rate. A sample size of 150 to 200 can provide an acceptable reflection of the population (Fowler, 1993).

Special care should be taken not to expect too much compliance; we need to look at compliance from both the patient and provider point of view. Patients for example might be expected to continue with treatment although they do not suffer any pain. As with the findings in this study intentional primary non-compliance might indicate the need to ensure that clinicians reach concordance with their patients, and should also consider other alternative medication that the patients might already have at home before prescribing. By asking the patient “do you have any medication for pain at home?” might reduce over prescribing and costs to the patient.

CHAPTER 6: RECOMMENDATIONS

Every hospital should evaluate the existence of primary non-compliance in their hospital setting.

Every hospital should also evaluate the reasons why primary non-compliance occurs in their setting and implement the necessary systems to minimize primary non-compliance.

A telephonic reminder system could be implemented to ensure that patients are informed of discharge medication being prescribed for them.

Special care should be taken to ensure proper provide and patient interaction and communication regarding discharge medication and the discharge process.

The hospital dispensing and information system could be programmed to identify patients whom did not redeemed discharge medication from the hospital pharmacy and a daily report would enable pharmacy staff to make follow-up telephone calls to those patients whom did not redeem their discharge medication to ensure that these patients are informed of discharge medication being prescribed.

The physician could also be notified that his/her patient did not redeem their discharge medication.

Pharmacists could be incorporated in the discharge planning; ensuring patients are informed regarding their medical aid rules related to discharge medication.

Pharmacists could also assist in identifying items that need prior authorization from the medical aid e.g. haematopoietic agents, and ensure the necessary motivations and authorizations are done to reduce possible time delays.

A discharge medication program that enables discharge medication to be delivered to the patient in the ward by a pharmacist could significantly improve compliance in this category.

CHAPTER 7: CONCLUSION

Four reasons and five types of medication together accounted for 54% of the total value not redeemed. These four reasons included: Medical aid TTO rules, patient unaware of TTO being prescribed, ward stock given and patient have stock at home.

The reasons why patient do not redeem medication at discharge indicate that several solutions could be implemented to improve primary compliance.

Incorporation of a pharmacist in the discharge planning could result in better outcomes, the pharmacist could inform patients regarding their medical aid rules related to discharge medication.

Communication and education might be a solution for reducing the primary non-compliance rates of discharge prescriptions. Patients reported that they were not aware of discharge medication being prescribed for them. This illustrates the need for a solution. The discharge process should be re-evaluated and redesigned ensuring all patients for whom discharge medication were prescribed are properly informed of such a prescription. The importance of provider and patient interaction and communication cannot be overstated (Papke, 1999).

Ward stock is intended to be used by the patient during his/her hospital stay.At discharge a proper system to credit all ward stock that was not used could eliminate ward stock being handed to the patient.

Some patients reported that they took own decision not to redeem the medication and some still had stock at home, a fact that should lead healthcare providers to ensure that they reach concordance with their patients. If providers discover that patients still have adequate supplies of medication at home, these items should be removed from the discharge medication prescription.

The five types of medication included: blood and haematopoietic agents, analgesics, unclassified, antimicrobials and agents of the gastrointestinal tract.

Most of the blood and haematopoietic agents need prior authorization from medical aid to be paid from the insured benefit option. Early communication between the clinician and pharmacists could ensure authorization is obtained before patient is discharged from hospital.

If patients reported that they had adequate pain medication at home, proper communication could reduce the risk of prescribing items that the patient already has at home. Physicians and pharmacists should take this in consideration to prevent issuing unnecessary medication.

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ANNEXURE A: Patient Data Collection Sheet

PATIENT DATA COLLECTION RECORD

Subject Number:

Discharged from Ward: ***Patient Number:***

age

Date of birth ***Gender:***

Discharged Date ***Medical aid code:***

Was any discharge medication prescribed for this patient?

Number of items on TTO

Value of TTO medication dispensed to this patient on the Hospital System (0 if none)

Value of TTO medication dispensed to this patient on the Retail System (0 if none)

Any item on TTO not Dispensed ***If YES please list products below***

Any item on TTO only partially dispensed ***If YES also list below***

These items must be captured under the Items Summary Sheet

	Product name	Strength	Dosage form	Quantity	Value	Remarks

Was a TTO Prescribed for this patient but No medication redeemed from the Pharmacy

If yes Patient should be contacted and telephonic interview questionair attached

ANNEXURE B: Approval Letter from Hospital

NETCARE

Tel: +27 (0)12 422 2300
Fax: +27 (0)12 990 5529
Cnr Garstfontein and Netcare Roads, Moreleta Park, South Africa
Private Bag X391, Pretoria, 0001, South Africa
www.netcare.co.za

17 July 2008

Mr DF Kruger

LETTER OF PERMISSION TO CONDUCT RESEARCH IN A NETCARE FACILITY

Nursing Manager: Ella McGregor
Hospital Manager: Bets Welman

Cc: Ella McGregor/Bets Welman
Human Resources Manager: S Molema

RESEARCH IN PRETORIA EAST HOSPITAL

It is with pleasure that we inform you that your application to conduct research on ***"Evaluating Patient compliance to collecting discharge medication"*** at Pretoria East Hospital site has been successful, subject to the following:

i) All information with regards to Netcare will be treated as confidential.
ii) Netcare's name will not be mentioned without written consent from the Academic Board of Netcare.
iii) Where Netcare's name is mentioned, the research will not be published without written consent from the Academic Board of Netcare.
iv) A copy of the research will be provided to Netcare once it is finally approved by the tertiary institution, or once complete.
v) All legal requirements with regards to patient rights and confidentiality will be complied with.

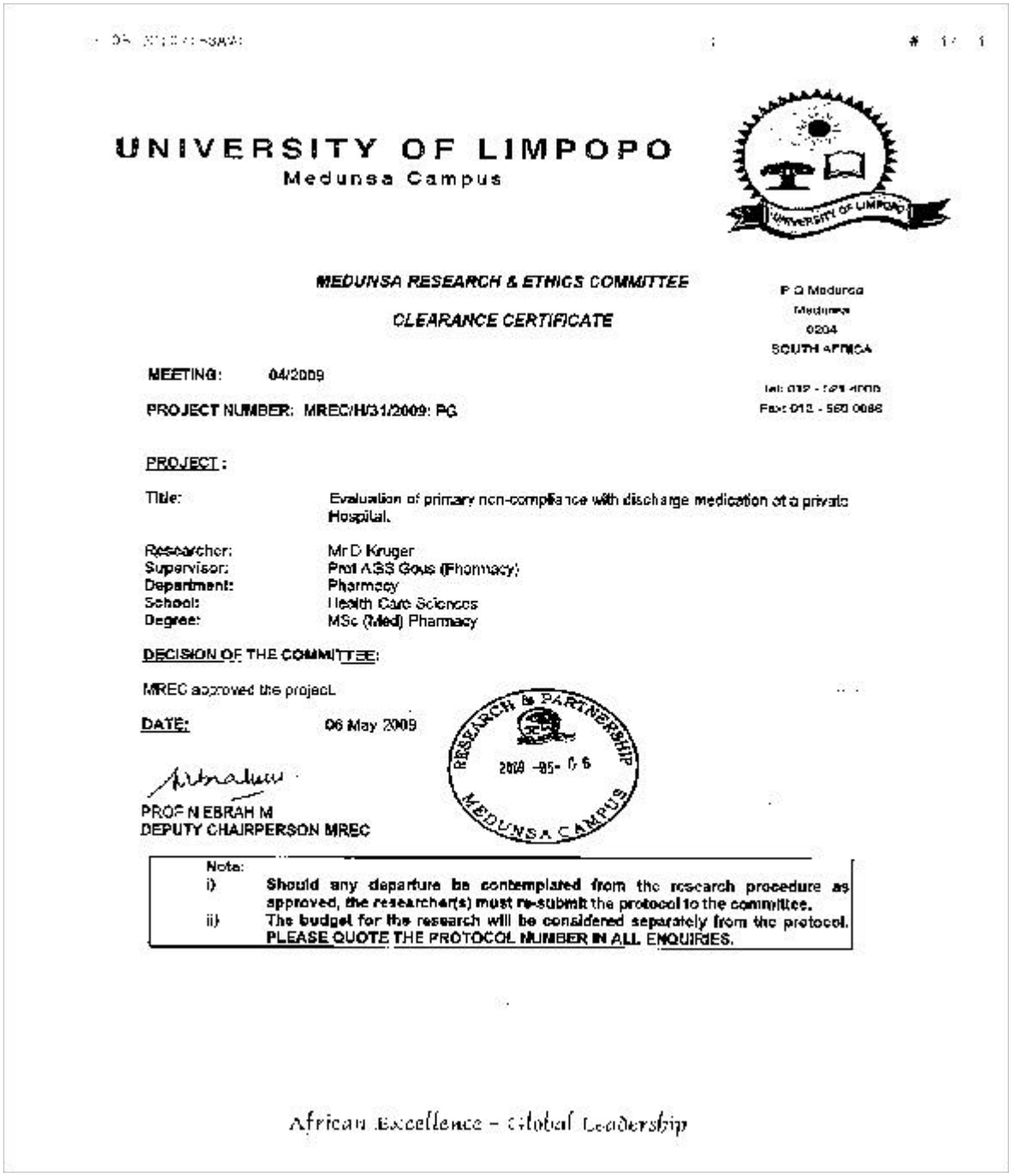
We wish you success in your research.

Yours faithfully

BETS WELMAN
HOSPITAL GENERAL MANAGER

Netcare Hospitals (Pty) Ltd T/A Netcare Pretoria East Hospital
Directors: ...
J du Plessis, K L Gerhurst, V E Firman, R H Friedland, M I Sacks
Company Secretary: L Bok   Reg. No. 1996/006501/07

ANNEXURE C: Approval Letter from MREC



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MEDUNSA RESEARCH & ETHICS COMMITTEE

CLEARANCE CERTIFICATE

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0204
SOUTH AFRICA

Tel: 012 - 521 4000
Fax: 012 - 560 0086

MEETING: 04/2009

PROJECT NUMBER: MREC/H/31/2009: PG

PROJECT:

Title:	Evaluation of primary non-compliance with discharge medication at a private Hospital.
Researcher:	Mr D Kruger
Supervisor:	Prof ASS Gous (Pharmacy)
Department:	Pharmacy
School:	Health Care Sciences
Degree:	MSc (Med) Pharmacy

DECISION OF THE COMMITTEE:

MREC approved the project.

DATE: 06 May 2009

RESEARCH & PARTNERSHIP 2009 -05- 06 MEDUNSA CAMPUS

PROF N EBRAH M
DEPUTY CHAIRPERSON MREC

Note:
i) **Should any departure be contemplated from the research procedure as approved, the researcher(s) must re-submit the protocol to the committee.**
ii) **The budget for the research will be considered separately from the protocol.**
PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES.

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ANNEXURE D: Types and value of items not redeemed by different age groups

Age group	Types of items (MIMS classification)	Value of items			
		Redeemed at hospital pharmacy	Not redeemed at hospital pharmacy	Redeemed at another pharmacy	Not redeemed at all
Under 1 year	Unclassified items		1 625		1 625
	Leukotriene receptor antagonist		1 020	81	939
	Combinations (bronchodilators)		723	179	544
	Glucocorticoids		562		562
	Analgesics and antipyretics		478	19	459
	Anti-histamines		313		313
	Penicillins		306	144	161
	Mouth and throat preparations		276		276
	Corticosteroids		244	87	157
	Anti-viral agents		241		241
	Top ten types of items, subtotal	n/d	5 787	510	5 276
	Other	n/d	1 394	187	1 208
	Total	**11 099**	**7 181**	**697**	**6 484**
2 to 20 years	Unclassified items		1 224	213	1 011
	Combinations (analgesic)		1 187	527	660
	Anti-coagulants		1 053	526	526
	Corticosteroids		877	169	709
	Insulins		848	848	
	Specific cyclo-oxygenase 2 inhibitors		739	435	305
	Surgical non-specific		407	253	154
	Anti-epileptics		385		385
	Combinations (bronchodilators)		353		353
	Other GI meds		330	223	106
	Top ten types of items, subtotal	n/d	7 402	3 195	4 207
	Other	n/d	3 486	1 152	2 334
	Total	**41 891**	**10 888**	**4 347**	**6 542**
21 to 50 years	Anti-coagulants		4 687	75	4 612
	Quinolones		3 658	378	3 280
	Combinations (analgesic)		3 404	1 576	1 828
	COX Inhibitors		1 320	710	610
	Progestogens		1 302	1 302	
	Urinary antiseptics		1 238	696	541

Age group	Types of items (MIMS classification)	Value of items			
		Redeemed at hospital pharmacy	Not redeemed at hospital pharmacy	Redeemed at another pharmacy	Not redeemed at all
	Unclassified items		1 053	405	648
	Specific cyclo-oxygenase 2 inhibitors		860	101	758
	Histamine-2-receptor antagonists		670		670
	Other urinary system meds		426	426	
	Top ten types of items, subtotal	n/d	18 617	5 671	12 946
	Other	n/d	5 893	1 452	4 441
	Total	**171 922**	**24 510**	**7 123**	**17 388**
51 to 70 years	Anti-coagulants		5 367	92	5 274
	Combinations (analgesic)		3 194	1 217	1 976
	Specific cyclo-oxygenase 2 inhibitors		1 980	449	1 531
	Histamine-2-receptor antagonists		1 654	410	1 244
	Quinolones		1 263	1 155	108
	Surgical non-specific		1 256		1 256
	Unclassified items		1 163	409	754
	Proton pump inhibitors		1 094		1 094
	Anti-epileptics		992	226	767
	COX Inhibitors		591	591	
	Top ten types of items, subtotal	n/d	18 553	4 550	14 003
	Other	n/d	3 564	1 486	2 078
	Total	**89 526**	**22 117**	**6 036**	**16 081**
over 70 years	Anti-coagulants		2 603	28	2 575
	Haematinics		2 367		2 367
	Urinary antiseptics		1 083		1 083
	Combinations (analgesic)		1 042	361	681
	Anti-arrhythmics		941	941	
	Combinations (bronchodilators)		841	443	398
	Anti-epileptics		759		759
	Specific cyclo-oxygenase 2 inhibitors		649	101	548
	Unclassified items		581		581
	Insulins		489		489
	Top ten types of items, subtotal	n/d	11 356	1 875	9 481
	Other	n/d	2 734	1 526	1 208
	Total	**25 472**	**14 090**	**3 401**	**10 689**
All	**Grand total**	**339 910**	**78 787**	**21 603**	**57 184**