PRESCRIPTION ERRORS AT THE UNIVERSITY COLLEGE HOSPITAL, IBADAN, NIGERIA.

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DEDICATION

This work is dedicated to the Triune God, by who all things are created. He is the Almighty God who made this possible. To Him alone be the Glory, Honour, Majesty and Power.

Also to all patients who are victims of prescription errors.

ABSTRACT

The problem associated with medication arising from prescription error is widespread and has received public attention. Prescription error is a dimension of quality of care seldom used because of lack of data There is a dearth of knowledge on prescription error in the Nigerian health care systems. This study examined the prevalence of prescription errors in the University College Hospital (UCH) Ibadan.

Prescription sheets from the different pharmacy points at the UCH were selected using a three-stage sampling method. A pool of error descriptors was collected through literature review out of which twelve with the highest face validity were selected. A total of 1866 prescription sheets from the four pharmacy points namely, Medical-Out-Patient (MOP), General Outpatient (GOP), Wards, and Accident and Emergency (A&E) were reviewed. The process of dispensing was also observed for thirty minutes for two days at the pharmacy points to see how prescriptions were handled to avoid prescription errors. In depth interviews were conducted with five pharmacists and five physicians from the departments of Pediatrics, Surgery, Medicine, Ear, Nose and Throat (ENT), and Accident and Emergency (A&E). Descriptive analysis was used to analyse the quantitative data while content analysis was performed for the in-depth interview data.

A total of 1424 (76%) prescription errors were detected. The error types were: illegitimacy (no date, no sig.) 52%, omission (no dose, no dosage form, no dosage frequency, no duration, and no strength) 24%, style (illegal abbreviation and writing) (19%) wrong dose (5%) and irrational prescription (polypharmacy and PRN meaning when necessary) 0.8%. Prevalence of prescription errors by units were 33.6% in the wards, 24.6% in GOP, 23.4% in MOP, and 18.5% in A&E, ($p>0.05$). From the prescriptions observed, the age group affected most by prescription errors was between 35-49 years (58.1%). Drugs affected by prescription error were infusions (29.0%), analgesics and routine drugs (18.0%), anti-infectives (17.0%) antimalarials (13.0%) and those used in emergencies such as hydrocortisone (12.0%). Only 10% of the errors were detected and corrected during the process of dispensing, while 90% were not. Information given to patients at the pharmacy points were also not adequate to avert prescription errors. Of the 19 observation indicators set, only (36.8%) met the observation to practice criteria. The in-depth interviews revealed that workload and unconducive work environment adversely affected productivity of prescribers and dispensers. In-depth interviewees revealed that the institution does not have a written policy or format on reporting and handling prescription errors, neither is

a system put in place to monitor, evaluate and prevent medication errors arising from prescription errors

Prescription errors are common in the drug use system of the UCH. It is therefore recommended that regular in-service training for prescribers and dispensers, equitable distribution of workload and institution of a quality assurance mechanism for monitoring the drug use system be implemented in this institution.

Key Words: Prescription error, Health workers, Prevalence, Pharmacy drugs
Word Count: 469

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CERTIFICATION

I certify that this project was carried out by OLUWOLE, Kayode Simon in the Department of Health Promotion and Education, Faculty of Public Health, College of Medicine, University of Ibadan under my supervision.

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GLOSSARY OF ABBREVIATIONS

ADE's:	Adverse Drug Effects.
AIDS:	Acquired Immune Deficiency Syndrome.
BNF:	British National Formulary - a pocket guide on drugs.
CPOE:	Computerized Physician Order Entry.
DAW:	Dispense as written.
FDA:	Food and Drug Administration.
IOM:	Institute of Medicine
JAMA	Journal of American Medical Association
ISMP:	Institute of Safe Medical Practice.
NAFDAC:	National Agency for Food and Drug Administration and Control
NHS:	National Health System.
NSAID:	Non Steroidal Anti-Inflammatory Drug.
PRN:	When necessary.
℞:	An order to prepare or dispense.

OPERATIONAL DEFINITIONS OF TERMS

Prescription Error	A prescription writing that does not result as intended
Irrational Use of Drugs	Prescription of drugs that is not appropriate to meet with the clinical requirements of the patients
Error of Style	This refers to unacceptable abbreviation and illegible writing
Prescription Error of Illegitimacy	These are prescriptions that contain no date, and no age and so makes it of no legal tender
Filling of Prescription:	A process of dispensing drugs to patients
Misfill:	This refers to wrong dispensing.
Polypharmacy:	Prescriptions that contain more drugs than necessary.
High Alert:	Potent drugs that could be very dangerous if wrongly used.
Routine Drugs:	Drugs not meant for any specific ailments, they are prescribed in combination with specific drugs, for example; multivitamins.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

A medication is a pharmaceutical product used in or on human body for the prevention, mitigation, diagnosis and/or treatment of disease or for the modification of physiological function. When medications are prescribed for a patient, the intent is to improve the patient's quality of life by curing a disease, reducing or eliminating the symptoms of a disease, arresting or slowing a disease process, or preventing a disease or its symptoms from appearing in the first place (Helper and Segal 2003). A medication is however a two-edged sword, it cuts both ways. The same dose of medication given to two different people may cure one and harm the other.

Human beings increasingly come in contact with powerful medications that possess great potential both to heal and to harm. Used correctly, prescribed medications and those purchased by consumers directly can be the single best means of staying healthy, getting better and controlling chronic health problems. The right medication, in the right amount administered to the right patient can produce a "medical miracle".

Error is defined as the failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim (Kohn, Corrigan and Donaldson 1999). Errors can happen in all stages of the care process, from diagnosis to drug administration. According to Reason (1990), errors depend on two kinds of failures, either the correct action does not proceed as intended (an error of execution) or the original intended action is not correct (an error of planning).

Not all errors result in harm. Errors that do result in injury are sometimes called preventable adverse events. An adverse event is an injury resulting from a medical

Errors could also be classified as omission or commission. Error of Omission occurs when information essential to filling the prescription for example, drug, dose or dosage form are missing. These errors are thought to incur minimal risk to the patient because the prescription would not be filled. Errors of Commission consist of the prescriber incorrectly specifying the dosage regimen or strength of the prescription or the occurrence of therapeutic duplication. Those errors could harm the patient because the prescription could be filled (Cerulli 2001).

More and more drugs are being approved each year many of them with similar names. When it comes to drug errors, physicians have traditionally received most of the blame because they choose most medications, write and sign it. They are therefore the ones who take the blame when things go wrong.

With the number of prescription expected to go up into billions with time, and the number of pharmacists, steadily decreasing, there are bound to be more problems down the road.

A clinically meaningful prescription error has therefore been defined (Dean 2000) as a prescribing decision or prescriptions writing process that results in unintentional significant reduction in the probability of treatment being timely and effective or increase in the risk of harm, when compared with generally accepted practice. Prescribing without taking into account the patients' clinical status, failure to communicate essential information, and transcription errors are all considered prescribing errors.

1.2 Statement of the Problem:

In health care, building a safer system means designing processes of care to ensure that patients are safe from accidental injury. When agreement has been reached to pursue a course of medical treatment, patients should have the assurance that it will

proceed correctly and safer so they have the best chance of achieving the desired outcome

Concerns of medication error arising from prescription errors have become a hot topic in the medical communities as well as in the lay press This is due to the steady increase in the use of prescriptions medications The rate of injury from botched prescriptions is sky rocketing Prescripoon error represents the largest single cause of errors in the hospital setting (Philips, David, and Christenfed, 1998)

There are as many as 7000 deaths annually in the USA from incorrect prescriptions more than the number of deaths resulting from work place injuries As many as 5% of the 3 billion prescriptions filled each year are incorrect (Philips et al, 1998)

Prescribing is becoming increasingly difficult, and the inherent risks of adverse reactions and interactions have increased Modern drugs are pharmacologically complex, the population is ageing, and the use of polypharmacy is increasing The root cause of prescribing errors among final year medical students in the United Kingdom has been documented to be the lack of an integrated scientific and clinical knowledge base (Boteham, Mawer and Foster 2003)

Another fundamental problem according to Walley et al (1994) is that medical students are not adequately instructed In 1994, the United Kingdom medical students received a median 61 hours of teaching related to pharmacology, clinical pharmacology and therapeutics Since then, the numbers of pharmacologists in the UK (and thus the amount of teaching) have fallen In contrast nursing students seeking to obtain postgraduate certificate in prescribing from the University of Liverpool must complete a training course of 162 hours of theory and 90 hours of practice (Walley, Hilgh and Orme1994)

All prescribers are fallible yet most prescriptions are perceived to be correct, suggesting an emphasis on basic prescription skills and knowledge coupled with appropriate use of a prescribing reference (Dean, Schacter and Vincent 2000)

When professionals talk to each other about a patient's medicines, often they only make the name of the medicine explicit, leaving vital information about the dose, form, and frequency implicit. On a consultant ward round it is not unusual to hear something like "Put them on digoxin". There is no mention of checking that the dose will suit the body weight and renal function, nor a debate about starting with a loading dose, nor a check that the patient is not on interacting drugs, nor a suggestion about if and when the plasma concentration might (or should) be measured (Barber et al 2003)

At present, pharmacists routinely intervene errors but only give the feedback to the prescribers while preventing and correcting error. This has two problems: (1) errors are not shared across the team and (2) this does not enable a hospital-wide study and national issues nor to develop strategies for their reduction. The recent focus on errors by the UK Department of Health, the US Audit Commission and this study means that now may be an appropriate time to revisit these ideas. (Nadeen 2000)

There is a dearth of knowledge or information about prescription error in the Nigerian health system. The author of Pharmanews, Pharm. Alucyl a seasoned publisher and organizer of seminars and continued education on pharmaceutical practices and other health matters for the first time ever included this topic in one of his seminars for the year 2006 but had to delete it for lack of resource persons (Personal discussion with Pharm. Alucyl Ifeanyi)

The problem associated with the prescription medication is wide spread and it has received public attention. The America Institute of Medicine released its year 2000 report in which the safety of the patient was highlighted. The theme was "To Err is Human - Building a safer Health System for the 21st century". It recognized the importance of medication errors arising from prescription errors. According to this report, 44,000 to 98,000 Americans die each year as a result of such errors. This statistics is associated with a cost of $17 to 29 billion and rank medication error due to prescription error as the 8th leading cause of death in the United States with the number of deaths exceeding those associated with motor vehicle accidents, breast cancer or AIDS (Institute of Medicine 2000)

Public health officials warn that medication mix-up is a common problem. No one knows exactly how common because no one in the health care system is required to report it. No accurate records are kept. Even when the outcome is not death, errors decrease quality of life by affecting the mind and body's ability to function normally.

It is also important to note that prescription is a relatively neglected skill that has no simple or single solution to its improvement, rather a range of different measures is needed in order to make a significant breakthrough.

One problem in preventing drug errors is that the existing data are imprecise. No one really knows how many drug errors are being made said Dr Brian Strom (1999), a Pharmacologic epidemiology specialist at the University of Pensylvania Medical School.

1.3 Justification for the study.

When a "misfill" occurs, there are two related consequences, one is that the patient does not take correct medication needed to treat an illness or conditions, the second is that the patient takes a medication that was not prescribed and is likely to be dangerous. Sadly, permanent injury or death sometimes results.

The quality of healthcare is so important that it cannot be compromised. Medical errors fall into a measure of quality of healthcare. There are several reasons for this. First, errors are responsible for an immense burden of patient injury, suffering and death. Second, errors in the provision of health services, whether they result in injury or expose the patient to the risk of injury, are events that everyone agrees just should not happen. Third, errors are understandable to the general public. Fourth, there is a sizeable body in other industries to draw upon in tackling the safety problems of the healthcare industry. Fifth, the healthcare delivery system is rapidly evolving and undergoing substantial redesign which may introduce improvement, but also new hazards (Institute Of Medicine 1999).

The United States of America and even Nigeria suffer from a lack of an adequate system for collecting, processing and analyzing data about prescription effects.

especially after medications are approved for marketing by the Food and Drug Administration (FDA) (NAFDAC) In the US, although the FDA's medication watch program collects spontaneous reports of suspected adverse effects in the general population, these reports rely on voluntary accounts and are not adequate to develop a database that can be used to extract general information about prescription-related problems. The absence of focus in such related problems, along with funding constraints has resulted in a lack of data on prescription-related effects (Ray, Griffin and Avorn, 1993) This present research work will therefore be a sort of database where others can proceed from

Case studies reveal that the same mistakes are repeated over and over by physicians, regardless of specialty and status. While some of the errors appear very obvious, the fact that they happen again and again necessitates a reminder. When a physician takes time to communicate effectively and prescribe medications knowledgeably the rate of errors will decrease

This serious concern in health care if discussed at all is done only behind closed doors because most health care givers have little or no knowledge about it. As health care and the system that delivers it becomes more complex, the opportunities for problems/error abound. Correcting this will require concerted efforts by the professionals, health care organizations, purchasers, consumers, regulator and policy makers. Traditional clinical boundaries and culture blame must be broken down

It is hoped that the findings of this study can serve as a call to action that will illuminate a problem to which all are vulnerable. It is therefore necessary at this time of Nigeria's development to document these prescription-related problems which are ever present and yet seems not to be. These findings would therefore be useful in continue education programme for pharmacists and doctors on the significance of prescription errors as well as provide them with the tools to implement programme collaborations aimed at improving patient safety in the drug use system

1.4 Research Questions

1. What types of prescription errors are prevalent in University College Hospital (UCH), Ibadan?
2. What are the common causes of prescription errors in UCH, Ibadan?
3. What group of patients are mostly affected by prescription errors?

1.5 Broad Objectives

The broad objective of this study was to examine the prevalence of prescription errors at the University College Hospital (UCH), Ibadan

1.5.1 Specific Objectives

The specific objectives were to

1. To identify different types of prescriptions errors in UCH Ibadan
2. To identify the common causes of prescription errors in UCH, Ibadan
4. To determine the categories of patients mostly affected by prescription errors

CHAPTER TWO

LITERATURE REVIEW

2.1 Medical Prescriptions

A medical prescription (R.) is an order (often in written form) by a qualified health care professional to a pharmacist or other therapist for a treatment to be provided to their patient. It is a legal document which not only instructs in the preparation and provision of the medicine or device but indicates that the prescriber takes responsibility for the clinical care of the patient and the outcomes that may or may not be achieved (Wikipedia the free encyclopedia 2008)

Prescriptions are typically hand written on preprinted prescription forms that are assembled together into pads. Preprinted on the form is text that identifies the document as a prescription, the name and address of the prescribing provider and any other legal requirements such as registration number. Unique for each prescription is the name, age and address of the patient. There is also the doctor's signature. Appendix I – types of prescriptions used in UCH

2.1.1 Content of a prescription

Both pharmacists and physicians are regulated professions. A prescription as a communications mechanism between them is also regulated and a legal document. Regulations may define what constitutes a prescription, the contents format and how they should be handled and stored by the pharmacist. Many brand name drugs have less expensive generic drug substitutes that are chemically equivalent. Prescriptions also may contain instructions on whether the prescriber will allow the pharmacist to substitute a generic version of the drug. This instruction is communicated in a number of ways. In some jurisdictions, the preprinted prescription contains two signature lines: one line has "dispense as written" printed underneath, the other line has

"substitution permitted" underneath. In other jurisdictions the protocol is for the prescriber to handwrite one of the following phrases "dispense as written" "DAW", "brand necessary", "do not substitute", "no substitution", "medically necessary" do not interchange. (Wikipedia, the free encyclopedia 2008)

In some jurisdictions, it may be a legal requirement to include the age of a child on the prescription. For pediatric prescriptions some advise the inclusion of the age of the child if the patient is less than twelve and the age and months if less than five. (In general, including the age on the prescription is helpful) Adding the weight of the child is also helpful.

Some prescribers further inform the patient and pharmacist by providing the indicator for the medication, that is, what is being treated. This assists the pharmacist in checking for errors as many common medications can be used for multiple medical conditions.

Some prescriptions will specify whether and how many "repeats" or "refills" are allowed, that is whether the patient may obtain more of the same medication without getting a new prescription from the medical practitioner. Regulations may restrict some types of drugs from being refilled.

In group practices, the preprinted portion of the prescription may contain multiple prescribers' names. Prescribers typically circle themselves to indicate who is prescribing or there may be a checkbox next to their name (Wikipedia, the free encyclopedia)

2.1.2 Handling of Prescriptions

When filled by a pharmacist, as a matter of business practice, the pharmacist may write certain information right on the prescription e.g. name, strength and quantity of drug given. He is also required to sign on the prescription. This could be a legislation requirement.

Prescriptions are assigned a prescription number (often abbreviated R. #) that is unique to the pharmacy that filled it. This has the practical purpose of uniquely identifying the prescription later on. The prescription number is also put on the label on the dispensed medication. The patient may be required to reference the prescription number for refills and drug insurance claims. (Wikipedia the free encyclopedia 2008)

2.1.3 Writing Good Prescriptions

Independent of the actual prescription decision, elements of good prescription writing include

- careful use of decimal points to avoid ambiguity
  - avoid unnecessary decimal points: 5ml instead of 5.0ml to avoid possible misinterpretation of 5.0 = 50
  - always zero prefix decimals e.g. 0.5 instead of .5 to avoid misinterpretation with .5 = 5
  - never have trailing zeros on decimals e.g. use 0.5 instead of 50 to avoid misinterpretation with .50 = 50
  - avoid decimals altogether by changing the units 0.5g = 50mg
- "mL" is used instead of "cc" or "cm^3" even though they are technically equivalent
- Directions should be written out in full in English although some common Latin abbreviations are listed below
- Quantities can be given directly or implied by the frequency and duration of the directions
- Where the directions are "as needed" the quantity should always be specified
- Where possible, usage directions should specify times (7am, 3am, 11pm) rather than simply frequency (3 times a day) and especially relationship to meals for orally consumed medication
- Use permanent ink

- Avoid unspecified *prn* or "as needed" instructions – limits and indicators should be provided e g. "every 3 hours prn pain"
- For refills, minimum duration between repeats and number of repeats should be specified.
- Provide the indication for all prescriptions even when obvious to the prescriber so that the pharmacist may identify possible errors. This step facilitates professional pharmacist counseling, reinforces care plans and provides multiple opportunities for patient education
- Avoid non-standardized units such as "teaspoons" or table spoons". Write out numbers as words and numerals ("dispense #30 (thirty)") as in a bank draft or cheque. (Wikipedia, the free encyclopedia 2008)

Just as verbal drug orders can be vague and confusing, so to can handwritten drug orders are confusing and potentially dangerous. Hand written prescriptions are still used and many times the hand writing is poor if not illegible. Poor handwriting is a known cause of adverse drug events. One study for example, reported that more than 30% of pharmacies investigated (n=245) filled prescriptions for potentially lethal drug combination (Cavuto, Woosely and Sale1996). The use of computerized pharmacy orders rather than handwritten prescriptions is increasingly common in today's practice setting because they are an effective way of improving medication safety. Computerized Physician Order Entry (CPOE) systems have automatic safety functions, such as allergy alerts and drug interaction alerts as well as valuable tracking and record keeping functions. (Schiff and Rucker 1998)

2.1.4 Risky Abbreviations

Risky abbreviations are abbreviations used by prescribers and when misinterpreted can be fatal prescription errors. They also have a high potential of being confused. Prescribers should avoid the use of abbreviations, including those for drug names, because they can frequently be misunderstood.

Some examples of risky abbreviations compiled by the Institute for Safe Medication Practices (ISMP) include

- ug (microgram) – can be mistaken for "mg" when handwritten and should be written as mcg
- q d or QD (every day) – can be mistaken as q i d especially if the period after the "q" or the tail of the "q" is misread as an "i" "daily" or "every day" preferred
- IU (international unit) – can be misread as IV, "units" preferred
- No zero before decimal point in dosage, for example, .5mg (for 0.5mg) – can be misread as 5mg (Institute for safe medication practice ISMP 1999)

The following examples of drug names that have been misinterpreted illustrate the importance of spelling out a medication's complete name

- AZT (zidovudine) can be misinterpreted as "azathioprine"
- CPZ (compazine) can be misinterpreted as "chlorpromazine"
- DPT (diphtheria-pertussis-tetanus) can be misinterpreted as "Demerol-Phenergan-Thorazine"
- HCT (hydrocortisone) can be misinterpreted as "hydrochlorothiazide"
- HCTZ (hydrochlorothiazide) can be misinterpreted as "hydrocortisone"
- $MgSO_4$ (magnesium sulfate) can be misinterpreted as "morphine sulfate"
- MSO_4 (morphine sulfate) can be misinterpreted as "magnesium sulfate"
- TAC (triamcinolone) can be misinterpreted as "tetracaine, adrenalin, cocaine"
- 5-ASA (5-aminosalicylic acid) can be misinterpreted as "five tablets of aspirin" (ISMP 1999)

2.2 Incidence and Prevalence of Prescription Error

Prescription errors are the most serious and important source of medication errors in the health care system. In the United States, it kills 7000 patients in one year (Kohn, Corrigan and Linda 2000) and account for nearly 1 in 20 hospital admission (a similar admission rate to that of cancer (Hepler and Segal 2003). In the United Kingdom hospital prescribers make errors in 1.5% of prescriptions (Dean Schneider and Vincent 2002) and in primary care errors occur in up to 11% of prescriptions

(Sanders and Esmail 2003). However, little is known about the current incidence of prescription error in the Nigerian health care system

The importance of prescription errors is magnified by the sheer frequency of prescribing. It is the most common form of treatment in the health care system globally. In the year 2000, 637 million prescriptions were written in the UK and accounted for 12.3% National health System (N.H.S) costs

2.3 Factors influencing Prescription Errors:

Individual Competence. - The poverty of teaching medical students about therapeutics in general and prescription in particular has been documented as a major source of concern to both educators (Rawlins, Maxwell and Walley 2003) and medical students themselves. These deficiencies have also been highlighted in two major national surveys (Callum, Carr, Gray and The Audit Commission UK, 2002)

According to this literature, once doctors start pre-registration training, they usually learn prescription by the accretion of shards of knowledge and then building up their own college skills and understanding. Dean, Barber and Rawlins (2002) in an interview with doctors who had made serious prescription errors (mostly inappropriate choice of doses), found that most had not been taught about doses. Usual practice reported was being told by senior colleagues which drug to prescribe or looking up the doses in the British National Formulary or the hospital formulary. Some of the respondent reported that they depended on pharmacist and sometimes nurses to tell them if the dose was wrong

Control. The control and transfer of information is another source of error. Much of prescribing involves copying the decision of another doctor and if this is inaccurately communicated, then prescribing errors ensue. This often happens at admission to or discharges from hospital, on transfers between general practices, and between doctors in a team. Barber et al (2003) documented that the environment in which the prescribers perform needs to be controlled in order to standardize it, they also need to have greater controls in riskier drugs

Culture - Barber et al (2003) further documented that there are several ways in which the organization culture contributes to the prevalence of prescribing errors. Firstly, the small amount of teaching in undergraduate courses, and the absence of teaching doses of drugs to house officers, all send a message that these issues are not important. Surely, if choosing the right drug, "for the right patient, at the right dose" matters, then it would be taught?

When patients are reviewed on ward rounds it is very rear to see a consultant look at the drug chart to review the overall prescription, whether the drugs have been administered correctly, and whether the chart is a mass of crossing out and conflicting information (Barber, et al 2003)

Much of a doctor's prescription is personal to them and not debated in the open. Hence, it is hard for any reflective learning to occur. Pharmacists' correction of prescriptions is usually just discussed with the prescribers and the information does not come out into the team for them to discuss and learn from. Even in primary care general practitioners will rarely discuss details of their prescribing with colleagues.

There are also structural issues as to why prescribing error is so prevalent. In secondary care, the hower structure is created vertically by clinical area. Medicines, however, go across all clinical areas although they are not a major issue for many clinical directors. Everybody uses them and has opinions about them, but there is rarely anybody with enough power or influence in either primary or secondary care to lead on them at a local level. A pharmacist is needed to review, and potentially prescribe, drugs in each practice if we are to make significant reduction in preventable drug related hospital admission. To be effective, this activity would have to tackle the issue of non-adherence (Barber, et al 2003)

Distraction

Regulators and patients implicitly expect individual physician attention and caution when prescribing medications and have accorded prescribing privileges based upon competence and constancy. However, modern physician-patient encounters are increasingly marked by competing demands limited physician attention. Compressed

within individual encounters is the need to address the patient's presenting concern while updating health histories, documenting adherence to disease-specific guidelines, selecting and ordering preventive care services, promoting healthy lifestyles, and defusing internet-induced anxieties. Concurrently, a background cacophony of unscheduled yet daily intrusions, such as pages, telephone calls and meetings, further disrupts patients care. Acknowledging and reducing these distractions are integral to decreasing prescription errors and protecting prescribing privileges (Teichman and Coffee 2002)

Though seemingly innocuous, disruptions and distractions account for a large portion of errors in all professional fields. Health care is not spared. In pharmacotherapy, approximately three quarters of transcription errors can be traced to distractions (Leape et al. 1995). Strategies used in other industries to reduce distractions include separating cognitive activities from secondary tasks and guarding cognitive performance with both physical and temporal barriers. For example, though now recognized for their security purposes, airline cockpit doors were originally introduced to reduce pilot's distractions. Additionally, acknowledging the role of fatigue on pilot's performance, federal laws mandate limits on their work hours. While neither law nor custom reduces distraction in medicine, distractions can be reduced within each patient encounter by separating competing demands from cognitive activities necessary to complete the "prescribing moment"

Though not always perceptible to patients, clinical encounters progress through various stages, with the prescribing of a medication as the penultimate activity. Because the physician is concentrating on accessing information and transmitting it to paper, this prescribing moment is typically the quietest time during the examination. Frequently patients use this time to expand their presenting concerns, seek advise on unrelated conditions or return to a prepared list of questions. To dedicate attention to the prescribing moments, prescribers should temporarily delay the patient's additional comments via verbal or nonverbal cues. For example, say, "let me complete your prescriptions, and then I will answer your question" or "Once I finish this, we will go over it together", or hold up a single finger as a delaying signal. Most patients expect and respect this dedicated prescribing time and realize that it is for their benefit (Teichman et al 2002)

To reduce the prevalence of prescribing errors to any extent, it is necessary to change the culture, so medicine would be seen as important. To do so, there is the need to have to treat medicines in special ways – by controlling access and use, and by ensuring competence in the prescribers. It will take time and resource but our future patients will reap benefits (Barber, et al 2003.)

2.4 Pharmaceutical Care

Pharmaceutical care was first defined by Mikeal (1975) as the care that a given patient requires and receives, which assures a safe and rational drug usage. Helper (1988) described it as a conventional relationship between a patient and a pharmacist in which the pharmacist performs drug use control functions with appropriate knowledge and skills governed by an awareness of and commitment to the patient's interest. In recent times, Pharmaceutical care is defined as the responsible provision of drug therapy for the purpose of achieving definite outcomes that improves the patient quality of life (Helper and Strand, 1990). These outcomes are: cure of disease, elimination or reduction of a patient's symptomatology, arresting or slowing down of a disease process, and prevention of a disease or symptomatology. It is a patient-focused, pharmacist-initiated service through which pharmacists, in collaboration with the patient and other health care professionals, design, implement and monitor a therapeutic outcome for the patient and thus improve the patient's quality of life and general wellness (Helper and Strand, 1990).

Pharmacists in all practice settings have been encouraged to provide pharmaceutical care to identify, prevent and resolve drug-related problems and reduce negative medication outcomes. Drug-related morbidity and mortality often are preceded by a drug-related problem (Hepler, 1990). Drug-related problems have been defined as events or circumstances involving a patient's drug treatment that actually or potentially interfere with the achievement of an optimal outcome (Strand , 1990). Most drug-related problems can be assigned to one of eight (1 of 8) categories listed below:

- Unnecessary drug therapy (drug without indication).
- Untreated indications.

- Improper drug selections.
- Sub therapeutic dosage.
- Overdosage.
- Adverse Drug Reaction
- Drug interaction
- Failure to receive drug

The first series of observations involved nine community pharmacies filling 5874 new prescriptions. Of those, 2.8% (153) required active intervention by the pharmacist. Approximately 51% of the errors were errors of omission and 29% that of wrong dose. Subsequent studies used two experts in pharmacotherapeutics to evaluate the clinical significance of the prescribing errors and interventions. The expert panel concurred that 38 of the errors would have resulted in harm to the patient had the pharmacist not intervened (Rupp et al 1992)

2.5 Patient Counselling

One to four percent of all visits to the emergency room are due to inappropriate use of medication that is no fault of the patients. Counseling at the point of delivery in the pharmacy is an area in which pharmacists can significantly improve medication safety and patient compliance. Pharmacist can help patients avoid medication mishaps and latent errors at home by providing with tips on medication safety (The American Pharmaceutical Association (APhA) and Foundation, 2000).

Equally important, patient counseling offers pharmacists a final opportunity to review a patient's medication and their proper use, and identify potential or outright medical errors. Approximately 25% of medication errors result because drug information is not available during prescription, dispensing and administration (Jackson and Wesley,2003)

2.6 Monitoring of Medical Therapy

The medication monitoring program is a concept with every evolving implication for the hospital and community pharmacists. The full involvement of the hospital

pharmacist in the functioning of the health care team is far from being complete However, in recent years, the status of the hospital pharmacist may be seen to have improved as he is now involved in ward and clinical situation more than previously in certain hospital in the country. He can still contribute more than he is presently doing in the specialized area of medication usage and monitoring. Pharmacist must interact more with the medical and nursing staff to facilitate greater exchange of information which may be to the ultimate interest of the patient. It is suggested that a record of patient's medication history should become an integral part of the patient's case note. The advantage of this system is that should the patient have causes to seek treatment or advice from his doctor, dentist or pharmacist, his current medical status comes readily to hand or should the patient be involved in an accident and be taken to hospital in an emergency, the hospital staff should know if the patient was taking medication which would have to be maintained or which incidents of death resulting from in advertent over medication might be prevented if the hospital pharmacist plays his very important role as a medication monitoring specialist in the healthcare delivery system (Coker 1999).

Patients are ever becoming conscious of their right to quality products and services. Pharmaceutical care is thus well structured to provide and ensure these expectations. Pharmaceutical care is therefore their right. It is therefore the pharmacist professional responsibility to provide and ensure patient's safety therapy through pharmaceutical care.

2.7 Educating Patients

Apart from patient counseling which usually takes place at the pharmacy, it will not be too much for patients to receive health talk from health educators and/or physicians.

Patient education is central to ensuring adherence to drug regimen. The patient must know what to do, when to do it and how to do it. This task is difficult and studies have shown that over one third of patients forget information given to them by physicians and a large percentage of patients do not understand general information additionally, physicians have a finite amount of time to spend with each patient. Consequently, physicians must be efficient and productive during visits to ensure that the patient

thoroughly understands the treatment regimen. The physician can employ a number of educational strategies to maximize the time spent with each patient and ultimately enhance patient's adherence to prescribed medication. Several of these strategies address the central information given to the patient, particularly the type, amount and timing of the information, as well as how it is organized, categorized and delivered (Reason, 1990).

2.8 Patients Susceptible To Prescription Errors

While all classes of patient deserve diligent prescribing attention, pediatrics, geriatrics and pregnant patients require the physician to exercise particular caution when administering or prescribing medications. The dosage of any newly prescribed or administered drug for these patients should initially be at the lowest effective level until the physicians is able to determine its effect on the patient and adjust the dosage appropriately (Online Continued Medical Education, 2006).

Pediatric Patient

Physicians prescribing for children must consider many variables, particularly age and weight, before writing a prescription for a child. Many medications safe for adults may be contraindicated for children.

Further, some drugs are specifically contraindicated in children at various ages. For example, sulfa antibiotics are contraindicated in new borns because of their competitive bindings with bilirubin and tetracyclines are contraindicated for children under age eight because of dental staining. Dosage calculation is critical in children because pediatric dosages are not always listed in reference manuals most medications are not packed in pediatric doses. To ensure correct calculation, it is imperative that a recent record of the child's weight is available to prevent under or overdosing the child. Furthermore, it is important to recognize conditions such as fever and dehydration when calculating dosage (Online Continued Medical Education, 2006).

Geriatric Patients

Elderly patients commonly receive multiple drugs, often from more than one provider. Since the incidence of adverse drug reactions increases as the number of medications increases, elderly patients are especially at risk for medication errors. Poly-pharmacy, compounded by drug interaction potentials and side effects from competing modes of action, can produce devastating consequences.

In addition, patients over 65years may experience physical changes that affect the distribution within the body and the metabolism of drugs. Renal and liver function, lean body mass and water decreases, while body fats increases. Cognitive skills, including ability to read, hear and comprehend instructions may decrease significantly with increasing age. When explaining a treatment regimen, physicians should consider the patient's cognitive skills as well as the cognitive skills of a spouse or other caregivers involved in administering medications (Online Continued Medical Education, 2006).

Drugs commonly associated with adverse effects in the elderly include systematic steroids, non-steroidal anti-inflammatory agents (NSAIDS), calcium channel blockers, beta-blockers and psychotropic.

Pregnant Patients

A common scenario is initiating medication use and discovering soon after that the patient is eight weeks pregnant and may have been exposed to a potentially teratogenic drug. Women of child bearing age should be treated as if they could be pregnant and teratogenic drugs should be prescribed with extreme caution (Online Continued Medical Education 2006).

1.0 Drug Classes and Drugs Commonly Associated With Prescription Errors

Several studies have reported on the drug classes and specific drugs commonly associated with medication errors arising from prescription errors. A study by Lesar, et al (1997) reported that antimicrobials, cardiovascular agents, gastrointestinal

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agents, non-narcotic analgesics/antipyretics were the common drug classes associated with medication errors. Premier Health Alliance (1991) reported that the most common drugs involved in errors were insulin, heparin solutions, warfarin sodium and potassium chloride. Additionally, the United State Pharmacopeias-institute for safe medication practices, Medication Error Reporting Programme (USP-ISMP MERP) identified the following drugs as particular problematic: Aminophylline-theophylline cancer chemotherapy; anticoagulants, local anesthetics, insulin, neuromuscular blockers, parenteral narcotics, vasoactive drugs, parenteral calcium salts and hypertonic solutions.

Different studies produce diverse result, but each documents the existence of a problem. Vigilance in prescription and dispensing practices can limit potential adverse outcome.

In 1993, another medication study identified 27 classes of drugs involved in professional liability claims. The study further delineated the percentage of claims and the percentage of indemnity paid for each drug. The three drug classes associated with the most frequent and severe claims were narcotics 15.9%, antibiotics 11.2% and glucocorticoids 9.3% (ISMP 1993).

Research indicates that medications errors arising from prescription errors are often preventable. In fact, serious medication-related problems are the most likely to be preventable. Most of them result from errors at the ordering or prescribing stage but may also occur at the administration stage. Prevention strategies should therefore target both stages of the drug delivery process ("Common Thread" sought as clinical errors continue to make headlines. 1995 American Journal of Nursing).

2.10 Attitude about Prescription Errors

Medication professionals including physicians, nurses and pharmacists do not deliberately commit medical errors. They are trained to deliver error free health care. However, when errors are discovered, there is an attitude of placing blame on the professional(s) involved. Formal punishment by the individual professional is sometimes administered resulting in fines, license suspension or even revocation.

Where medication errors are concerned, the question of who was involved is of less importance than what, how and why the system went wrong. An investigation of medication errors should begin with an analysis of the drug use and delivery channel within a health care system, rather than result in punitive actions. Although, there is no acceptable level of error within in the system, the goal of health care organization should be to evaluate errors when they occur and to make changes in the drug delivery process to prevent them from reoccurring in the future (Leape Bates et al 1995).

2.11 Initiating a Change

The question that remains is "where is the best to start to improve the safety of medication dispensing and reduce the occurrence of errors". Selecting the best strategy to remedy medication errors is not easy. The most effective strategy is not always obvious, even when system based causes of error have been identified. Although, there are many strategies available, the first priority for successful error reduction efforts lies in obtaining resources to assess medication safety and implement system-level changes that makes it difficult or impossible for practitioners to make mistakes that reach the patient.

A Systematic Approach

With expectation of the quality of health care rapidly increasing, it is imperative that health professional take the initiative to create and implement risk management procedures to prevent medication errors from occurring. Health care professionals need to develop and maintain an ongoing process that uncovers potential risk, while promoting ways to eradicate vulnerability to error. In order to accomplish these tasks, the system needs to provide resources to monitor and evaluate errors, and to implement methods to reduce them. This process is referred to as system approach to medication error reduction. Human beings make error, but a risk management system can be designed to reduce these errors. A true system of quality assurance goes beyond risk management to include the concept of continues quality improvement. No system can eliminate errors, but using a system approach process is one of the most effective ways to address potential problems, reduce risk, and sustain improvement.

A system can be defined as "an interdependent group of items, people, or processes with a common purpose (Leape, Bates et al 1995). The primary objective of this approach is to identify potential errors, and redesign or alter the system to detect errors and correct them before they occur. If a self-correcting system is impossible, systems should be designed to identify errors and make them known as soon as possible. This requires that systems be designed with feedback and monitoring mechanism as an integral part of the system. Some systems approaches are relatively inexpensive and easily implemented, such as the use of a pharmacy computer system. In this approach, a pharmacist or other personnel enters the medication orders into a database enlist long-term strategies that will require a substantial capital investment, as well as a significant organization change.

The Human Element in Errors

Thus far, it has been shown that systems approach evaluates systems processes to root out errors and tends to discount the role that individuals may have in producing human error. An alternative – or even complementary- approach to evaluate medication errors is to consider what roles individual human performances and susceptibilities may play. The case has been argued that a number of psychological factors may influence a pharmacist's work performance and may contribute to an increase in medication errors (Bates 1995). In addition, while workplace conditions such as workload have long been understood to influence the number of medication errors that occur, one researcher has found that the relationship is complex and not always linear in accordance with common assumptions (Bates 1995).

One study has shown that a higher workload did not necessarily correlate with higher error rates, as one might predict (Bates 1995). Instead, pharmacists were found to be most vulnerable to making an error when they were less busy, or during a dramatic shift in the number of prescriptions presented (i.e. from high to low and vice versa). This was especially prevalent in high-volume settings. One explanation postulated is that when pharmacists are especially busy, their mental faculties are highly engaged and they are very focused on their task. During slower periods, boredom may contribute to lack of attention. The study author emphasized that workload alone could not predict the outcome on a pharmacist's performance, the quality of a

pharmacist's performance was also determined by personal attributes, such as how the pharmacist perceived and responded to workload conditions (Bates 1995)

The intriguing findings presented above clearly implicate human factors as an integral aspect behind medication errors, at least under certain conditions. The researcher of that study determined that workload represented only one of a number of possible factors influencing human error. This range from a pharmacist's personal characteristics, such as impulsive or Type A behavior tendencies, to the quality of the pharmacist interpersonal relationships (both on the job and at home), to ability to focus on details and to concentrate, to stress arising from handling third-party requirements. Interestingly, the researcher also found that even one's subjective impression of workplace lighting could increase the risk of a medication error (Bates 1995)

Suggestions to improve the human factor in reducing prescription errors involved first identifying those factors for an individual, then improving factors that could be changed. Examples include providing adequate ambient lighting and supplying extra lighting "as-needed" as the eyes fatigue later during the work shift, reducing unnecessary sensory distractions such as loud noise or visual clutter, educating pharmacists about their increased vulnerability to errors during downtimes, and instituting self-monitoring procedures for pharmacists

Finally, the researcher noted, while individual pharmacists may vary in their ability to competently perform their jobs under increasing workload stress, enough of an increase in workload will have a detrimental effect that cannot be overridden by competency, increased self-awareness, or self-monitoring (Bates 1995). In this context, the current shortage of pharmacists may have the effect of extending service responsibilities of front-line caregivers beyond their ability to effectively manage a busy health system

2.12 Conceptual Framework

The PRECEDE framework will be used to explain the behavior of healthcare providers in this study.

This model is a true model meant for pragmatic efforts to change health behavior rather than for theory development. With this model, the health planner avoids "victims blaming" that often accompanies individual focused needs assessment and evaluation and, instead, keeps the focus in the community level (the 'system' in this study). Nevertheless, the behavioral and educational diagnosis both stress behavior-environmental relationships.

Consistent with a behavior perspective, the education diagnosis phase of precede emphasize "predisposing, enabling" and "reinforcing" factors. The former two relate to antecedent of a behavior and the skills necessary for it's performance, whereas reinforcing factors are synonymous with the term consequences used in behavior analysis. Judith et al 1993.

Some of the predisposing factors are knowledge of prescribers and dispensers, policy issues and culture of the system in which prescription is purely personal to the doctor and are not discussed in the open.

The enabling factors include enhanced skill of prescriber and dispensers, adequate numbers of personnel on duty, good working environment devoid of heat and distractions.

Some of the reinforcing factors are less workload for prescribers and dispensers, availability of hospital formulary, encouraging of prescription error reporting as against punitive measures, and continuous quality improvement of the staff, the system, and the environment.

All these result in good professional practice due to improved knowledge. There is a reduction in the occurrence of prescription errors ultimately resulting in increased patient safety.

THE PRECEDE FRAMEWORK ADAPTED TO THE PREVENTION OF PRESCRIPTION ERRORS

EDUCATIONAL DIAGNOSIS | BEHAVIOURAL DIAGNOSIS | EPIDEMIOLOGICAL DIAGNOSIS | QUALITY OF LIFE

Predisposing Factors

- Knowledge of prescribers and dispensers
- Policy issues (e.g. prescriptions, non-punitive stance & monitoring/tracking
- System of ordering dispensing
- Culture

Enabling Factors

- Skills of healthcare givers
- Adequate no. of healthcare givers.
- No. of drugs on prescription sheet
- Environmental Distraction

Reinforcing Factor

- Workload of pharmacists/doctors
- Availability of hospital formulary
- Support to medical staff
- De-emphasize focus on punitive aspects
- Encouraging prescription error reporting
- Continuous quality improvement (C.Q.I.)
- Increased awareness

- Good professional practices
- Improvement of knowledge
- Counseling and information
- Improved team work
- Patient is well informed
- Increased compliance by patient

→ Reduction of prescription error →

- Increased patient Safety
- Decreased liability
- Decreased cost of medication

CHAPTER THREE

METHODOLOGY

3.1 Study Design

The study was exploratory and descriptive in design. It was set out to review prescriptions and observe dispensers in order to identify potential causes and specific types of prescription errors prevalent in the University College Hospital Ibadan and document the extent to which these errors occur.

3.2 Description of Study Area

The University College Hospital Ibadan (UCH) is a tertiary institution in Oyo State, South West Nigeria. It was opened in November 20th 1957. It is the premier teaching hospital in Nigeria and provides health care for people from all works of life. There are fifty four service and clinical departments in the hospital which run seventy five consultative outpatient clinics a week. (UCH diary 2006). There are over one hundred and twenty five consultants who conduct the clinics with the resident doctors. All doctors in UCH have integer number which makes it easy to trace them.

The hospital is run by the Chief Medical Director through the coordinated efforts of vital areas as administration, pharmacy, nursing, medical, social welfare, engineering, instrument and laundry services (Akinkoye, 1994).

The pharmacy department is headed by the Deputy Director of Pharmaceutical Services. As at the time of this study, there were sixty five pharmacists made of thirty eight registered and twenty seven interns. There are nine (9) pharmacy points where dispensing

of drugs take place. These are medical outpatient (MOP), general outpatient (GOP) which includes staff clinic, accident and emergency (A & E), a satellite pharmacy on each of the four floors for the wards, dental center, and the psychiatric clinic. The last two were not in use at the time of this research.

The general outpatient (GOP) runs two shifts from Monday to Friday and one on Saturday. The medical outpatient (MOP) runs one shift only from Monday to Friday. The accident and emergency and the wards' pharmacies operates a 24 hour three shifts service.

3.3 Study Population

The study population consisted of dispensers (pharmacists) and medical doctors (Registrars and senior registrars).

3.4 Sampling Technique

Random sampling was done only for the prescriptions while non-probability sampling was used in selecting the in depth interview respondents. In the random sampling of prescriptions, the following steps were followed.

- Average prescription per shift for the pharmacy dispensing points 1-7 was calculated and represented by
  Avpi = xi

Hence,

Avpi 1-7 = x1, x2, x3 ..... x7

- The sum of the $\sum_{i=1}^{7} xi = T$

  For one week of 5 working days is T x 5 = N (N represent sample frame)

- Sample size n for each point is calculated by

$$n1 = \frac{N \times X1}{T}, \quad n2 = \frac{N \times X2}{T}, \quad \ldots\ldots \quad n7 = \frac{N \times X7}{T}$$

Using the formula above the sample size, for MOP =

$\frac{76 \times 1940}{388} = 380$

For General Out Patient (GOP) - $\frac{124 \times 1940}{388} = 619$

1st Floor Pharmacy $\frac{42 \times 1940}{388} = 209$

2nd Floor Pharmacy $\frac{37 \times 1940}{388} = 184$

3rd Floor Pharmacy $\frac{47 \times 1940}{388} = 234$

4th Floor Pharmacy $\frac{24 \times 1940}{388} = 119$

Accident & Emergency $\frac{39 \times 1940}{388} = 194$

Sample Size

Pharmacy point	Average Prescription / shift	Calculated Sample size n	Actual Sampled
MOP	76	380	387
GOP	124	619	568
1st FLOOR (ward)	42	209	195
2nd FLOOR	37	184	184
3rd FLOOR	47	234	232
4th FLOOR	24	119	116
Accident & Emergency	39	194	184
TOTAL	388 = T_s	1934	1866

3.5 Instrument for Data Collection

Three sets of instruments were used to obtain quantitative as well as qualitative data

1. Prescriptions for one week from all the different pharmacy points were examined for
   a. Whether they were legally tenable that is, if they consisted of name of patient, date, prescription number, and signed by the prescriber
   b. Types of errors such as no dose, no duration, interactions, unspecified dosage and illegible writing as well as the number of times each of the errors occurred
2. A pretested in-depth interview guide was used to collect qualitative data from the representative of the different cadres in the pharmacy department and the doctors (Registrars and senior Registrars) from each department of the UCH. This was done to collect information on their knowledge and experiences about medication error, the effect of welfare / workload on the workers, environment (micro and macro) policy issues and their recommendations for improvement of medication safety
3. A pretested observation checklist was used to observe the dispensers while dispensing to the patients. This was done at the different pharmacy points of the hospital to obtain qualitative data to capture the types of information about drug use that was passed to the patients by the pharmacists. This was also to see how medication errors from prescription were avoided

3.6 Process of Data Collection

Prescriptions between year 2000 and 2006 were considered. Using simple random sampling (balloting) the prescriptions for year 2006 was chosen and called for. Prescriptions for each shift from each unit were boxed and kept on monthly basis

Samples for each pharmacy point were selected randomly across the twelve months of year 2006 until the required sample for each point was achieved

3.6.1 Recruitment and Training of Research Assistants

Two pharmacy interns were recruited and trained as research assistants who worked with the researcher who is also a pharmacist to look into the prescriptions. The duration of the training was one day. The objectives of the training were for the research assistants to (1) identify all errors in the prescription, (2) are able to categorize the identified errors into different groups and (3) to record properly the errors identified. The content of the training included the purpose of the study where the objective of the study, methodology, sampling technique, the instrument and the process of data collection were well explained. A trial run was done by the research assistants before the training ended. The researcher personally carried out the in-depth interviews as well as observation at the pharmacy points

3.7 Validity and Reliability

The in-depth interview guide and the observation check list were all pre-tested at the Lagos State University Teaching Hospital Lagos before final administration. The responses were discussed with the research supervisor and necessary corrections effected and followed

3.8 Ethical Consideration

Permission was taken from the Chief Medical Advisory Council (CMAC) and the head of the pharmacy department for the release of the prescriptions. For the in-depth interview, informed verbal consent was obtained from all the respondents while being assured of confidentiality

3.9 Data Management and Analysis

The quantitative data was analyzed using the statistical Analysis System (SAS) software. Descriptive statistics like frequency distribution, percentages and graphic presentations were used to describe data. Qualitative data (in-depth interview) were analyzed manually. The transcripts were read several times teasing out the thematic areas that could not be obtained from the prescriptions as well as to explain some of the findings from the prescription review. Data from the observation checklist were analyzed manually to know the types of errors that were avoided during dispensing procedures.

3.10 Limitation of the Study

This study was delimited to doctor's prescriptions only and not patients case notes that have more history or information of the patient. Duplicate carbon copies of the prescription were made available for observation since the originals had been taken away by the patient. These carbon copies were in most cases not readable. Problems associated with administration of drugs by nurses (in the wards) in the drug use system were not considered in this study. This was due to limited time available for the study. The sample size had to be increased to make up for this limitation.

CHAPTER FOUR

RESULTS

The results of this study are presented in two sections. Section A contains the results from the prescriptions reviewed and section B consists of the observation and indepth interview results.

4.1 Types and Volume of Error

A total of 1866 prescriptions were reviewed. Of this number 1424 (76.0%) prescription errors were identified. The errors consisted of prescription error of illegitimacy (52.2%), i.e. prescriptions with no date and no age and cannot be rendered legally, of omission (23.8%) that is no dose, no dose frequency, no strength, prescription error of style (18.8%), that is unacceptable abbreviation and illegible writing, prescription error of wrong dose (4.9%), irrational use of drugs (0.8%), that is, prescription that does not meet the clinical requirements of patients. The prevalence of these errors was highest in the wards(33.0%) followed by General Outpatient (GOP) (24.6%), Medical Outpatient (MOP) (23.4%) while Accident & Emergency (A&E) had (18.4%) See table 4.1. Of all the number of 1866 prescriptions reviewed, errors were detected and corrected on only 26 (1.4%) in the pharmacy.

The in-depth interview confirms this volume of error. Causes of these errors are *"lack of drug knowledge by prescribers, and no update information about drugs that keep on changing."* One of the doctors interviewed said *"workload makes us tired."* A pharmacist said that errors sometimes arise when transferring drug orders from case files to prescriptions. Another also said *"medication error is caused by look alike and sound alike drugs e.g. lasix and lasoxid."*

All interviewed said the UCH environment is neat and good but according to a doctor "everything is wrong, sometimes no light, no water, plenty them. How do we give our best under such conditions he asked?" A doctor said "we have dual responsibilities to pass our exams and also attend to patients. We are always stressed and so we can not afford not to make mistakes".

Table 4.1: Types and frequency of Prescription Errors identified from Prescriptions in University College Hospital (UCH).

TYPES OF ERRORS	FREQUENCY ACROSS DEPARTMENTS				
	Medical Outpatient	General Outpatient	Wards	Accident & Emergency	Total
Illegitimacy	232 16.3%	222 15.6%	214 15.0%	75 5.3%	743 52.2%
Omission	19 1.3%	50 3.5%	174 12.2%	94 6.6%	337 23.7%
Wrong Dose	9 0.6%	20 1.4%	28 2.0%	13 0.9%	70 4.9%
Irrational Uses of Drugs	5 0.4%	0 0.0%	4 0.3%	2 0.1%	11 0.8%
Style	68 4.8%	58 4.1%	58 4.1%	79 5.5%	263 18.5%
Total	333 23.4%	350 24.6%	478 33.6%	263 18.5%	1424 100%

4.2 PRESCRIPTION ERROR OF ILLEGITIMACY

Illegitimacy errors are prescriptions that contain no date and age. Sometimes the only indication that shows its connection with a human being is when "Adult" is written on it. As a result of such omissions such prescriptions do not have any legal status. Of all the errors identified, illegitimacy error was the commonest representing 51.2% of the total errors identified. Broken down into specifics and considering 'adult' as no age, topped the list of errors with 52.4% followed by that of and error of 'no date' (17.9%)

Table 4.2: Types, and frequency of Prescription Error of Illegitimacy across Pharmacy points

TYPES OF ILLEGITIMACY ERRORS	NUMBER OF ERRORS FROM DEPARTMENTS				
	Medical Outpatient	General Outpatient	Wards	Accident & Emergency	Total
No Date	46 62%	31 41%	50 67%	4 0 5%	131 17 6%
No Age	186 25 0%	191 25.7%	164 22 1%	71 9 6%	612 82 4%
Total Errors	232 312%	222 (299%)	214 (288%)	75 (10 1%)	743 (100%)

Looking at the frequency of illegitimate error as shown in table 2 above analysis showed that it occurred more in Medical Outpatient (31 2%), followed by General Outpatient (29 9%) with the Accident and Emergency having the least (10 1%)

4.3 ERROR OF OMISSION

Error of Omission occurs when information essential to filling the prescription such as, dose, dosage form and or dosage frequency are not specified on the prescription

There are five types of errors that constitute error of omission No dose frequency, no dose, no dosage form, no duration, and no strength. There were 337 (23 7%) errors of omission in the 1866 prescriptions screened (table 4 1) Wards contributed half of the sources (51 6%) of error of omission followed by Accident and Emergency (27 6%) The least of the error is from Medical outpatient with 5 6%. Table 4 3 below

Table 4.3: Types of Prescription Errors of Omission by Departments of Occurrence

TYPES OF ERRORS OF OMISSION	FREQUENCY OF OMISSION ERROR FROM DEPARTMENTS				
	Medical Outpatient	General Outpatient	Wards	Accident & Emergency	Total
No Dose Frequency	5 1.5%	11 3.7%	0 0.0%	39 11.6%	55 16.3%
No Dose	1 0.3%	12 3.6%	68 20.2%	19 5.6%	100 29.7%
No Dosage Form	2 0.6%	2 0.6%	4 1.2%	0 0.0%	8 2.4%
No Duration	11 3.3%	13 3.8%	102 58.6%	36 38.3%	162
No Strength	0 0.00%	12 24.0%	0 0.0%	0 0.0%	12 3.6%
Total Errors	19 (5.6%)	50 (14.8%)	174 (51.6%)	94 (27.8%)	337 (100%)

The above is confirmed by a Senior Registrar at the MOP who said "*it is common among all prescribers. Sometimes I forget to put duration on my prescriptions*" A senior pharmacist said that "*recently it has been on the increase about 20% even though there is a decrease in prescription medication due to strikes of patients to the hospitals*"

4.4 ERROR OF WRONG DOSE

There were 70 (4.9%) errors of wrong dose in 1866 prescriptions. Wards contributed 100.0% of this prescription error, closely followed by General Outpatient (28.6%). The least is from the Medical outpatient with 12.9%. Wrong dosage error is made up of under-dosage (62.9%) and over-dosage errors (37.1%). Distribution is as shown in table 4.4 below

A doctor said "*we have that responsibilities to pass our exams and also attend to patients. We are always stressed and so we can not afford not to make mistakes*"

Table 4.4: Types and Frequency of Prescription Errors of Wrong Dosage

	Frequency of Errors from Departments				
Error of Wrong Dosage	Medical Outpatient	General Outpatient	Wards	Accident & Emergency	Total
Under-Dosage	2 2.9%	12 17.1%	21 30.0%	9 12.9%	44 62.9%
Over-Dosage	7 10.0%	8 11.4%	7 10.0%	4 5.7%	26 37.1%
Total Errors	**9** **12.9%**	**20** **28.6%**	**28** **40.0%**	**13** **18.8%**	**70** **(100%)**

4.5 ERROR OF IRRATIONAL USE OF DRUGS

Error of irrational use of drug means that drugs are prescribed in a way that is not appropriate to meet the clinical requirements of the patients. It is made up of poly-pharmacy and PRN (Latin abbreviation 'for use when necessary'). Eleven (7) 0.8% errors of irrational use (PRN 6 (54.5%), poly-pharmacy 5, (45.5%)) were identified from 1866 prescriptions. Frequency of error of irrational use analyses showed that it occurred more in MOPD 5 (45.5%), followed by wards 4 (36.4%) while A&E had 2 (18.2%). GOPD had zero occurrences. Table 4.5 below.

This finding agrees with what was said at the in depth interview on knowledge upgrade, all said that seminars are organized within each department. Representatives from drug companies also give drug information during such seminars. A doctor in pediatrics said "it is by personal effort that we learn through assignments, patients management and interactions". The pharmacy department also sends drug bulletin at periodic occasions to all doctors.

Table 4.5: Prescription Errors related to Rational Use of Drugs across Pharmacy points

	FREQUENCY OF PRESCRIPTION ERRORS RELATED TO RATIONAL USE OF DRUG FROM DEPARTMENTS				
TYPES OF ERRORS related to Rational Use of Drug	Medical Outpatient	General Outpatient	Wards	Accident & Emergency	Total
PRN (Use when necessary)	2 18.2%	0	3 27.3%	1 9.1%	6 54.5%
Poly-pharmacy	3 27.3%	0	1 9.1%	1 9.1%	5 45.5%
TOTAL ERRORS	5 (45.5%)	0	4 (36.4%)	2 (18.2%)	11 (100%)

4.6 ERROR OF STYLE

This refers to illegal abbreviations and illegible writing. Out of a total error of 263, illegal abbreviation was 244 (92.8%) while illegible writing was 19(7.2%). Looking at the frequency of this error analysis showed that it occurred more in Accident and Emergency (A&E) (30.0%) followed by MOP (26.0%) while GOP and the wards each had 22.0% (See table 4.6 below)

Table 4.6: Types and Frequency of Prescription Errors of Style

	FREQUENCY OF ERROR OF STYLE FROM DEPARTMENTS				
TYPES OF ERROR OF STYLE	Medical Outpatient	General Outpatient	Wards	Accident & Emergency	Total
Unacceptable Abbreviations	60 22.8%	55 21%	55 21%	74 28.1%	244 92.8%
Illegible Writing	8 3.0%	3 1.1%	3 1.1%	5 2.0%	19 7.2%
Total Errors	68 (28.0%)	58 (22.0%)	58 (22.0%)	79 (30.0%)	263 (100%)

4.7 MEDICATION ERROR AND NON-MEDICATION ERROR

The prescription errors were further divided into those that could easily result into medication error and those that could not. Out of the prescription errors of 1424 in 1866 prescription observed 681 (47.8%) have the potential of leading to medication error while 743 (52.2%) could not. Table 4.7 below shows the distribution of prescription error that could lead to medication and non medication error. Based on this classification Accident and Emergency (A&E) emerged as the department that has the highest 188 (13.2%) of the errors that can lead to medication errors followed by the wards (18.5%).

Table 4.7: Frequency of Prescription errors likely to cause Medication errors

Frequency of Errors From Departments

TYPES OF ERRORS	Medical Outpatient	General Outpatient	Wards	Accident & Emergency	Total
Errors that could lead to Medication Errors	101 (7.1%)	128 (9%)	264 (18.5%)	188 (13.2%)	681 (48.0%)
Errors that could not lead to Medication Errors	232 (16.3%)	222 (15.6%)	214 (15.0%)	75 (5.3%)	743 (52.2%)
Total Errors observed	333 (23.4%)	350 (24.6%)	478 (35.5)	263 (18.5%)	1424 (100%)

4.8 Categories of Patients Affected by Prescription Errors

It was observed that prescriptions with 'Adult' age were more than any other age category. Considering the errors along with observed prescriptions, the age group mostly affected was the 35-50years old category as shown in the table below

Table 4.8: Category of Patients affected by Prescription Error

Frequency of Prescription errors that could lead to medication error by age group

Age Groups (In years)	Prescriptions Observed	Prescriptions with Errors	% Prescription with Errors
Under 5	230	78	33.9%
Age 5 - 19	253	127	50.2%
Age 20 -34	264	110	41.7%
Age 35 - 50	198	115	58.1%
Age 50+	311	46	14.8%
Adult	374	88	23.5%
No Age	238	57	24.2%
TOTAL	1886	621	33.3%

4.9 The Different Groups of Drugs Mostly Affected by Prescription Error.

Out of 1424 errors observed 562 (39.5%) were linked to specific drug products. A total number of 34 drug items were mostly affected by prescription errors. These are grouped into seven classes as shown in table 4.9 below. Intravenous infusions accounted for 39.0% of all prescription errors while non-steroidal anti-inflammatory drugs were responsible for as low as 1.0% of the errors.

Table 4.9: Groups of drugs affected by prescription error

Drug Categories affected by prescription error.	Total Error	Frequency
Anti-infectives	97	17%
I/V Infusions	162	29%
EMERGENCIES/	67	12%
NSAID*	8	1%
Antimalarials	73	13%
Analgesics + Routines**	100	18%
Others***	55	10%
Total Error	562	100%

* NSAID- Non Steroidal Anti Infective Agent

** Routines These are group of drugs that are not meant for any specific ailments They are prescribed as a routine in combination with specific drugs An example is multivitamins

***Others are drugs that are not classified in any of the drug categories Table 4 10 below shows such drugs and the errors observed in them

Table 4.10: Groups of drugs not classified in drug categories and Frequency of prescription error

Drugs	Prescription Errors			
	Illegal Abbreviations	No Dose	No Strength	Total Error
DF118	25 (45.5%)	-	-	25 (45.5%)
Hydrocortisone (HCT)	12 (21.8%)	-	-	12 (21.8%)
Mist Mag Trisilicate (MMT)	8 (14.5%)	-	-	8 (14.5%)
Cap Livolin	-	3 (5.5%)	-	3 (5.5%)
Tab Diazepam	-	3 (5.5%)	-	3 (5.5%)
Glucophage	-	-	4 (7.2%)	4 (7.2%)
Total Error	45 (81.8%)	6 (11.0%)	4 (7.2%)	55 (100%)

DF118 (Dihydrocodeine Tartrate) is involved in 25 (45.5%) errors being the highest while Tab Diazepam and Cap Livolin are the lowest with 3(5.5%) errors each. The biggest error type is illegal abbreviations that constitute a total of 45 (81.8%) errors.

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Tab Diazepam	-	3 (5.5%)	-	3 (5.5%)
Glucophage	-	-	4 (7.2%)	4 (7.2%)
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DF118 (Dihydrocodein Tartrate) is involved in 25 (45.5%) errors being the highest while Tab Diazepam and Cap Livolin are the lowest with 3(5.5%) errors each. The biggest error type is illegal abbreviations that constitute a total of 45 (81.8%) errors.

4.10 PRESCRIPTION ERRORS IN INTRAVENOUS (IV) INFUSIONS

Table 4.11 below shows the frequencies of prescription errors involved in the use of infusions at the University College Hospital. Analysis revealed error of no dose 34.0%, no duration 30.0% and illegal abbreviation 25.9% while no frequency was 9.3%. Mostly affected infusion was Normal saline.

Table 4.11: Types and Frequency of Errors Associated with IntraVenous Infusions

	Type and Frequency Of Prescription Errors				
Drugs (iv Infusions)	Illegal Abbreviations	No Frequency	No Duration	No Dose	Total Error
Potassium Chloride	15 (9.3%)	3 (1.9%)	3 (1.9%)	8 (5.0%)	29 (17.9%)
Dextrose Saline	6 (3.7%)	2 (1.2%)	10 (6.2%)	15 (9.3%)	33 (20.4%)
Dextrose Solution	5 (3.1%)	4 (2.5%)	18 (11.1%)	10 (6.2%)	37 (22.8%)
Normal Saline	6 (3.7%)	3 (1.9%)	15 (9.3%)	20 (12.3%)	44 (27.2%)
Sodium Bicarbonate	10 (6.2%)	3 (1.9%)	3 (1.9%)	3 (1.8%)	19 (11.7%)
Total Error	42 (26.0%)	15 (9.3%)	49 (30.2%)	56 (34.6%)	162 (100%)

4.11 Prescription Errors Associated with Antimalarials

Antimalarials, Analgesics and anti-infectives are the most prescribed drugs in secondary and tertiary care institutions. In view of frequency of use the type of errors involved in prescribing them are analysed.

Artesunate Combination Therapy (ACTs) represented by Coartem® is the most prescribed antimalarial in line with the newly formulated national policy on malaria treatment. Of the 73 errors affecting antimalarial drugs 60(82.1%) are in connection with wrong dose.

Table 4.12: Antimalarials affected by Prescription Error.

	Types Prescription Errors					
Antimalaria drugs affected by Prescription Error	No Frequency	No Durations	Wrong Dose	No Strength	No Dosage Form	Total Error
Tab. Coartem®	5 (6.8%)	1 (1.4%)	25 (34.2%)	1 (1.4%)	-	32(43.8%)
Tab. Camoquine®	-	-	5 (6.8%)	3(4.1%)	3 (4.1%)	11 (15.1%)
Tab. Artesunate®	-	-	20 (27.4%)	-	-	20(27.4%)
Tab. Coarinate®	-	-	5 (6.8%)	-	-	5(6.8%)
Tab. Artequine®	-	-	5 (6.8%)	-	-	5(6.8%)
Total Error	6 (6.8%)	1 (1.4%)	60 (82.2%)	4 (5.6%)	3(4.1%)	73 (100%)

4.12 Prescription Errors Associated with Analgesics and Routine Drugs

Multivitamins, commonly prescribed as routine drugs was grouped along with the analgesics – Paracetamol and Acetylsalicylic acid (ASA). Most malarial prescriptions go along with these drugs. Prescribers were found to abbreviate them thereby referring to paracetamol as PCM and acetylsalicylic acid (aspirin) as ASA and multivitamin as MVT. Of the 100 errors associated with this group of drugs, 90.0% belonged to illegal abbreviation 8.0% to no dose while 2.0% to PRN (when necessary). See Table 4.13

Table 4.13: Types and Prevalence of Prescription Errors Associated with Analgesics and Routine Drugs

Drugs	Prescription Errors			
	Illegal Abbreviations	No Dose	PRN	Total Error
paracetamol	35 (35.0%)	3 (3.0%)	2 (2.0%)	40 (40.0%)
Aspirin (ASA)	45 (45.0%)	5(5.0%)	-	50 (50.0%)
Multivitamin	10 (10%)	-	-	10 (10.0%)
Total Error	90 (90.0%)	8 (8.0%)	2 (2.0%)	100 (100.0%)

4.13 Prescription Errors Associated with Anti-Infectives

Anti-infectives are widely prescribed because of prevalence of infections in tropical weather. Like anti-malaria it is presumed usually that prescribers are familiar with commonly used antibiotics Most anti-infective are injectable antibiotics Oral antibiotics such as Doxycycline, Ampiclox and lab Augmentin which have reserved status in community infection attracted little errors as a total of 7 (7.0%) errors was observed out of the 97 prescriptions screened These errors were wrong dose related The injectables are mostly third generation antibiotics for example, cephalosporins and flucloxacillin Errors on intravenous flucloxacillin alone were 2(2.0% while those related to the Cephalosporines was 59.0% Error of no dose recorded the highest number of errors 45 (46.4%) Other Dose-related errors were No duration (21.7%) and No frequency (17.5%) as shown in table 4.14 below

Table 4.14: Prescription Errors among Antimicrobials/Anti-Infectives

Antimicrobials/Anti Effectives	Prescription Errors						
	No Frequency	No Durations	No Dose	No Strength	Wrong Dose	No Dosage Form	Total Error
I/V Ceftazidine	2 (2.1%)	4 (4.1%)	15 (15.5%)	1 (1.0%)	-	-	22 (22.7%)
I/V Cefuroxime	7 (7.2%)	8 (8.2%)	12 (12.4%)	-	-	-	27 (27.8%)
I/V Flucloxacillin	6 (6.1%)	8 (8.2%)	10 (10.3%)	2 (2.1%)	-	-	26 (26.8%)
I/V Amikacin	2 (2.1%)	1 (1.0%)	-	-	-	-	3 (3.1%)
I/V Ceftriaxone	-	-	8 (8.2%)	-	-	-	8 (8.2%)
I/M Flagyl	-	-	-	-	2 (2.1%)	2 (2.1%)	4 (4.2%)
Cap Doxycycline	-	-	-	-	5 (5.2%)	-	5 (5.2%)
Cap. Ampiclox	-	-	-	-	1 (1.0%)	-	1 (1.0%)
Cap. Augmentin	-	-	-	-	-	1 (1.0%)	1 (1.0%)
Total Error	17 (17.5%)	21 (21.7%)	45 (46.4%)	3 (3.1%)	8 (8.3%)	3 (3.1%)	97 (100%)

4.14 Emergency\ Clinical Procedures

There are a total of 67 errors affected by the drugs used in clinical/emergency procedures shown in table 4.15 below. Sixty-two of these are related to no dose, no duration and no frequency.

Table 4.15: Emergency/Clinical procedures

	Prescription Errors						
Drugs used in emergency/clinical procedures	No Frequency	No Durations	No Dose	PRN	No Dosage Form	No Strength	Total Error
Hydrocortisone	-	-	-	-	1(1.5)	-	1(1.5%)
I/V Lasix		5 (7.5%)	3(4.5%)	-	-	-	8(11.9%)
Cal. Gluconate	3 (4.5%)	5 (7.5%)	5(7.5%)	-	-	-	13(19.4%)
Pilocin	5 (7.5%)	5 (7.5%)	6(8.9%)	-	-	-	16(23.9%)
Adrenaline	2 (2.9%)	3 (4.5%)	5(7.5%)	-	-	1(1.5%)	11(16.4%)
I/M Diazepam	3 (4.5%)	5 (7.5%)	7(10.4%)	2(3.0%)	-	-	17(25.4%)
I/M Dicynone	-	-	-	1(1.5%)	-	-	1(1.5%)
Total Error	13 (19.4%)	23 (34.3%)	26 (38.8%)	3 (4.5%)	1 (1.5%)	1 (1.5%)	67 (100%)

The study also looked at error types that were common with drug groups. Intravenous infusions, anti-infectives and clinical emergencies appeared much more for no dose error, where as antimalarials were noted for wrong dose error. Routine drugs, others and infusions were noted for illegal abbreviations. Drugs used in clinical emergencies, intravenous infusions and anti-infectives seem to be related due to similar profile of errors involving no dose, no duration and no frequency. See table 5.16 below

Table 4.16: Types of errors against drug groups

DRUG GROUPS	TYPES OF PRESCRIPTION ERRORS							TOTAL
	No Frequency	No Durations	No Dose	No Strength	Wrong Dose	No Dosage Form	Abbr. PRN	
Others	-	-	6 (1.1%)	4 0.9%)	-	-	46 (8.2%)	56 (10.0%)
Anti-infectives	17 (3.0%)	21 (3.7%)	45 (7.9%)	3 (0.5%)	8 (1.4%)	3 (0.5%)	-	97 (17.2%)
I/V Infusions	15 (2.7%)	49 (8.7%)	58 (10.3%)	-	-	-	42 (7.5%)	164 (29.1%)
Clinicals	13 2.3%)	23 (4.1%)	26 (4.5%)	1 (0.2%)	-	1 (0.2%)	-	64 (11.4%)
NSAID	-	-	-	-	5 (0.9%)	2 (0.4%)	1 (0.2%)	8 (1.4%)
Antimalarials	6 (1.1%)	1 (0.2%)	-	4 (0.7%)	60 (10.7%)	3 (0.5%)	-	74 (13.1%)
Analgesics + Routines	-	-	8 (1.4%)	-	-	-	92 (16.3%)	100 (17.8%)
TOTAL	51 (9.1%)	94 (16.7%)	143 (25.4%)	12 (2.1%)	73 (13.0%)	9 (1.6%)	181 (32.2%)	563 (100%)

SECTION B

4.15 OBSERVATION AT THE PHARMACY POINTS

A total of six observations of dispensing practices were carried out using a pretested checklist (table 4.18 below) This was carried out at both the main pharmacy (OOPI (which includes the staff clinic) and the medical outpatient clinic (MOP). Observations could not be done at the other points because at these points patient relatives go to collect drug orders on behalf of the patients. No information whatsoever was given to these relatives. Apparently all medications including infusions are kept with the patients and handed over to the nurses who with the doctors do the calculations (if need be) and administered accordingly.

These particular processes in the check list were specifically observed for six dispensing sessions. Observation revealed that it was in the area of patient information that the pharmacy points failed to adhere to the protocol of prescription filling. Patients were not given the name of drug at all on the six sessions observed. Only the dosage strength and frequency of administration were given. Critical information required by the patient which were not given were time and duration of use (regimen), expected side effects and expected benefits. It was only in one of the sessions observed did the patient have the opportunity of receiving special counsel. Finally the patients were also not obliged to ask question nor any form of interaction encouraged.

All the pharmacists and the doctors interviewed were of the opinion that the workload is heavy at the UCH and seriously affecting their productivity. According to the head of the pharmacy "there are no orderlies to the pharmacists do everything including pushing drug trolleys around the hospital. We therefore don't have enough time to counsel patients." We have to close some pharmacy delivery points as well as cover 24 hours."

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drug trolleys, around the hospital. We therefore don't have enough time to counsel patients". We have to close some pharmacy delivery points so as to cover 24 hours"

Table 4.17. Observation at the Pharmacy Points

	Behaviors Observed	PLACE OF OBSERVATION						Ratio of observation to practice	
		GOP		STAFF CLINIC		MOP		to Value	%
1	Takes time to read or study prescription	Yes	Yes	Yes	Yes	Yes	Yes	66	100
2	Verbal information given to patients								
	- Dosage instructions	Yes	Yes	Yes	Yes	Yes	Yes	66	100
	- Mode of Administration	Yes	Yes	Yes	Yes	Yes	Yes	66	100
	- Time of Administration	Yes	Yes	Yes	Yes	Yes	Yes	66	100
	- Duration of Treatment Administration	No	No	No	No	No	No	00	0
	- Expected side effects	No	No	No	No	No	No	00	0
	- Precaution/warnings	No	No	No	No	No	No	00	0
	- Storage	No	No	No	No	No	No	00	0
	- Expected benefits & when patient will start noticing effect of drugs	No	No	No	No	No	No	00	0
	- Any special advice	Yes	No	No	No	No	No	01	1
	- Asks if patient is on any drug	No	No	No	No	No	No	00	0
	- Gives room for questions	No	No	No	No	No	No	00	0
	- Asks if patient is the ultimate user	No	No	No	No	No	No	00	0
	- Asks patient to repeat all instruction given	No	No	No	No	No	No	00	0
3	Written information on labels	Yes	Yes	Yes	Yes	Yes	Yes	66	100
	- Name of Patient	Yes	Yes	Yes	Yes	Yes	Yes	66	100
	- Name of Hospital	Yes	Yes	Yes	Yes	Yes	Yes	66	100
	- Date	Yes	Yes	Yes	Yes	Yes	Yes	66	100
	- Names of drugs								

CHAPTER FIVE

DISCUSSION

5.1 Types of Prescription Errors identified

This study has demonstrated a wide range of different types of errors (10.8% to 52.2%) associated with prescriptions from a hospital setting. This is not too far from previous studies which have shown wide variation in prescription error rates from less than 1% to over 40%. (Westerlund et al 1990, Greene et al 1995, and Stevens et al 1997). The reasons for these variations relate mainly to study design. The lowest rates have been in studies that focused on clinically significant problems and interventions made by pharmacist while the highest rates were found in studies that included minor errors and where there were strict criteria as to what constitute an error. This study has considered anything that is wrong with the prescription as an error starting from "no date" (represented by error of illegitimacy) to error of wrong dose. This accounts for the high error rate. For example in a Swedish study, a 12% error rate was reported, but nearly 70% of these 'errors' were due to the indications for medication not being included on the prescription (Lesterud et al 1993).

The prescription errors can be generally grouped into two, those that could lead to medication errors (47.8%) and those that could not (52.2%). Out of those that could lead to medication error 96.2% could further be classified as "minor" while 3.8% as "more serious errors" that is could cause serious adverse drug reaction. This is comparable to the findings of Dean et al (2002) who classified errors into 'potentially serious' and 'not serious'. It is likely that some of the minor errors represent deficiencies in the prescription system that might increase the risks of more serious errors taking place

(Nadeen et all 2001). For example, age or weight is an important factor in drug prescription hence drugs are prescribed in relation to body weight or age. Smaller adults might not be able to tolerate adult dose while bigger minors might be given 'correct' dose but because of their sizes, such doses might be an under-dose for them. Furthermore, errors relating to' directions' typified by error of omission were not serious but could lead to wastage and financial burden on the patients especially when such prescriptions are discontinued.

Prescription error of irrational use of drugs and that of style also fall under minor errors. A PRN (use when necessary) prescription is common but should be avoided. Such prescription should have a minimum and maximum caveat in order to avert adverse drug reaction. A patient in pain who has such prescription will continue to swallow the drug until death occurs. The drug mostly involved were analgesics, psychoactives and drugs used in emergencies. Most prescribers assume the patients will keep to the normal dose since such drugs are common or known ones. Unfortunately, there were no indications or record to show that the pharmacy department detected or corrected this during dispensing.

Prescription error is a proxy indicator of medication error and it is difficult to determine how much of prescription errors actually resulted into medication error. However it was observed that prescription errors are corrected at the pharmacy point before they can result into medication error. The diligence at the pharmacy point becomes a paramount factor. Enforcement of therapeutic standard also at pharmacy point also goes a long way to reduce errors such as illegal abbreviations and legitimacy of a prescription.

Prescription Error of over-dose (3.8%) was the most serious of all the errors observed. This is comparable with findings in the United States of America. According to the National Academy of Science Institute of Medicine (IOM) (2000), drug complication in hospitals is the leading cause of hospital mistakes. The report of the Institute of Medicine (2000) said that there has been nearly eight fold increase in the number of outpatient death from medication errors compared to 2-3 fold increase in hospital admission due to prescription mistakes. Out of this 80% of the errors involved giving patients the wrong

(Nadeen et all 2001). For example, age or weight is an important factor in drug prescription hence drugs are prescribed in relation to body weight or age. Smaller adults might not be able to tolerate adult dose while bigger minors might be given 'correct' dose but because of their sizes, such doses might be an under-dose for them. Furthermore, errors relating to' directions' typified by error of omission were not serious but could lead to wastage and financial burden on the patients especially when such prescriptions are discontinued.

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drug or the wrong strength or dose. This 3.8% is also consistent with the study of Cohen (1999) which found that between 1.5% and 4% of all prescriptions are wrong and pose a substantial risk to patients. If according to one prescriber *"there are enough British National Formulary (BNF) all over the wards for prescribers to consult if in doubt of any information on any drug like dosage"* then these books should be put to use more than ever to avoid such errors.

Underdosage may not be as serious as overdosage, however, most of the resistances to most potent drugs of yesterdays were due among others to underdosage, and example is chloroquine. It is therefore very important to be sure of dosage before giving to patients or the new antimalaria Artemisin Combination Therapy (ACTs) will also have some problems as chloroquine if wrongly used. The National Policy on malaria treatment recommends the use of ACTs, a combination therapy and not a monotherapy like artesunate. Table 4.12 shows vividly that prescribers have not really understood the dosage regimen of these antimalarials. Out of total errors of 73, wrong dose accounted for 60 (82%).

5.2 Different groups of drugs affected by prescription error

Most of the drugs were indicated for specific errors. The intravenous infusions were implicated in illegal abbreviation and error of omission (no frequency, no duration and no dose). These errors may be due the 'emergency nature' of the situation and the prescriptions were left open for review. The antimalarials were known for errors of wrong dose (Table 4.12). Though malaria is a common occurrence, prescribers were not familiar with the dosage regimen of the new recommended drugs.

Findings revealed that regimen was a real issue with the use of artesunate (a monotherapy) in the management of severe malaria. The National Policy does not recommend the use of artesunate as a monotherapy but rather to be used in combination with an existing one like camoquine or amodiaquine. Such combination does not seem to be at play here for which error of "rational use" of drug ought to be alleged. Camoquine

being less prescribed separately is in more varieties of prescription errors (table 4.12). When viewed against the background that non-inclusion of age, the use of camoquine as it was, could easily lead to medication error with consequent exacerbation of development of resistant malaria parasite. Wrong dosage and frequency of use in the management of malaria in a teaching hospital, show the relevance of this study even to the implementation of the National Policy on malaria via the roll back malaria programme.

Common error with routinely prescribed drugs was abbreviation and non-specification of dose. Again, this was done with the assumption that for example Aspirin (ASA) is 300mg. This assumption is wrong because ASA 75mg is used in the management of hypertension. Anti-infectives are widely prescribed because of infections in tropical weather. The profile of errors with this group differ while error of omission is more prominent with the ingestibles, wrong dose was common with the oral antibiotics. This difference has already been explained in the section of error of omission.

5.3 Observation at the Pharmacy Points

The pharmacist task for ensuring meticulous dispensing and also to encourage the patient to use the medicine in the best possible manner was not adequately performed. There were not enough communication with the patients to make sure that he or she had the ability, will and the knowledge to use the dispensed medicine correctly.

Only 1.8% of the prescription errors were intervened and corrected by the pharmacists. This was probably due to the crowd at each of the pharmacy points that overwhelmed the number of pharmacists on duty at each time of the observation. This is in conformity with Dean et al (2002) who reported that pharmacist identified and rectified a prescription error in 1.55% of all medication orders written in their study. In the US, pharmacists identify and prevent prescribing errors in 0.3-1.9% of all inpatient medication and administration of medications(Lasar, Briceland and Stein 1997). Studies of pharmacists'

interventions have been carried in other United Kingdom hospitals (Barber et al 1997) but interventions are made for many reasons other than in response to prescribing errors.

It was also observed that the pharmacists had no access to the patients' case notes to have back ground information of the patients such as diagnoses and laboratory reports. They therefore had to use a consideration amount of professional judgment when accessing the risk of prescription. In most cases they have to consult with the prescribers to clarify before making corrections.

5.4 Conclusion

Prescription errors are common in the drug use system in the University College Hospital Ibadan. This study has demonstrated a wide range of different types of errors and their frequencies, classes of drugs, and the age groups mostly affected. Most of the errors were related to problems with the way in which prescriptions had been written (style). Another area highlighted by this study is that the information given by the pharmacists to patients were not enough to avert medication error arising from prescription errors.

The reasons adduced to these were lack of knowledge about drugs, deviation from procedures, workload, transcription errors, and faulty identity checking. There is no written policy or format on reporting and handling of errors in the drug use system of UCH Ibadan. Neither is there a system in place that monitors, evaluate, and prevents errors.

Even though relatively few of the errors detected in this study were serious, errors can be time consuming to pharmacists. Also it is likely that some of the minor errors represent deficiencies in the prescribing system that might increase the risks of more serious errors taking place.

5.5

Implication of the Study on Health Education and Promotion

Heath education has been defined by (Wass 1995) as any combination of learning experiences that is designed to facilitate voluntary action conducive to health

One of the main goals of health education is the promotion of the adoption of positive health practices by individuals. Among the practices of interest are those directed at preventing diseases, promoting and maintaining health recovery from illness, promoting and rational utilization of health services. These goals can be achieved through among others by upgrading people's knowledge and modifying when the need arises their opinions, attitude, beliefs and practices (Oshiname 2003)

Health promotion on the other hand is the process of enabling people to increase control over, and to improve their health (Moronkola, 2002) It entails the empowerment of a community to improve their health through education

From the above it is very obvious that there are gaps in the knowledge base of newly qualified prescribers in competencies required for effective and safe prescribing

As at now much of a doctor's prescription is personal to them and not debated in the open. Hence, it is hard for any reflective learning to occur. Pharmacists' correction of Prescriptions is usually just discussed with the prescribers and the information does not come out into the team for them to discuss and learn from. This call for absolute need to upgrade the knowledge of prescribers, modify their attitudes, beliefs and practices. Addressing this is surely multi-disciplinary and involves pre and post-graduate training, work experience, and the support of skilled clinical pharmacists. This will greatly reduce morbidity and mortality rate due to prescription errors

It is not enough to teach prescribing skills. They must also be assessed. Drug therapy cuts across all medical practice and modern medicine are too potent for the newly qualified graduate to be allowed to prescribe without evidence of competence. They should not be

allowed to compensate for poor performance in this high risk activity by good performances in other areas. (Aronson et al 2006)

To reduce the prevalence of prescribing errors to any extent, it is necessary to change the attitude and culture, so prescribing would be seen as important patient-oriented and holistic. To do so, medicines have to be treated in special ways – by controlling access and use, and by ensuring competence in the prescribers. It will take time and resource but future patients will reap benefits. (Barber, et al 2003.)

Patient education is therefore central to ensuring adherence to drug regimen. The patient must know what to do, when to do it and how to do it. This task is difficult and studies have shown that over one third of patients forget information given to them by physicians and a large percentage of patients do not understand general information. Additionally, physicians have a finite amount of time to spend with each patient. Consequently, physicians must be efficient and productive during visits to ensure that the patient thoroughly understands the treatment regimen. The physician can employ a number of educational strategies to maximize the time spent with each patient and ultimately enhance patient's adherence to prescribed medication. Several of these strategies address the central information given to the patient, particularly the type, amount and timing of the information, as well as how it is organized, categorized and delivered. (Reason, 1990)

Instead of punitive actions an investigation of prescription errors should begin with analysis (what, how and why) of the drug use and delivery channels within a health care system with the aim of evaluating errors when they occur and to make changes in the drug delivery process to prevent them from reoccurring in the future.

With expectation of the quality of health rapidly increasing, it is imperative that heath professionals take the initiative to create and implement risk management procedures to prevent errors from occurring. Health care professionals need to develop and maintain an

ongoing process that uncovers potential risk while promoting ways to eradicate vulnerability to error. Some of this includes distractions during "prescribing-moments"

Studies have been done to determine if it is possible to bring cost affective risk reduction strategies to places of employment. Findings from one of such studies revealed the increased expenditure directed towards the treatment of disease rather than prevention has not yielded the dramatic improvement hoped for (Green 1976). Green believes that the potential benefits of health education far outweigh the cost, and the ratio of benefits to cost will certainly be greater than the corresponding ratios for most medical and surgical procedures directed at the same problem.

Suggestions to improve the human factors in reducing prescription errors involve just identifying those factors that could be changed. Examples include providing adequate ambient lighting and supplying extra lighting as needed as the eyes fatigue later during the work shift, reducing unnecessary sensory distractions such as loud noise or visual clutter, educating pharmacist about their increased vulnerability to errors during down time, and instituting self monitoring procedures for pharmacist.

5.0 Recommendations

From the findings of this study, the followings recommendations have been made

1) There is need to improve the knowledge of prescribers and dispensers on drugs, prescription writing and communication with patients
2) There should be equitable distribution of workload by employing more doctors and pharmacists
3) A system should be in place to monitor, evaluate and prevent errors in the drug use system of UCH Ibadan
4) Health care workers should be encouraged to report any error that occurs in the drug use system while punitive measures should be de-emphasized

5) As part of the health care team pharmacists should have unhindered access to the patients' case notes to be able to contribute maximally to the care of the patient

6) In order to detect and correct prescribing errors, pharmacy department need to be resourced so as to have sufficient skilled staff, with adequate time to spend on clinical monitoring

7) Prescribing needs to be seen as an important act To achieve this, senior staff both medical and managerial should overtly spend time on it Prescribing mistakes need to be acknowledged, taken seriously and discussed openly The way in which pharmacist feed back on the errors they detect could also be improved At present when prescribing errors are detected, the information is indicated verbally to the prescribers This means that the clinical team remains unaware of its importance as a whole, of the competence of its staff In future the information on prescribing errors should be fed to the team in a structured manner and discussed openly Such interventions should not be done verbally but must be recorded in the patients notes All this should be done in a blame free manner

8) The time has come for UCH Ibadan to adopt the use of Computer-Generated prescriptions This has been piloted to reduce errors to the minimum level

REFERENCES

Anon 1993 American Society of Health System Pharmacists (ASHP) Guidelines on Preventing Medication Errors in Hop Am J Hosp Pharm 1993, 50 305-14

Anon 2006 Medication Errors Online connnued medical education, section I Patients susceptible to medication errors Retrieved Mar 28 file //A Medication Errors Section I htm

Anon 2008 Medical Prescription From Wikipedia The free Encyclopedia Retrieved Sept

Anon 1999 Centre for Disease Control & Prevention (National Centre for Health Statistics) birth and deaths for 1998 National vital statistics report 47 (25) 6, 1999

Avery A J, 2008 Prescribing Errors by Family Practice Residents Postgraduate Med Journal 84, 170-171

Arigbe-Osula E 2005 Ensuring patient safety in Drug Therapy through Pharmaceutical Care Nig J Pharm Vol 37, April-June 2005

Aronson J K, Henderson G C Rawlins M D 2006 A prescription for better prescribing B M J 311 459-460

Baker K N, Flynn E A, Pepper G A, 2002 Medication Errors observed in 36 health care facilities Arch Intern Med, 162

Barber N, Rawlins M, Dean B 2003 Reducing prescription errors compliance, control and culture Quality and Safety in Health Care, 12 129

Barber N D and Dean I S 1998 The incidence of Medication Errors and ways to reduce them Clinical Risk J, 103-106

Bates D W, Boyle D L, Vander M H 1995 Relationship between Medication Errors and adverse drug events J Gen Intern Med 1995, 10, 19-20

Bates D W Medical Errors 1996 How common are they and what can be done to prevent them Drug Safety, 15 (5) 303-310

Bates D W, Teich J.Mand Lee J, 1999 The impact of Computerized Physician Order on medication error prevention. American Medical Information Association. 6, 313-321

Bates D W 2000 Management of Drug Nursing Times. 90 (15), 27-30

Boreham NC, Mower GE, and Foster RW 2000 Medical Students Error in Pharmacotherapeutics Med Edu

Christine Kuelin Kelly 1998 Efforts to prevent prescription errors heat up American College of Physician (ACP) observer June

Cohen MR 2001 Understanding Medication Errors Platform Presentation The American Pharmaceutical Association 148th Annual meeting: March 16-20, San Francisco, California

Coker II OB 1996 A lecture on monitoring of Drug/Medication therapy: What role for the pharmacist in the developing country, keynote address delivered at the Annual Lagos State Pharmacy week

Dean B, 2002 Learning from prescribing errors Quality and Safety in Health Care. 11, 258-60

Dean B, Schachter M Vincent C, 2002 Causes of prescribing errors in hospital inpatients: Their incidence and clinical significance. Quality and Safety in Health Care, 11 340-4

Dean B, Barber N, Schachter M 2000 What is a prescribing error? Quality Health Care , 9 232-7

Helper C D, Segal R 2000 Preventing medication errors and improving drug therapy outcomes, a management systems approach

Jennifer Cetulli, Medication Errors

The role of community Pharmacist in identifying, preventing and resolving drug-related problems. (News 04/08/2548 web page)

Gnech J A, Elder J P and Booth E M 1993 Communication for Health and Behaviour Change A Developing Country Perspective 1st Edition Jossy-Bass Publishers San Francisco Pg 23

Khoja K.A. Sequeira, R.P and Al-Ansari T.M. 2008. Prescription Writing Skills of residents in family practice residency programme in Bahrain. Postgrad Med J 84 198-204

Kohn T, Linda T, Corrigan M 2000. To Err is Human, building a safer health system Washinton DC, Institute of Medicine National Academy Press

Lesar T.S, Briceland L.L, Delcone K, Parmalee J.C,and Masta-Gornic V 1990 Medication Prescribing error in a teaching hospital. The Journal of the American Medical Association (JAMA) Vol 263 No 17

Maclay J.S, Mansour T, and Ross S 2006. Foundation Programme Doctors confirm that they are unprepared for safe and rational prescribing, a response to an editorial by Aronson et al Sep 27

Maxwell S, Walley T.
Teaching Safe & Effective Prescribing in UK Medical Schools: A core curriculum for tomorrow's doctors. British J Clinical Pharmacology 2003, 55 496-503

Maxwell S, Walley T, Ferner R, 2002 Using drugs safely: Undergraduates must be proficient in basic prescribing. British Medical Journal, 324, 930-1

Michael A. Jackson and Wesley G. Rens 2003. A Systematic Approach to Preventing Medication Errors. A publication of the U.S Pharmacist June

Michelle Meadows 2004. Strategies to Reduce Medication Errors United State of America Food And Drug Administration magazine May June

Nadeem S, Shah H, Mohammed A and Avery A 2001. A survey of prescribing errors in general practice. The Pharmaceutical Journal Vol 267. 29

Teichman P.G and Calfee A.E 2000 Prescription Writing to Maximize Patient Safety. Journal of American Academy of Family Physicians July/Aug

Reason J 1990 Human Errors Cambridge. Cambridge University Press

Research Activities (1995). System may reduce hospital Medication Error. American Journal of Health-System Pharmacy, 185 (6), 3

Roberts M, Stokes J. 2001. Outcomes of a randomized control trial of a clinical pharmacy intervention in 52 nursing homes. British Journal of Clinical Pharmacology

Rozich JD, Haraden CR 2003 A practical methodology for measuring medication related harm. Quality Safe Health Care 2003, 12 194-200

Rubin P. 2006 A prescription for better prescription Medical Education is a continuum BMJ 333, 600-601

Sander J, Esmail A 2003 The frequency and nature of medical errors in primary health care. understanding the diversity across studies., 20, 231-6

Schiff G D and Rucker T D 1994 Computerized Prescribing, JAMA 279, 1024 -1029

Strauss LM, Morley P, and Cipolle RJ 1990 Drug related problems. their structure and function , 24 1093-1097

The Audit Commission,2002 A spoonful of sugar- Improving Medicines Management in National Health System Hospitals: London

Walley T, Haigh J, and Orme M 1994 A clinical and therapeutics in undergraduate medical education in the UK current status British journal of pharmacology , 37 29-35

APPENDIX I

UNIVERSITY COLLEGE HOSPITAL, IBADAN
General Prescription Form

Date

Surname | First Name(s)

Date

Signature

UNIVERSITY COLLEGE HOSPITAL, IBADAN
General Prescription Form

Age

Surname

Prescription

1

2

3

4

5

Total

APPENDIX II

OBSERVATION AT THE PHARMACY

PRESCRIPTION ERRORS AT THE UNIVERSITY COLLEGE HOSPITAL IBADAN, NIGERIA

INTRODUCTION

Good day, I am a postgraduate student of Public Health at the University of Ibadan. I am doing a study on medication safety and would like to observe the process of dispensing at the pharmacy points of the hospital.

This observation checklist is designed to gather information on the dispensers' practices related to dispensing at the University College Hospital. The purpose is to make health care safer for patient at the hospital.

1. Take time to read or study prescription
2. Verbal information given to patients' by dispensers
   - Name of drug
   - Dosage instruction
   - Mode of administration
   - Time of administration
   - Duration of treatment/administration
   - Expected side effects
   - Precautions/warnings
   - Storage
   - Expected benefit of drug and when patients will start noticing action of drugs
   - Any special advice
   - Ask if patient is currently on any other drug
   - Give room for question from patient
   - Asks if patient is the ultimate user of drug

- Asks patient to repeat all instructions given about medication

3 Written information on labels

- Name of patient
- Name of hospital
- Date
- Name of drug

Auxiliary Labels

Not to be taken by mouth
For external use only
Poison (in red)
Shake the bottle
Store in a cool place

APPENDIX III

INDEPTH INTERVIEW GUIDE FOR DEPARTMENTAL HEADS

PRESCRIPTION ERRORS AT THE UNIVERSITY COLLEGE HOSPITAL IBADAN, NIGERIA

INTRODUCTION

Good day. I am a postgraduate student of public Health at the University of Ibadan I am doing a study on medication safety and as a key personnel/head of department in this hospital, your views, ideas, comments and suggestions will be mostly useful in the study. I will be talking to you for about 10-20 minutes. Your name and your comments for this study will be kept private

Are you willing to participate? Yes [ ] No [ ]

If no, thank the respondent and terminate interview

1. **Demographic characteristics**

- Name, sex, job description, years of experience, number of years in current position

2. **Knowledge about Prescription Errors**

- What do you understand to be prescription Error? (Probe into causes in the use of prescription medication, how do you cope with problems associated with prescription/dispensing? (probe further into health giver/patient contact or relationship)

3. **Welfare/Workload**

What are the human factors behind prescription Errors? Are there enough personnel?

Probe for the effect of workload in the workplace (hospital environment) e.g lighting, distraction etc

4. **Policy Issues**

- Are there policies in place for dispensing and prescribing errors?
- If yes, are staff involved in dispensing and prescribing aware of the policy? If Yes, how? If No, why?
- Are dispensing or prescription errors reported in this hospital? If Yes, what is the reporting format? If No, why?
(Probe into – how it is handled? Any punitive measures – to know if there is any system in place to monitor, evaluate and prevent medication errors)
- What are the policies on upgrading knowledge of health care givers in this hospital?
(Probe for – different types available e.g seminars, and frequency of such seminars and frequency of such trainings)
- What are the source of drug information services?

5. What recommendation can you give for improving medication safety in this hospital?

Name (Optional): _____

Profession: _____

Department: _____

Thank you