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DOCUMENTATION OF ACCURATE AND COMPREHENSIVE MEDICATION

HISTORIES AT KOMFO ANOKYE TEACHING HOSPITAL

BY:

CONSTANCE CAROLINE COBBOLD

B. PHARM (HONS.), MPSGH

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DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own research and that, to the best of my knowledge, no part of it has been presented for another degree in this university or elsewhere.

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CONSTANCE CAROLINE COBBOLD/ PG7859212

Candidate's Name/ Exam number

Candidate's Signature

Date

Certified by:

MRS. AFIA FRIMPOMAA MARFO

Supervisor's Name

Supervisor's Signature

Date

DR. KWAME OHENE BUABENG

Head of Department's Name

Head of Department's Signature

Date

ABSTRACT

Background: Medication errors represent the most common patient safety errors. Most of these errors result in adverse drug reactions, which cause harm to patients. Essential in preventing these medication errors, is the record of a complete and accurate medication history.

Aim: To evaluate the use of a formalised approach in obtaining patients' medication histories and also assess pharmacists' knowledge and perception of the medication history taking process.

Methods: The study, conducted at Komfo Anokye Teaching Hospital, involved a cross-sectional medication history interview of a purposive sample of 300 in-patients using a structured interview guide, an audit of the medication histories documented by physicians in folders of the sampled in-patients, and completion of a structured questionnaire by 55 pharmacists at the hospital.

Results: With the use of an interview guide during medication history taking, the frequency of documentation of medication history information increased significantly ($p = 0.000$) for all the eight medication history components compared to when no interview guide was used. The depth of medication history information documented also increased significantly for four of the medication history components outlined (for prescribed, non-prescribed and social drugs, $p = 0.000$, and for source of medication, $p = 0.025$). Pharmacists at KATH had an excellent knowledge (Mean = 4.32, $SD = 0.78$) and a positive perception (Mean = 3.90, $SD = 0.89$) of the medication history taking process. An inverse association was observed between pharmacists' hospital pharmacy practice years and their knowledge of medication history taking. This was statistically significant ($p = 0.024$).

Conclusion: The use of a formalised approach in taking the medication history of patients improves the quality of medication history information documented. Pharmacists are knowledgeable in the medication history taking process and are willing to be involved in it. However, the greater the number of hospital pharmacy practice years of pharmacists, the more likely they are to have little knowledge of medication history taking.

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LIST OF ABBREVIATIONS

ADR	–	Adverse Drug Reaction
BPMH	–	Best Possible Medication History
CHRPE	–	Committee on Human Research and Ethics
CI	–	Confidence Interval
ED	–	Emergency Department
HER	–	Electronic Health Record
EMR	–	Electronic Medical Record
GP	–	General Practitioner
KATH	–	Komfo Anokye Teaching Hospital
KNUST	–	Kwame Nkrumah University of Science and Technology
MRP	–	Medication Related Problem
<i>SD</i>	–	Standard Deviation
SPSS	–	Statistical Package for Service Solutions
UK	–	United Kingdom
USA	–	United States of America
SA	–	Strongly Agree
A	–	Agree
U	–	Uncertain
D	–	Disagree
SD	–	Strongly Disagree
M	–	Mean

LIST OF OPERATIONAL DEFINITIONS

- Adverse Drug Reactions – Any noxious or unintended reaction to a drug that is administered in standard doses by the proper route for the purpose of prophylaxis, diagnosis, or treatment.
- Iatrogenic disease – Any adverse condition in a patient occurring as a result of treatment by a physician, surgeon, or other health professionals.
- Medication discrepancies – Unexplained differences among documented regimens across different sites of care.
- Medication error – An unintentional error in the prescribing, dispensing, administration or monitoring of a medicine while under the control of a healthcare professional, patient or consumer.
- Medication reconciliation – A formal process of obtaining and verifying a complete and accurate list of each patient's current medicines.
- Prescribing errors – Errors in prescribing that cause administration of the wrong therapy with or without harm.
- Prescription error – A failure in the prescription writing process that results in a wrong instruction about one/ more of the normal features of a prescription.

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DEDICATION

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

It is recognized that iatrogenic disease accounts for 5% of all hospital admissions (Taylor and Datta, 1992). A number of Australian studies conducted between 1988 and 1996 demonstrated that, medication related hospital admissions accounted for up to 22% of Emergency Department (ED) admissions involving the elderly (Crook *et al.*, 2007). Among hospital in-patients, medications were a leading cause of adverse events, and errors involving medications were frequent (Cornish *et al.*, 2005). On admission to hospital, up to 50% of patients had an incomplete medication list, resulting in a medication not being administered during hospital stay (Council, 2005). In a study by Dobrzanski *et al.*, (2002), it was established that over a quarter of hospital prescribing errors were attributable to incomplete medication histories being obtained at the time of admission.

A record of an accurate and detailed medication history is a vital part of patient assessment and hospital admission process (Crook *et al.*, 2007). It remains an essential component of a successful pharmacotherapeutic plan and constitutes the foundation of a carefully planned, patient-specific and optimized drug therapy (Yusuff and Awotunde, 2005). The occurrence of medication errors, interrupted drug therapy, as well as wastage of considerable time and effort is particularly minimised with the documentation of a complete history of patients' drug use. A careful assessment of patients' drug history, also provides an opportunity for understanding patients' knowledge of the role of drug therapy in the management of their disease(s), patients' drug adherence tendencies, and the effectiveness of previous and current therapy (Yusuff and

Awotunde, 2005). Again, availability of a complete medication history is critical to the success of diagnostic and patient management tasks. It also helps to improve the efficiency and quality of patient care (Nester and Hale, 2002; Tam *et al.*, 2005).

Historically, documentation of medication histories has been undertaken by physicians and sometimes, nurses. The general observation from studies done mainly in developed settings is that, the medication history information documented by physicians is often inaccurate and incomplete (Beers *et al.*, 1990; Batty *et al.*, 1997; Bedell *et al.*, 2000). Though the factors responsible for this are not readily apparent, it probably stems from the relatively long time required to take a comprehensive medication history in relation to the busy schedule of a physician. Yusuff *et al.* (2010) identified that it takes nine to thirty minutes on average to complete a comprehensive medication history. This makes it a potentially overwhelming task for busy physicians. The perception of drug history documentation as an additional burden on physicians' work schedule as well as the problem of insufficient manpower may also be a contributing factor to the inaccuracy and incompleteness of medication histories taken by physicians (Yusuff and Awotunde, 2005).

Owing to the compelling need to improve the quality of drug history documentation, several options are being explored to ensure that the best possible medication history is recorded for patients. One of such options is for medication histories to be taken by pharmacists. Several studies have demonstrated that pharmacists' involvement yielded significant improvement in the frequency and depth of medication histories documented (Hocking and Kalyanaraman, 1998; Montpetit and Roy, 1998; Nester and Hale, 2002). In some developed countries (for example, USA and UK), where medication history taking by pharmacists in health facilities is quite a common practice, it is estimated that an average of seven million dollars (\$7 million) per year

per hospital is saved. Also, mortality rates are reduced by 128 deaths per year per hospital, compared with hospitals that do not use this service. Although there is evidence in the biomedical literature that pharmacist-conducted medication histories are more accurate, save money, and increase patient safety, this service is not widely implemented in healthcare institutions in these countries; only about 3% do (Beers *et al.*, 1990, Bond *et al.*, 2000). As experts in medicines, pharmacists are especially suited to acquire and supervise the recording of accurate medication history. They are known to compile such histories with a high degree of precision and reliability (Nester and Hale, 2002).

Another suggestion for recording in-depth medication histories is the use of a formalised process or a standardized documentation technique (either electronic checklists or preprinted interview guides) (Halapy and Kertland, 2012). Without a formalised process for gathering this information, the reliability of the history is variable and can be influenced by the training and background of the person documenting the history, the time allotted to the interview process and the patient's level of familiarity with his or her drug regimen (Bond *et al.*, 2000; Rozich and Resar, 2001).

1.2 STATEMENT OF THE PROBLEM

The significance of the use of a formalised approach in obtaining patients' medication histories has not been extensively investigated in Ghana and many other developing countries. Assessing how the use of a formalised or structured process in acquiring a patient's medication history affects the quality of medication history obtained in health facilities in Ghana, is therefore essential.

Currently in Ghana, as in many other developing countries, the involvement of pharmacists in the medication history taking process is not routine. Documentation of patients' medication history in health facilities is usually done by physicians, often without the use of a formalised approach. With the current call for pharmacists to get more involved in the medication history taking process, documented empirical evidence on pharmacists' knowledge and perception is needed to inform policy decision on the issue. The present study is an attempt to fill this gap.

Thus, the findings on these matters will be of immense significance to the Ministry of Health, health care teams (especially physicians and pharmacists), patients and health care facilities at large.

1.3 RATIONALE FOR THE STUDY

First, any differences in the quality of medication histories taken without the use of a formalised process compared to those taken by using a formalised process (e.g. the use of a site specific medication history taking form) would impress upon physicians and pharmacists the crucial need to employ the latter approach when recording a patient's medication history. For physicians, a detailed medication history obtained using such processes will help them minimise prescribing errors, identify, prevent and/ or resolve any active or potential drug related problems, and plan for future treatment for the patient. For pharmacists, accurate and complete medication histories obtained through a formalised process will aid them in the monitoring of patients' therapy, counseling and education of patients on their medications and disease conditions, as well as the making of meaningful and relevant interventions in the therapy of patients. This will go a long way to ensure that patients receive the best patient-oriented care.

Secondly, with the call of pharmacists for an extended role in the health care delivery system, assessing and documenting the knowledge and perception of the Ghanaian pharmacist in the medication history taking process will provide relevant data to influence decisions by the Ministry of Health, involving pharmacists and their role in the medication history taking process in health facilities within the country.

Finally, the findings of this study will provide baseline data for future studies on medication history taking in health facilities in Ghana.

1.4 AIM OF THE STUDY

The aim of this study is to evaluate the use of a formalised approach in obtaining patients' medication histories and also assess pharmacists' knowledge and perception of the medication history taking process.

1.5 OBJECTIVES

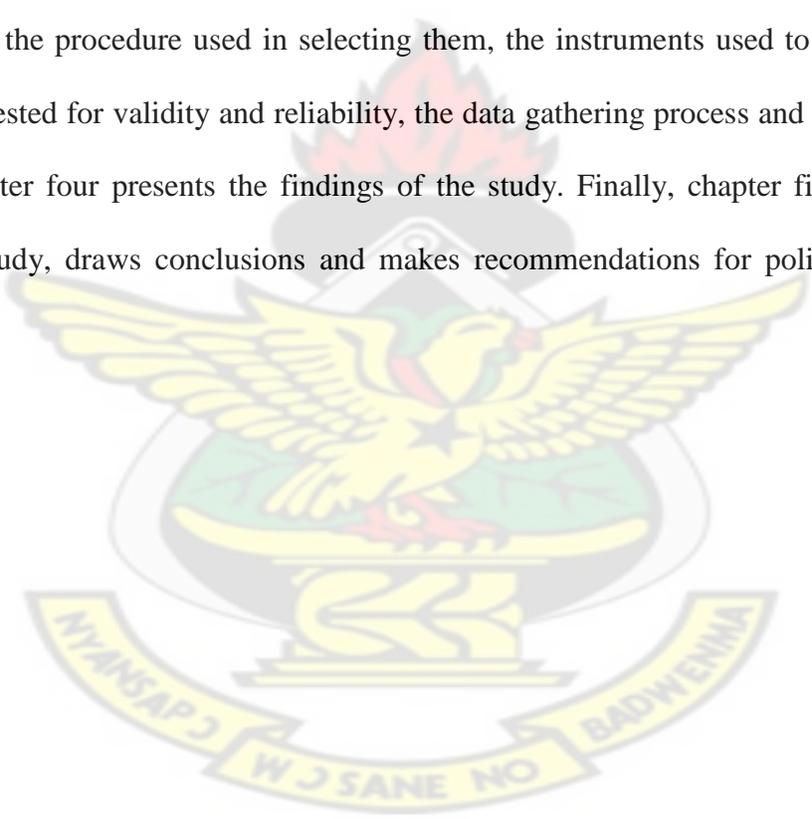
The study seeks to achieve the following specific objectives.

1. To assess the differences in the frequency of documentation of medication history information for in-patients at Komfo Anokye Teaching Hospital (KATH) with and without the use of a formalised approach.
2. To assess the differences in the depth of medication history information documented for in-patients at KATH with and without the use of a formalised approach.
3. To assess the knowledge of pharmacists about the medication history taking process.
4. To assess the perception of pharmacists on the medication history taking process and their role in it.
5. To establish the relationship between pharmacists' demographics (eg: gender, highest

qualification in the field of pharmacy, number of hospital pharmacy practice years) and their knowledge and perception of the medication history taking process.

1.6 ORGANISATION OF THE STUDY

The entire study is organised in five chapters. Following the present chapter is the review of related literature in chapter two, which presents the conceptual issues that underpin the study and reviews empirical studies related to the current study. Chapter three describes the method adopted to carry out the study. It includes the research design, study site, population, sample of respondents and the procedure used in selecting them, the instruments used to collect data and how they were tested for validity and reliability, the data gathering process and the data analysis procedure. Chapter four presents the findings of the study. Finally, chapter five discusses the results of the study, draws conclusions and makes recommendations for policy, practice and further research.



CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 DEFINITION AND COMPONENTS OF MEDICATION HISTORY

A medication or drug history is simply a written record of a patient's drug therapy. It is a detailed, accurate and complete account of all prescribed and non-prescribed medications that a patient has taken or is currently taking prior to a newly initiated institutionalized or ambulatory care (Yusuff *et al.*, 2010). Medication history encompasses a patient's allergic tendencies, previous adverse drug reactions, adherence to previous pharmacological therapy, social drug use and probable self- medication with complementary and alternate medicines. For each medication, the name (generic and brand), strength, dose, dosage form, frequency, time and route of administration and the indication for therapy should be recorded. A good medication history also assesses the medication taking behavior including self-management and adherence to therapy of a patient (Covington, 1972; FitzGerald, 2009; Tietze, 2011).

2.2 SOURCES OF MEDICATION HISTORY INFORMATION

In obtaining a patient's medication history, several sources can be used. These sources include : patient or caregiver interview, inspection of medication containers, review of a personal medication list, follow-up with a community pharmacy, review of a current medication list printed by the community pharmacy and other health care professionals involved with patient's care, such as family physician, clinical nurse specialist and community pharmacist (Ellington *et al.*, 2002; FitzGerald, 2009). In order to obtain the Best Possible Medication History (BPMH), two or more of these sources of information can be used.

2.3 IMPORTANCE OF MEDICATION HISTORIES

The importance of a patient's medication history in medical and pharmacy practice cannot be overemphasized, and is well-documented in the extant literature. In the first place, it serves as a vital tool to improve patient care and safety. It has been found that lack of accurate and complete information about patients' medicines when their care is transferred between healthcare settings constitutes a common patient and medication safety problem worldwide (Duguid, 2012). In one study, up to two-thirds of patients had variances between the medicines they took at home and the medicines ordered on admission to hospital (Tam *et al.*, 2005). A well-developed medication history may uncover reasons for a patient's illness, such as adverse drug events or non-adherence to drug therapy (Tam *et al.*, 2005). Knowledge of the medications a patient has taken in the past or is currently taking and of the responses to those medications will help in planning future treatment, thus ensuring appropriate therapy during and following hospital stay.

Accurate medication histories are also useful in detecting drug-related pathology or changes in clinical signs that may be the result of drug therapy (FitzGerald, 2009). Drugs can mask clinical signs. For example, β -adrenoceptor antagonists can prevent tachycardia in a patient with haemorrhage, and corticosteroids can prevent abdominal pain and rigidity in a patient with a perforated duodenal ulcer. Drugs can also alter the results of investigations. Amiodarone, for instance alters thyroid function tests (Gandhi *et al.*, 2003; FitzGerald, 2009). A good drug history will therefore help to ameliorate such occurrences.

A history of a patient's medications also influences counseling and education given to patients about their medications. The poorly regulated drug distribution system in most countries (especially developing countries) underscores the need to promote the acquisition of detailed medication histories in health facilities. In most of these countries, some prescription drugs are

indiscriminately obtained without prescriptions and/ or appropriate counseling (Pronovost *et al.*, 2003; Lee *et al.*, 2010). An in- depth information about patients’ drugs will uncover the sources of their medications and ensure that drugs supplied to patients are safe for consumption.

Secondly, medication histories facilitate medication management. There is the need for patients, caregivers and healthcare professionals to be aware of the relevance of medicine information availability at the start of each episode of care. The medication history interview is an opportunity to focus on optimizing medication management during the episode of care. In medication management, the health care professional reviews each medicine to determine whether:

- there is a clear indication for continuing therapy with each medicine
- the dosage form, dose and frequency of medications are appropriate for the indication and patient
- there are contraindications due to previous allergies or adverse drug reactions
- there is compliance to therapy
- medications are achieving the goals of therapy (Australian Pharmaceutical Advisory Council, 2005; Fertleman *et al.*, 2005)

The availability of a well- documented medication history makes decisions about medication management easy and less stressful.

Thirdly, a complete and accurate medication history helps prevent medication errors. A report on “Preventing Medication Errors” (Aspden *et al.*, 2006) stated that the average hospitalized patient is subject to at least one medication error per day. This confirms previous research findings that medication errors represent the most common patient safety error, with most of these errors

resulting in harm (Bates *et al.*, 1997). Medication histories are known to be essential in preventing these medication errors, especially prescription errors and consequent risks to patients. Apart from preventing prescription errors, errors in prescribing, which include duplication of therapy, drug-drug interactions and drug-related problems can be avoided with an accurate medication history (Beers *et al.*, 1990; Lau *et al.*, 2000; Grahame-Smith and Aronson, 2002; FitzGerald, 2009).

It has been suggested in previous studies that, unintended medication discrepancies that represent errors are common at the time of hospital admission, with up to 27% of all hospital prescribing errors being attributable to incomplete medication histories at the time of admission (Cornish *et al.*, 2005). In a study to find out unintended discrepancies in medication history at the time of hospital admission, Cornish *et al.* (2005) concluded that medication errors at the time of hospital admission are common, and some have the potential to cause harm to the patients involved. Consequently, Cornish *et al.*, (2005) called for better methods of ensuring an accurate medication history at the time of hospital admission.

Finally, a detailed medication history enhances medication reconciliation. Medication reconciliation is defined as a formal process for creating the most complete and accurate list possible of a patient's current medications and comparing the list to those in the patient record or medication orders (Burrige, 2007). According to Santell (2006), it involves comparing a patient's medication orders to all of the medications that a patient has been taking. In medication reconciliation, the medication history obtained is compared to admission, transfer or discharge medication orders in the context of the plan for care. The discrepancies are brought to the attention of the prescriber and if changes are made they are documented. This seeks to ensure that patients receive all intended medicines and avoid errors of transcription, omission,

duplication of therapy, drug-drug and drug-disease interactions (Burrige, 2007). An accurate and complete medication history is therefore very vital in medication reconciliation. Indeed, medication history constitutes the foundation for the medication reconciliation process.

2.4 THE MEDICATION HISTORY TAKING PROCESS

According to Ellington *et al.* (2002) and FritzGerald (2009) in order to obtain the best possible medication history (BPMH), it is essential to follow the following steps:

Prior to the medication history interview, it is important to acquire as much background information as possible about the patient. This can be done through looking at the patient's history for at least the previous three months, reviewing the patient's past medical history as these conditions serve as trigger to prompt consideration of appropriate common medications. Where the patient's medication vials or blister packs are available, it is important that the interviewer takes them along for the interview.

Identify possible sources of information available for conducting the history. Verification of the accuracy of the history by at least two sources is recommended. Factors influencing the type of sources used include patient's current medical status, availability of the caregiver and time of day.

Introduce yourself to the patient and/ or care giver. Patients and caregivers must know the identity of the interviewers as well as the purpose of the interview. The importance of obtaining a good medication history must be emphasized to the patient. Be sure to confirm patient's identity with at least one patient identifier (eg: birth date, telephone number, home address etc.) before commencing the interview.

Solicit a comprehensive list of all prescribed and non-prescribed medicines. This can be done by referring to the site-specific medication history taking tool. Review all medications that the patient has brought from home. For each of these medications, enquire about generic and brand name, strength, dose and dosage form, frequency and time of administration, route of administration and the rationale for use. The interviewer must specifically ask about inhalers, injections, ointments and eye/ear/nasal drops as most patients usually consider only “pills” when they are asked about their medications.

Ask about allergies and adverse drug reactions. Enquire about the nature of the reaction, medicine or agent that caused the reaction, how the reaction was managed and the outcome of the management.

Identify patient’s regular community pharmacy and ask about their adherence to previous medication regimen.

Close the interview with the patient and/ or caregiver. This involves assessing the patient’s understanding, providing the opportunity for the patient to ask questions and discussing follow-up plans with them.

2.5 ERRORS IN MEDICATION HISTORY TAKING

Medication history errors are common and could be potentially fatal. (FitzGerald, 2009). They can result in interrupted and inappropriate drug therapy during and following hospital stay (Tam *et al.*, 2005). Some studies have shown that up to 60% of patients admitted to the hospital will have at least one discrepancy in their medication history (Beers *et al.*, 1990; Lau *et al.*, 2000). Medication history errors include omission errors (deletion of a drug used before admission), commission errors (addition of a drug not used before admission), dose errors and frequency

errors. Possible causes of errors are multifocal, relating to the system, the patient or care giver and the health care staff (Campbell *et al.*, 2007; Gleason *et al.*, 2010).

2.6 FACTORS AFFECTING THE QUALITY OF MEDICATION HISTORY

The completeness of the medication history depends on several factors. First and foremost is the method used for the collection of information on the patient's medications. It has been suggested that a standard, structured and consistent process should be used in conducting the medication history interview (Cornish *et al.*, 2005). In the absence of a structured and formalised process for conducting the interview, information may be inferred from prescription vials and written medication lists without confirmation from patients. This often makes the reliability of the information variable. In Ghana, where medication histories of patients are usually taken by physicians without the use of a standardized or formalised process, the likelihood of the above shortcomings affecting the quality of medication histories is very high.

Secondly, the training and background of the person recording the information often influences the quality of medication history obtained. A streamlined process involving appropriately trained personnel is more efficient and improves patient safety (Bond *et al.*, 1999; Rozich and Resar, 2001; Cornish *et al.*, 2005). It is therefore suggested that pharmacists be involved in recording medication histories as they are known to be the experts in medicines. It is believed that pharmacists are particularly suited for conducting medication history interviews, as they are more familiar with drug names, characteristics, effects, dosage forms, and administration than other health care personnel. They can readily identify inconsistencies and mistakes in patients' self-reported medication histories. They also have the expertise and experience to scrutinize questionable drug orders and optimize a patient's drug therapy through clinical interventions (Nester and Hale, 2005). It is also believed that pharmacists can devote more time to this duty

compared to physicians (Yusuff *et al.*, 2010).

A third factor that affects the quality of the medication history is the time allotted to conduct the interview. The duration of time the interviewer spends with the patient influences the amount of information collected from the patient. Generally, the longer the time spent with the patient, the better the information gathered. This helps the interviewer to probe further in order get certain information that patients would not usually give readily.

Language barrier is another factor that affects the quality of medication history. Effective communication between the interviewer and the patient is very essential in obtaining a good medication history. The interviewer must be able to comprehend all the information given by the patient and vice versa. It is therefore imperative that the patient or his/her caregiver and the interviewer understand a common language in order to facilitate effective communication.

The severity of a patient's illness and his/her cognitive status is also a critical influence on the medication history. In recording a patient's medication history, the patient is one of the sources that can be used. However, the quality and reliability of information provided by the patient is dependent on the condition of the patient on presentation to the healthcare facility. Critically ill patients may not be able to talk to the interviewer whereas the information provided by a mentally disturbed or ill patient may not be reliable. In such cases, another source other than the patient must be used.

Finally, the patient's familiarity with his or her medications and medication regimen is an important determiner of the quality of medication history. Not all patients carry their home medications along with them during a hospital visit. In such instances, the patient's familiarity with the names, colours, shapes, dosage forms, and dosage regimen of his/her medications may

give the interviewer a clue to the medications he or she is taking at home. Sometimes, based on the description given, the interviewer might show samples of the medications (if available) to the patients to verify if they are the same as the ones they take at home.

2.7 CRITERIA FOR ASSESSING MEDICATION HISTORY COMPONENTS

In a study by Yusuff *et al.* (2010), the criteria used for the assessment of the frequency and depth of medication history information documented included the medication history components, items of information documented for each component and the maximum score for each component (see Table 2.1)



Table 2.1: Criteria for evaluating depth of medication history information documented

Medication history Component	Depth of information	Maximum score for depth of information
Prescription medicines used	Name or description, dosage form, Dose frequency, duration	5 points
Over-the-counter medicines used	Name or description, dosage form, Dose frequency, duration	5 points
Sources of medicines used	Name or Place of purchase	1 point
Side effects / adverse reaction	Name of suspected medicine, Description, Start/ Stop date	3 points
Allergies to medicines	Name, Description, Start/Stop date	3 points
Allergies to foods	Name, Description, Start/Stop date	3 points
Allergies to chemical/ Environmental agents	Name, Description, Start/Stop date	3 points
Patient adherence	Clinician judgment	1 point
Alcohol use	Start/stop or duration and Amount	2 points
Cigarette smoking	Start/stop or duration and Amount	2 points
Illicit drug use	Start/stop or duration and Amount	2 points
Use of herbal medicine	Name or Description, Start/Stop or Duration	2 points
Dietary restriction	Clinician judgment	1 point

A point system was used in assessing the depth of medication history information documented. In this system, proportional scores were assigned to, each medication history information documented. In order to obtain the proportional score, the counts of medication history information provided was divided by the maximum obtainable points for each component. The raw scores for each of the eight medication history components was calculated and divided by

the maximum obtainable scores listed in the third column of Table 2.1. For example, if “Tab Nifedipine 30mg tds x 3/12” was recorded under prescribed drugs in the case notes of a patient, the calculation was done as follows:

Information contained is:

- Tab- dosage form
- Nifedipine - name of drug
- 30mg - dose
- tds – frequency
- 3/12 - duration

Hence, the raw score = 5 points

Proportional score = Raw score ÷ Maximum obtainable score

Proportional score = $5 \div 5 = 1$, hence proportional score for prescription drug in the case notes of this patient was 1.

In the event where “None” or “No known drug allergy” was documented, the maximum proportional score of (1) was assigned since this suggested that enquiries about that medication history component had been made. On the other hand, if “Yes” or “No” was documented for any medication history component, the information provided was regarded as inadequate and assigned a raw score of 1 point for the effort made to present the information. In the absence of documentation for any of the medication history components, it was assumed that no enquiries were made about that component and therefore a raw score of zero was assigned.

2.8 BENEFITS OF PHARMACISTS' INVOLVEMENT IN MEDICATION HISTORY TAKING

The role of pharmacists cannot be overlooked in medication history taking. Being the experts in drugs, their involvement in issues relating to the medications of patients is very crucial. Several studies have been carried out especially in developed settings to assess the effects of pharmacists' involvement in medication history taking on the health of patients and the health care system in general.

Nester and Hale (2002) conducted a study on the effectiveness of pharmacist-acquired medication history in promoting patient safety. This study aimed at comparing the impact of pharmacist-obtained medication histories with standard nurse-obtained medication histories on clinical pharmacy services. The effect of this service on pharmacist time was also investigated.

The study revealed that, pharmacists are especially suited to conducting medication history interviews and can readily identify inconsistencies and mistakes in patients' self-reported medication histories. The average time spent by pharmacists in conducting medication history interviews, recorded to be 13.4 ± 6.7 minutes, was deemed efficient and worthwhile.

Another study by Cornish and co-authors (2005), sought to prospectively identify unintended discrepancies between the physicians' admission medication orders and a comprehensive medication use history obtained by a pharmacist or a trained pharmacy or medical student. In this study, the potential clinical significance of these discrepancies was also evaluated. The duration of medication use history completion and discrepancy reconciliation was recorded using a stopwatch. This was prospectively done in 38 patients within 2 weeks.

Findings from the study showed that, among the study population, 53.6% had at least 1

unintended medication discrepancy at the time of hospital admission with 38.6% of the identified discrepancy having the potential to cause moderate to severe discomfort or clinical deterioration. The most common type (46.4%) of discrepancy involved the omission of a medication that the patient was taking before admission. The median time for the entire process was 24 minutes. The study also established that, medication errors at the time of hospital admission were common, and some had the potential to cause harm. However, the small sample used for the study, lacked power to detect associations between unintended discrepancies and baseline variables of interest.

The impact of pharmacists' participation on the frequency and depth of medication history information documented in a developing country, specifically Nigeria, was assessed by Yusuff *et al.* (2010). The study involved a cross-sectional assessment of the frequency and depth of medication history information documented by physicians and pharmacists for patients at a premier teaching hospital in south western Nigeria.

The study found that the frequency of medication history information documented by pharmacists was significantly higher for twelve of the thirteen medication history components ($p < 0.0001$). The depth of medication history information acquired and documented by the pharmacist was significantly better for all the thirteen medication history components ($p < 0.0001$).

Carter *et al.* (2006) also conducted a study to identify discrepancies between medication histories taken by Emergency Department (ED) providers (physicians, nurses and medical students) and medication histories taken by clinical pharmacists.

In this study, pharmacists identified 1096 home medications as against 817 home medications documented by ED providers. Of the 817 home medications documented by the ED providers,

the regimens of 637 (78%) were incomplete and were supplemented with dosing information by the pharmacists. Pharmacists reported 375 medication allergies compared to 350 reported by ED providers. Immunization histories were obtained in all the 252 (100%) pharmacist-acquired medication histories as against 45 of the 252 (18%) acquired by ED personnel. The study concluded that pharmacist-acquired medication histories in the ED were more complete than those acquired by other health professionals.

In a study to evaluate the role of pharmacists in eliciting a comprehensive medication history in the emergency department (ED) of the Royal Adelaide Hospital in Australia (Crook *et al.*, 2007), researchers sought to examine the accuracy of medication histories recorded by doctors at the ED by comparing it with those elicited by a pharmacy researcher. The profile of each recruited patient was reviewed for medication related problems (MRPs).

Findings from the study showed that, 1152 medications were recorded by the pharmacy researcher and 189 by the ED doctors. A total of 79 adverse drug reactions (ADRs) were recorded by the pharmacy researcher compared to 57 in the case of the ED doctors. In 30 out of 100 patients, there was no ADR recorded by the ED doctor. Fifty-five MRPs were identified within patients' regimens compiled by the pharmacy researcher with the most frequently recorded MRP being 'compliance problems'. The study concluded that pharmacists' training in pharmacology and familiarity with the appearance and dosage forms of medications, places them in an ideal position to elicit a more accurate medication history.

2.9 DISCREPANCIES IN MEDICATION HISTORIES TAKEN WITHOUT A FORMALISED PROCESS

Discrepancies in medication histories are known to be one of the causes of several cases of medication errors, adverse drug events and sometimes morbidity and mortality of patients.

A study by Yusuff and Awotunde (2005), investigated the frequency of drug history documentation in an institutionalized tertiary care setting in Nigeria. This research also sought to identify opportunities for intervention to improve documentation.

The study revealed that, the dose, dose frequency and duration of use were documented in only 6.4%, 6.4% and 8.4% of patients' case notes respectively, while side effects experienced prior to admission, were documented in only 1.6% of patients' case notes. Documentation of allergies to drug(s), food and chemicals represented 1.4%, 1.8% and 0.8% respectively. Documentation of the history of social drug use was done in 36.6%, 23.2% and 4.2% of the case notes for alcohol, cigarette and illicit drugs respectively; whilst patients' adherence history was documented in 10.2% of the study sample. Source(s) of drug supply for patients was documented in only 6.6% of patients. The study concluded that drug history documentation at the study site was not as detailed as it should be. The factors responsible for the observed inadequacy were however, not investigated in the study.

The accuracy and completeness of medication histories in Emergency Department triage was assessed in another study (Mazer *et al.*, 2011). Enrolled patients completed a questionnaire regarding the medications being taken by them. An ED nurse blinded to the study goals also generated a medication list at triage for each patient. Patients self-reported lists were compared to the lists obtained during the triage interview and the overall medication discrepancies recorded.

Findings from the study showed that omitted and discontinued medications were noted in 626 patients, yielding a 37% discrepancy rate (95% CI = 35% to 40%). This included 163 (9.8%, 95% CI = 8.5% to 11.4%) patients with discontinued medications and 463 (27.9%, 95%

CI = 25.8 to 30.2) patients with omitted medications. Thirty-eight percent (632) of patients reported taking over-the-counter medications. The study found significant discrepancies in medication histories obtained at triage and those verified later by the patients. Mazer *et al.* (2011) recommended that further research be conducted to determine the optimal approach in obtaining medication histories at the ED.

2.10 QUALITY OF MEDICATION HISTORIES TAKEN USING A FORMALISED PROCESS

As part of the strategies being explored for recording accurate and detailed medication histories, there is the suggestion that a formalised approach (interview guide or an electronic medication checklist) be used in obtaining a patient's medication history. This brought to birth a study by Wang and Biederman (2012), at Central Texas hospital.

The study aimed at assessing whether an electronic medication checklist can enhance the accuracy of medication history obtained for the elderly. The medication histories of all the sampled patients were recorded using both handwritten documentation and an electronic medication checklist. Medication reconciliations, during which paper-based and electronically assisted histories were compared to the hospital's existing Electronic Health Record (EHR), were carried out.

Medication errors identified included incorrect dose and frequency, error of commission and error of omission. It was evident that the medication errors noted with the use of electronic medication checklist were significantly lower ($p < 0.001$) than that of the paper-based documentation. It was concluded that, the electronic medication checklist resulted in a lower medication error rate than when the medication history was documented by handwritten transcription at the time of admission.

A study titled “Pharmacist - versus physician-acquired medication history: a prospective study at the emergency department”, conducted by De Winter *et al.* (2010), demonstrated that, medication history acquisition is very often incomplete in the emergency department. During the study, medication histories were taken by pharmacists or technicians from patients admitted to the emergency department (ED) using a structured form as a guide. Discrepancies defined as the difference in pharmacist-acquired medication history and that obtained by the physician, were analyzed.

The findings showed that 59% of medication histories obtained by physicians were different from those recorded by pharmacy staff. Within these inaccurate medication histories, 5963 discrepancies were identified. The study further demonstrated that the use of a structured form and a standardized method for taking medication history were necessary. It concluded that pharmacists are especially suited to acquire and supervise accurate medication histories as they are educated on, and familiar with commonly used drugs.

2.11 KNOWLEDGE OF PHARMACISTS IN MEDICATION HISTORY TAKING AND THEIR PERCEPTION OF THIS PRACTICE

No published study in this area was found during the literature search for this study.

CHAPTER THREE

METHODOLOGY

3.1 RESEARCH DESIGN

The study employed the case study research design in the sense defined by Yin (2003). According to him, a case study is an empirical investigation into a contemporary phenomenon within its real-life context, over which the investigator has little or no manipulative control. Creswell (2009) explains that in a case study explores in depth a programme, event, activity, process, or one or more individuals.

Case studies are set in temporal, geographical, organizational, institutional and other contexts that enable boundaries to be drawn around the case (Cohen, Manion & Morrison, 2007), and researchers collect detailed information using a variety of data collection procedures over a sustained period of time. According to Merriam (2002), what characterizes a case study is the ‘unit of analysis’ which circumscribes the topic of investigation (the case). This makes the object of a case study research usually a specific, unique, bounded system (Stake, 2003).

The phenomenon of medication history taking is naturally observed in the “real-life context” of health facilities. This study about medication history taking (the case) was carried out at the Komfo Anokye Teaching Hospital (KATH) in Kumasi, Ghana. KATH is, therefore, the institutional context bounding the case and also the unit of analysis.

3.2 STUDY SITE

The study was conducted at KATH, in Kumasi, the capital of the Ashanti region and the second largest city in Ghana. It is a 1000-bed facility with a projected population of about 33, 000,000. Its geographical location, the road network of the country and the commercial nature of Kumasi,

makes it accessible to most of the areas that share boundaries with Ashanti region and others that are further away. The hospital receives referrals from all the Northern regions (Northern, Upper East and Upper West regions), Brong Ahafo, Central, Western, Eastern and parts of the Volta region of Ghana. The study was carried out at the Medicine and Pharmacy Directorates (two out of the thirteen (13) directorates of the hospital).

The Medicine Directorate provides specialist out-patient and in-patient services, first class emergency services and training of undergraduate and post-graduate medical and nursing professionals. All medical cases (including cardiac, respiratory, renal, neurological, hematological, sickle cell, autoimmune and infectious disease cases) for both male and female patients are handled by the Medicine Directorate. Seven main wards make up the directorate.

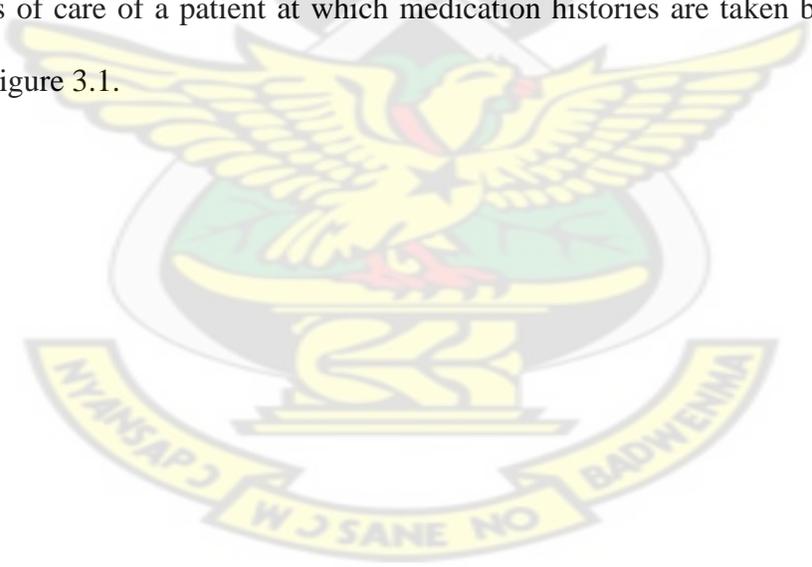
The pharmacy directorate comprises of thirteen (13) pharmacy units. Nine of these units are part of the various directorates and four are solely under the pharmacy department. Pharmacists in all these pharmacy units were targeted for the study.

KATH was chosen for the study due to its large population of patients, especially those diagnosed of chronic disease conditions such as diabetes, hypertension, kidney failure, liver diseases and heart failure, with majority of these patients being admitted to the medicine wards. Such patients are usually on multiple medications and medication histories for them, are very crucial. Patients at the medical wards are predominantly adults (above eighteen years) and are most likely to offer more helpful information. Again, being a teaching hospital, the recording of medication histories by physicians and student doctors is a common practice. Thus, the comparison of medication histories obtained without the use of a formalised process with that obtained by using a formalised process was facilitated.

3.2.1 Medication history taking points at KATH

At KATH, medication histories of patients are taken at two main points in the patient care process. These are the consulting rooms and the accidents and emergency unit. Non-accident in-patients and in-patients who do not require emergency care have their medication history taken by physicians in their consulting rooms before the patients are admitted to the wards.

In-patients who report at or are sent to the accidents and emergency unit are of two categories: those who are conscious and those who are unconscious. Conscious patients have their medication histories taken from them or from a caregiver. For unconscious patients, the medication histories are taken from caregivers but it is updated by the patients once they regain consciousness. Both conscious and unconscious patients are admitted to the wards when they get stabilized. Points of care of a patient at which medication histories are taken by physicians are summarized in Figure 3.1.



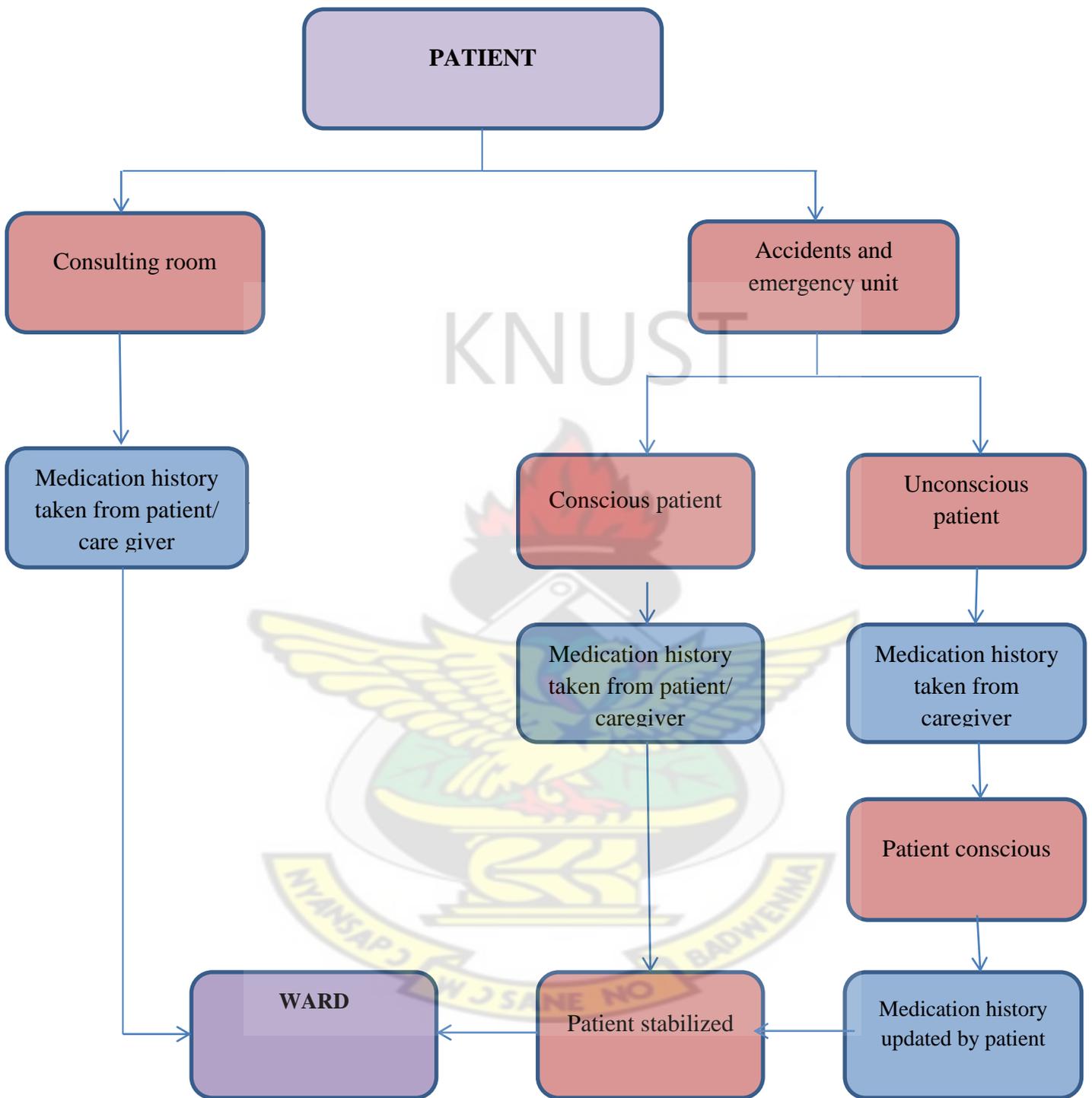


Figure 3.1: Flow chart showing points at which medication histories are taken at KATH

3.3 STUDY POPULATION AND SAMPLE

The population for the study comprised all pharmacists employed at KATH (a total of 61 pharmacists) and in-patients at the medicine wards of KATH at the time of the study. During the study period, a total of four hundred and ninety-six (496) patients were admitted to the medicine wards.

As and when patients were admitted to the wards, those who fell within the inclusion criteria were recruited. A total of 300 in-patients were thus, purposively sampled for inclusion in the study. In purposive sampling, the previous knowledge of a population and the specific purpose of the research influence the choice of sample (Wallen and Fraenkel, 2001). The sample of in-patients comprised those who were:

- Conscious, responsive and able to talk, or had a care giver who was well informed on their medications.
- Not severely ill or undergoing intensive care
- Able to speak English, Fante, Twi or Nzema (these languages were well spoken and understood by the interviewer).
- Mentally sound and not confused.
- Eighteen (18) years or above. If lesser than 18 years, then a caregiver had to be available to assist in the interview.

All such patients had to give their consent to participate in the study. Patients with history of chronic medical conditions were preferred since these patients were most likely to be taking multiple medications over a long period of time, if not for life.

Those excluded from the study were:

- All mentally ill and confused patients.
- All severely ill (undergoing intensive care) and unconscious patients.
- All patients who did not wish to take part in the study.

Pharmacists included in the study were those:

- Employed at KATH at the time of the study.
- At post at the time of the study
- Who consented to participate in the study.

Pharmacists excluded were those:

- Who were on leave at the time of study.
- Who did not wish to take part in the study.

During the study period, four pharmacists were on leave whilst two were unwilling to take part in the study, leaving a total of 55 pharmacists who participated in the study.

The above listed inclusion and exclusion criteria guided the purposive sampling of pharmacists and patients for the study. Recruitment of patients was done within the hours of 9:00 am and 5:00 pm from Mondays to Fridays, with week-end admissions reviewed on the Monday following admission.

3.4 DEVELOPMENT AND VALIDATION OF RESEARCH INSTRUMENTS

Three separate instruments were used for the study. These were a questionnaire, a medication history interview guide and a medication history evaluation form.

The questionnaire (Appendix A) was used to collect data on pharmacists' knowledge and perception of the medication history taking process. It was designed from scratch, using knowledge and information gathered from the literature on the medication history taking process as well as the general perception of health personnel on this practice in health facilities.

The questionnaire had three sections: A, B and C. Section A was designed to collect the bio-data of the pharmacists including their gender, age, highest qualification in the field of pharmacy, years of experience in hospital pharmacy practice, and training in medication history taking. Section B dealt with pharmacists' knowledge of the medication history taking process including the components of a good medication history, sources of a good medication history and the steps involved in conducting a good medication history interview. The general perception of pharmacists on medication history taking in health facilities, especially by pharmacists, was the focus of section C of the questionnaire.

The medication history interview guide (Appendix B) was a structured one; it was used to assist the researcher in taking the medication history of the 300 patients sampled. The medication history interview guide was designed based on an extensive review of literature concerning the components of a good medication history.

The interview guide had four sections. The first section dealt with the bio-data of the patients such as their name, gender, age, current diagnosis, contact number, and sources of information used to take the medication history. The second section dealt with the patient's medications such as prescribed and non-prescribed medicines taken in the last 3-6 months prior to hospital visit as well as their social or recreational drug use. The third section dealt with any allergies (drug and non-drug) and adverse drug reactions the patient had while the last section dealt with general

information such as preferred medication dosage form, preferred times for taking medications and possible causes of non-compliance.

The medication history evaluation form (Appendix C) was adopted from a study by Yusuff *et al.* (2010), titled “Pharmacists’ participation in the documentation of medication history in a developing setting: an exploratory assessment with new criteria”, in which a similar form was developed and used. Modifications were made to the form following an extensive review of literature on medication history taking. The form was used to assess the depth of medication history information documented by physicians at KATH and compare the results with those documented by the researcher.

The validity and reliability of the research instruments were ensured through two techniques, namely Peer/ Supervisor review and pretesting of questionnaire.

All the research instruments were first shared with postgraduate colleagues with expertise in the topic of study for their feedback. Secondly, the instruments were submitted to the research supervisor for her comments.

The questionnaire for pharmacists was pre-tested among a sample of twenty hospital pharmacists present at a meeting organized for pharmacists by the Pharmaceutical Society of Ghana. None of the pharmacists recruited for the pilot study was employed at KATH. The aim of the pilot study was to determine the clarity of the questionnaire, the sequence of the items, the time required by the respondents to complete the questionnaire, and also identify any omissions and redundancy that may be present in any of the items. The questionnaire was revised based on the feedback obtained from the pilot study.

According to McMillan and Schumacher (1997), a coefficient of 0.90 indicates a highly reliable instrument, but coefficients ranging from 0.77-0.94 are acceptable for most instruments. The pre-testing revealed that the questionnaire for pharmacists had a Cronbach alpha value of 0.91, which means it was highly reliable and within the acceptable range to be used for the actual study.

3.5 ETHICAL CONSIDERATIONS

Ethical clearance was obtained for the study from the Research and Development unit of KATH and the Committee on Human Research Publication and Ethics (CHRPE) of Kwame Nkrumah University of Science and Technology (KNUST). All the participants were given the opportunity to go through an informed consent process during which adequate information on the study was given. Specific information shared with participants included the purpose of the study, how long it would take, how the results would be used, voluntary participation, freedom to withdraw from the study at any time, and confidentiality of information.

3.6 DATA COLLECTION

Data was collected in three phases. Phase 1 involved a cross-sectional interview of the 300 in-patients sampled for the study. The interviews were conducted by a pharmacist using the medication history interview guide designed. It is worth noting that, the recording of medication histories was not part of the routine duties of a pharmacist at KATH. The duration for each interview was recorded using a stop watch. This phase sought to assess the frequency and depth of medication histories obtained using a well- structured interview guide.

Phase 2 occurred simultaneously with phase 1. It was an audit of the medication history information documented by physicians in case notes/ folders of the in-patients used in phase 1. Specifically, this phase aimed at assessing the frequency and depth of medication history

information documented by physicians at KATH. Data extraction from the case notes of patients was carried out with the aid of the medication history interview guide designed for the study. This helped in documenting the medication histories recorded in the case notes of these patients during clerking at patients' visit to the hospital.

Phase 3 involved the administration of questionnaire to all pharmacists (except those who fell within the exclusion criteria) at KATH. This phase sought to find out pharmacists' knowledge and perception of the medication history taking process.

The total duration of the study was two months. Six weeks were used to collect data from the in-patients and two weeks to collect data from pharmacists.

3.7 DATA ANALYSIS

Completed interview guides and answered questionnaires were coded to facilitate easy detection of any anomaly in the data analysis. Analysis of the quantitative data gathered through questionnaire administration and the use of the medication history interview guide was carried out with the Statistical Package for Service Solutions (SPSS) window version 20.0. Tests of statistical significance involving independent samples t-test, Cochran's Q tests and Spearman rho were also used to identify significant differences in data and establish relationships between variables. This was done in an effort to address the objectives set for the study. The results of the data analysis were presented in frequencies and percentages and in descriptive statistics such as means and their standard deviations, and presented in tables and graphs. These are found in Chapter Four.

In analyzing the results for item 10 of section A of the questionnaire for pharmacists, each medication history component listed was scored 2, whilst any component not listed was scored 1.

For section B and C of the questionnaire for pharmacists, which sought to find out pharmacists' knowledge and perception of the medication history taking process respectively, the responses of the respondents: strongly agree (SA), agree (A), uncertain (U), disagree (D) and strongly disagree (SD) were scored as follows: SA = 5, A = 4, U = 3, D = 2, SD = 1.

In the interpretation of the results of item 10 of section A, the level of knowledge was determined by the mean (M) with its standard deviation (SD), and rated using the following ranges: 0 - 1 = Not knowledgeable and 1.1 – 2.0 = Knowledgeable.

For section B, the level of knowledge was also determined by the mean (M) with its standard deviation (SD), and rated using the following mean ranges: 4.0 – 5.0 = Excellent knowledge, 3.0 – 3.9 = Very good knowledge, 2.0 – 2.9 = Some knowledge, 1.0 – 1.9 = Very little knowledge, 0– 0.9 = No knowledge.

In interpreting of the results of Section C, the direction and strength of perception was determined by the mean (M) with its standard deviation (SD), and rated using the following mean ranges: 4.0 – 5.0 = Very positive perception, 3.0 – 3.9 = Positive perception, 2.0 – 2.9 = Fairly positive perception, 1.0 – 1.9 = Negative perception, 0 – 0.9 = Very negative perception. This method was recommended by Cohen *et al.*, (2007) and Oppenheim (1992), and has been used in many studies that sought to measure participants' level of knowledge, attitude or perception (e.g. Ayaaba, 2013; Cobbold, 1999; Monney & Krueger, 2009).

CHAPTER FOUR

RESULTS

4.1 INTERVIEW OF PATIENTS/ REVIEWING DATA FROM PATIENTS' FOLDERS

4.1.1 Demographic data and medical diagnosis of patients

Of the 300 patients interviewed, 140 (46.7%) were males while 160 (53.3%) were females. The details of the patients' age distribution according to their gender are presented in Table 4.1. The mean ages of male and female patients were 44.91 ($SD=18.13$) and 46.16 ($SD= 17.82$) respectively.

Table 4.1: Distribution of patients' age by gender

AGE GROUP (YEARS)	MALES	FEMALES
	n (%)	n (%)
11 – 20	15 (5.00)	14 (4.70)
21 – 30	15 (5.10)	24 (8.00)
31 – 40	39 (13.00)	26 (8.80)
41 – 50	20 (6.60)	30 (10.00)
51 – 60	21 (7.00)	27 (8.90)
61 – 70	19 (6.40)	22 (7.40)
71 – 80	11 (3.60)	14 (4.70)
81 – 90	0	2 (0.70)
91 – 100	1 (0.30)	0
Total	141 (47.00)	159 (53.00)

The medical diagnosis of the patients interviewed included cardiovascular, respiratory, endocrine, renal, hepatic, gastrointestinal, urinary tract and blood disorders (Table 4.2). One hundred and eighty-one (63.65%) patients were diagnosed of only one medical condition, 100 (33.32%) had two medical conditions whilst 19 (6.33%) presented with three or more medical conditions.

Table 4.2: Medical Diagnosis of Patients

Diagnosis	Number of Patients (N=300)	Percent (%)
Chronic kidney disease	31	10.33
Congestive heart failure	14	4.67
Gastritis	4	1.33
Liver cirrhosis with massive ascites	22	7.33
Meningitis with cerebral abscess	4	1.33
Peptic ulcer disease	16	5.33
Rheumatic heart disease	4	1.33
Seizure disorder	11	3.67
Sickle cell disease	9	3.00
Systemic arterial hypertension	30	10.00
Type 2 diabetes mellitus	21	10.33
Urinary tract infection	6	2.00
Urosepsis	9	3.00
Alcoholic liver cirrhosis/ Bleeding peptic ulcer	7	2.33
Bilateral osteoarthritis/ Systemic arterial hypertension	4	1.33

Table 4.2 continued		
Cardiac Failure/ hypertension	18	6.00
Chronic kidney disease/ Severe acute hypertension	23	7.67
Hemiparesis / Systemic arterial hypertension	22	7.33
Retroviral infection/ Severe anaemia	10	3.33
Type 2 diabetes mellitus/ Systemic arterial hypertension	16	5.33
Cardiac failure/ Peptic ulcer disease/ hypertension	4	1.33
Type 2 diabetes mellitus/ hypertension/ cardiac failure	4	1.33
Type 2 diabetes mellitus/ hypertension/ Cardiac failure/ Asthma	11	3.67
Total	300	100.00

4.1.2 Frequency of documentation of medication history information

For 55 (18.3%) of the 300 patients, no medication history was found in their case notes. Also, physicians recorded in the case notes of seven (7) patients that, they had no history of the use of long term medications. However, in the interview these patients indicated that they were taking long term medications.

There were differences in the frequency of documentation of the eight medication history components outlined for the study (Table 4.3).

Table 4.3 Number of patients with each medication history component documented

Medication history component	Documented with interview guide (N = 300)	Documented without interview guide (N=300)	% Increase	Cochran's Q test (p-value)
Prescribed medications	294 (98.00)	217 (72.30)	26.00	0.000
Non-prescribed medications	296 (98.70)	93 (31.00)	68.00	0.000
Drug allergies	290 (96.70)	61 (20.30)	76.00	0.000
Non-drug allergies	290 (96.70)	18 (6.00)	91.00	0.000
Social drugs	289 (96.30)	209 (69.70)	27.00	0.000
Indication for medications	248 (82.70)	4 (1.30)	81.00	0.000
Source of medications	211 (70.30)	5 (1.70)	69.00	0.000
Compliance to medications	281 (93.70)	0 (00)	94.00	0.000

***Significance level = 0.05**

The variances were more remarkable in non-prescribed medications (203, 68%), drug allergies (229, 76%), non-drug allergies (272, 91%), indication(s) for medications (244, 81%), sources of medications (206, 69%) and compliance to medications (281, 94%). These differences were statistically significant ($p < 0.05$).

Also physicians reported the use of herbal preparations in 51 (16.2%) of the patients whereas 127 (42.3%) of the patients were reported to be taking herbal preparations when an interview guide was used in taking the medication history of the patients.

There were also differences in the total number of medications and allergies that were documented with and without the use of an interview guide (Table 4.4)

Table 4.4 Number of medications and allergies documented

Medication history component	Number documented with interview guide	Number documented without interview guide
Prescribed medications	929	562
Non-prescribed medications	384	13
Herbal medications	165	54
Drug allergies/ Adverse drug reactions	52	0
Non-drug allergies	16	0

From Table 4.4, fifty-two (52) drug allergies and 16 non-drug allergies were recorded through the use of the interview guide whilst no drug or non-drug allergies were recorded in the patients' case notes documented by the physicians.

4.1.3 Depth of medication history information documented.

The depth of information of the eight medication history components documented with and without the use of the interview guide is compared in Table 4.5.

Table 4.5 Depth of medication history information documented

Medication history component	Information documented with interview guide			Information documented without interview guide			t-test (p-value)
	Minimum/Maximum score	Mean	95% CI	Minimum/Maximum score	Mean	95% CI	
Prescribed medications	0.40-1.00	0.923	0.902-0.944	0.20-1.00	0.608	0.568-0.647	0.000
Non-prescribed medications	0.20-1.00	0.879	0.849-0.910	0.20-0.50	0.350	0.276-0.424	0.000
Drug allergies	0.60-1.00	0.970	0.940-0.999	-	-	-	-
Non-drug allergies	0.00-1.00	0.917	0.733-1.100	-	-	-	-
Social drugs	0.67-1.00	0.987	0.978-0.996	0.00-1.00	0.776	0.754-0.799	0.000
Indication for medications	0.50-1.00	0.510	0.501-0.519	0.50-0.75	0.563	0.364-0.761	0.718
Source of medications	0.50-1.00	0.519	0.506-0.532	0.50-1.00	0.600	0.322-0.878	0.025
Compliance to medications	0.50-1.00	0.991	0.984-0.999	-	-	-	-

***Significance level = 0.05**

For prescribed medications, non-prescribed medications, social drugs, $p = 0.000$ while $p = 0.025$ for source of medications. However, $p = 0.718$ for indication for medications. No p-values were obtained for drug/non-drug allergies and compliance to medications as these components were not documented in the folders of patients, hence no comparisons could be made with the values obtained by the researcher.

4.1.4 Time involved in recording medication histories

The time involved in taking the medication history of the 300 patients with the use of the interview guide has been presented in table 4.6.

Table 4.6: Time involved in taking medication histories

Time (minutes)	Number of patients (n %)
5.00	27 (9.0)
6.00	8 (2.7)
7.00	36 (12.0)
8.00	19 (6.3)
9.00	11 (3.7)
10.00	117 (39.0)
12.00	30 (10.0)
13.00	4 (1.3)
14.00	1 (0.3)
15.00	40 (13.3)
20.00	7 (2.3)
Total	300 (100.0)

The mean time taken to record a patient's medication history using the interview guide was 10.07 (SD= 3.21) minutes, with a minimum time of 5.00 minutes and a maximum time of 20.00 minutes.

4.2 PHARMACISTS SURVEY

4.2.1 Demographic data on pharmacists

Of the 55 pharmacists who participated in the study, 31 (56.4%) were males and 24 (43.6%) were females. For their age distribution only one respondent (1.8%) was below 25 years. Most of the respondents (45.2%) were from the ages 26 to 35 years, while none of them was above 56 years (Figure 4.1).

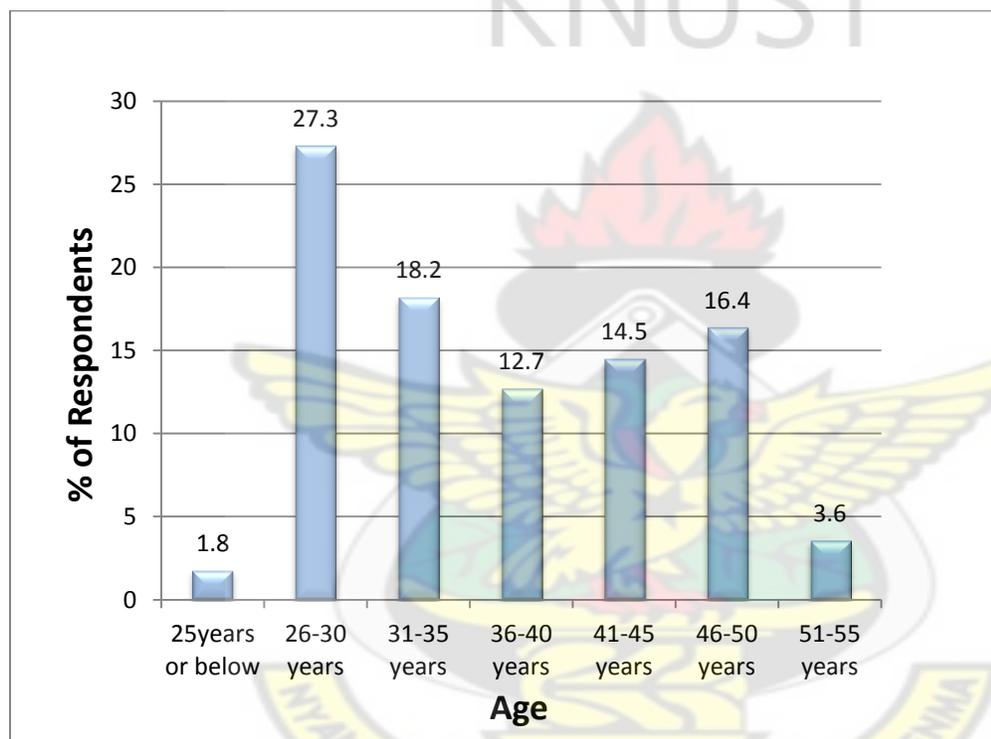


Figure 4.1: Age distribution of respondents

The highest qualification in the field of Pharmacy for 27.3% of the respondents was an MPhil/MPharm/MSc. The remaining were holders of a Bachelor of Pharmacy degree only. Sixty-seven percent (67.3%) of the pharmacists had practiced as hospital pharmacists for a maximum of 10 years, 25.5% had practiced for a period of 11-20 years and 5.5% had over 20 years working experience as hospital pharmacists. (Figure 4.2)

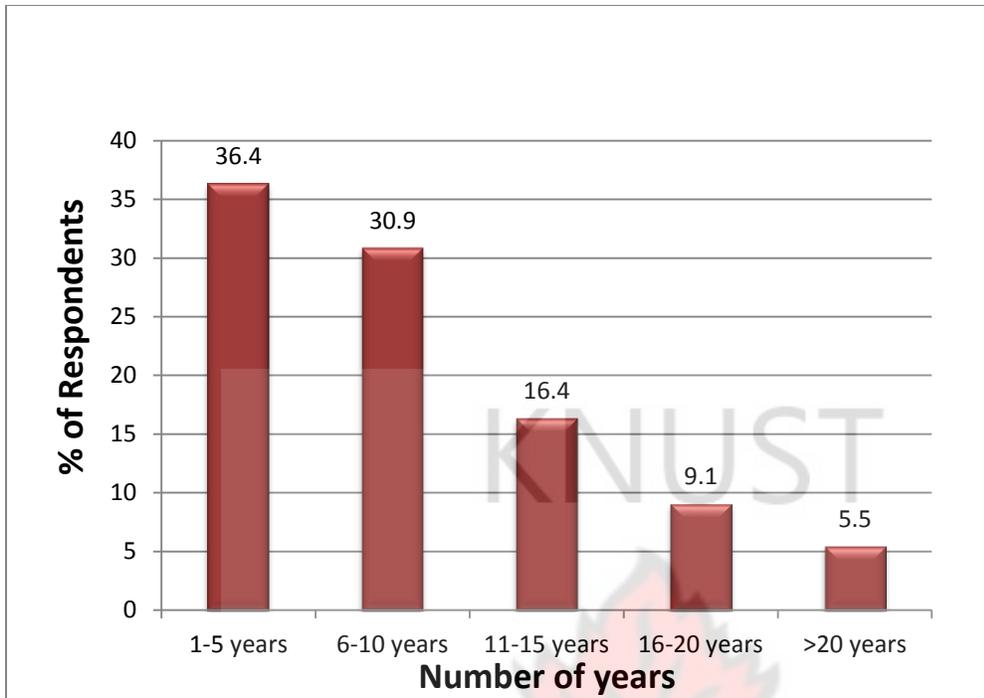


Figure 4.2: Distribution of years of hospital pharmacy practice of respondents

4.2.2 Stage at which pharmacists were trained in medication history taking and points of patient care at which pharmacists took medication history

Of the 55 respondents, 40 (72.7%) had received training in medication history taking whilst 14 (25.5%) had received no such training. Regarding the 40 respondents who had received training in medication history at some point in their training as pharmacists, 15% had this training during their undergraduate study, 5% during their post graduate study and 40% on the job as practicing pharmacists. Some (40%) however, were trained in medication history taking at more than one stage in their training as pharmacists. Details of these results are shown in Table 4.7.

Table 4.7: Stage of training of respondents in medication history taking

Stage of training	Number of respondents (n)	Percent (%)
Undergraduate study	6	15.0
Postgraduate study	2	5.0
On the job	16	40.0
Undergraduate study/ On the job	10	25.0
Postgraduate study/ On the Job	2	5.0
Undergraduate study/ Postgraduate study/ On the Job	4	10.0
Total	40	100.0

Also, 35 (63.6%) of the respondents were involved in medication history taking (though the medication histories taken were not documented) whereas 20 (36.4%) were not. Twelve (34.3%) of the pharmacists involved in medication history taking did so, when dispensing medications to out-patients. (Table 4.8)

Table 4.8: Points of patient care at which respondents took medication histories

Point of care	Number of respondents (n)	Percent (%)
On admission of a patient	3	8.50
When dispensing medications to out-patients	12	34.30
Upon discharge of a patient	3	8.50
On ward-rounds during drug monitoring	3	8.50
On admission of a patient + upon discharge of a patient	1	2.90
On admission of a patient + when dispensing medications to Outpatients	1	2.90
When dispensing medications to out-patients + upon discharge of a patient	4	11.40
Upon discharge of a patient + on ward-rounds during drug monitoring	1	2.90
On admission of a patient + when dispensing medications to out-patients + upon discharge of a patient	6	17.10
On admission of a patient + when dispensing medications to out-patients + on ward rounds during drug monitoring	1	2.90
Total	35	100.00

4.2.3 Pharmacists' knowledge of sources of information for taking a good medication history

The knowledge of pharmacists in the sources of information for taking a good medication history is detailed in Table 4.9.

Table 4.9: Pharmacists' knowledge of sources of information for taking a good medication history

Source of information (Multiple sources accepted)	Number of respondents	Percent (%)
Patient's previous health records	2	3.60
Patient / family members	1	1.80
Patient / patient's previous health records	4	7.30
Patient/ vials and other medication packages	1	1.80
Patient's previous health records/ vials and other medication packages	1	1.80
Patient / family members/ healthcare professionals involved in patients care	1	1.80
Patient/ family members/ patient's previous health records	6	10.90
Patient / healthcare professionals involved in patients care/ patient's previous health records	3	5.50
Family members/ healthcare professionals involved in patients care/ vials and other medication packages	1	1.80
Patient/ family members/ vials and other medication packages	1	1.80
Patient / family members/ healthcare professionals involved in patients care/ patient's previous health records	18	32.70
Patient / healthcare professionals/ patient's previous health records/ vials and other medication	1	1.80
Patient/ family members/ patient's previous health records/ vials and other medication packages	2	3.60
Patient / family members/ healthcare professionals/ patient's previous health records/ vials and medication packages	11	20.00
No response	2	3.60
Total	55	100.00

Two respondents (3.6%) said in order to document the best possible medication history, they would use only one source and seven (12.7%) said they would use two sources. Apart from two respondents who did not indicate any source, the remaining 44 (80%) indicated that they would use more than two of the sources provided (Table 4.9).

4.2.4 Pharmacists' knowledge of the components of a good medication history

Table 4.10: Knowledge of respondents in medication history components

Component	Components listed (2) n (%)	Components not listed (1) n (%)	M	SD
<i>Chronic medical conditions</i>	48 (87.3)	7 (12.7)	1.87	0.34
Names of prescribed medications	51 (92.7)	4 (7.3)	1.93	0.26
Names of non-prescribed medications	50 (90.9)	5 (9.1)	1.91	0.29
Dosage regimen of medications	51 (92.7)	4 (7.3)	1.93	0.26
Duration of therapy	51 (92.7)	4 (7.3)	1.93	0.26
Indication of medications	50 (90.9)	5 (9.1)	1.91	0.29
Allergies (drug and non-drug) and adverse drug reactions	21 (38.2)	34 (61.8)	1.38	0.49
Social/ recreational drug use	6 (10.9)	49 (89.1)	1.11	0.32
Level of compliance to medications	5 (9.1)	50 (90.9)	1.09	0.3
Grand Mean			1.62	0.32

M = Mean SD = Standard deviation

NB: Though “chronic medical conditions” was not part of the main components of a good medication history, enquiring about it informed the interviewer on the questions to ask during the medication history interview in order to get the needed information.

Inferring from the results shown in Table 4.10, more than 90% of the respondents listed details of a patient's chronic medical conditions, names of prescribed and non-prescribed medications, dosage regimen of medications, duration of therapy and the indication for all of the patient's medications as part of the components of a patient's medication history. However, 49 (89.1%) and 50 (90.9%) of the respondents did not mention that a patient's social/ recreational drug use and compliance of patients to their medications respectively should be recorded. The grand mean was 1.62 ($SD = 0.32$), which fell within the range, 1.1 – 2.0. This meant that pharmacists at KATH were knowledgeable in the medication history taking process. (Refer to page 34)

4.2.5 Pharmacists' knowledge of the steps to follow when taking a medication history

Table 4.11: Respondents' knowledge of the steps in medication history taking

Steps	SA (5)	A (4)	U (3)	D (2)	SD (1)	M	SD
	n (%)	n (%)	n (%)	n (%)	n (%)		
Identify the source of information to be used prior to the interview	13 (23.6)	32 (58.2)	5 (9.1)	4 (7.3)	1 (1.8)	3.95	0.89
Introduce yourself to the patient or care giver	26 (47.3)	27 (49.1)	0	2 (3.6)	0	4.40	0.68
Tell the patient/ care giver about the purpose of the interview	32 (58.2)	22 (40)	0	0	0	4.59	0.50
Obtain as much background information as possible about the patient prior to seeing him/ her	21 (38.2)	17 (30.9)	8 (14.5)	7 (12.7)	1 (1.8)	3.93	1.11
Counsel the patient on his/her medications	42 (76.4)	9 (16.4)	1 (1.8)	2 (3.6)	0	4.69	0.70
Grand Mean						4.32	0.78

SA = Strongly Agree A = Agree U = Uncertain D = Disagree SD = Strongly Disagree

M = Mean SD = Standard deviation

From table 4.11, the least mean recorded was 3.93 ($SD = 1.11$) for the step “*Obtain as much background information as possible about the patient prior to seeing him/her*” and the highest mean recorded was 4.69 ($SD = 0.70$) for the step “*Counsel the patient on his/her medications*”. The grand mean was ($M = 4.32, SD = .78$). The grand mean was within the range, 4.0 – 5.0, implying that pharmacists at KATH had an excellent knowledge of the process of taking medication history. (Refer to page 34)



4.2.6 Perception of pharmacists on the medication history process and their role in it

Table 4.12: Respondents' perception of the medication history taking process

Statement	SA (5)	A (4)	U (3)	D (2)	SD (1)	M	SD
	n (%)	n (%)	n (%)	n (%)	n (%)		
A record of an accurate and detailed medication history is an important part of patient assessment and should be encouraged in health facilities	50 (90.9)	5 (9.1)	0	0	0	4.91	0.29
There should be a formalised process for taking medication history	21 (38.2)	30 (54.5)	3 (5.5)	1 (1.8)	0	4.29	0.66
Recording a patient's medication history is far from simple and requires a lot of expertise	11 (20)	34 (61.8)	1 (1.8)	9 (16.4)	0	3.85	0.93
Pharmacists can elicit a more complete medication history than physicians	18 (32.7)	22 (40)	10 (18.2)	3 (5.5)	0	4.04	0.88
Pharmacists can allocate more time to the medication history taking process than physicians	18 (32.7)	23 (41.8)	9 (16.4)	5 (6.1)	0	3.98	0.93
Medication history interviews at the hospital should be the duty of the hospital pharmacist	15 (27.3)	22 (40)	9 (16.4)	9 (16.4)	0	3.78	1.03
Recording medication history by pharmacists brings an added burden on pharmacists and must attract extra allowance	15 (27.3)	14 (25.5)	8 (14.5)	12 (21.8)	6 (10.9)	2.64	1.38
Since physicians take a patient's medical history, taking the drug history should also be their duty and not the duty of pharmacists	1 (1.8)	7 (12.7)	8 (14.5)	28 (50.9)	11 (20)	3.75	0.99
Grand Mean						3.90	0.89

SA = Strongly Agree A = Agree U = Uncertain D = Disagree SD = Strongly Disagree

M = Mean SD = Standard deviation

The results presented in Table 4.12 shows that, all the 55 (100%) respondents were in support of the statement that, a record of an accurate and detailed medication history is an important part of patient assessment and should be encouraged in health facilities ($M = 4.91$, $SD = 0.29$). Only 8 (14.5%) of respondents supported the statement that “*since physicians take a patient’s medical history, taking the drug history should also be their duty and not the duty of pharmacists*”. The grand mean was 3.90 ($SD = 0.89$). The grand mean was within the range, 3.0 – 3.9, implying that pharmacists at KATH had a positive perception of the medication history taking process and their role in it. (Refer to page 34)

4.2.7 Pharmacists’ Gender and knowledge/ perception of the medication history process

Table 4.13: Male and female respondents’ knowledge of the medication history taking process

Gender	M	SD	T	Df	Sig.
Male	37.20	3.23	1.60	51	0.12
Female	38.48	2.37			

***Significance level = 0.05**

The Levene’s test for equality of variances indicated that, the variances for the two groups were equal ($F = 3.72$, $Sig > 0.05$). The knowledge of female respondents in medication history taking ($M = 38.48$, $SD = 2.37$) was not significantly higher ($t = 1.60$, $df = 51$, two-tailed probability > 0.05) than the knowledge of their male counterparts in the same area ($M = 37.20$, $SD = 3.23$).

Table 4.14: Male and female respondents' perception of the medication history taking process

Gender	M	SD	T	Df	Sig.
Male	3.88	0.40	0.63	53	0.53
Female	3.94	0.38			

*** Significance level = 0.05**

It was observed from the Levene's test for equality of variances that, the variances for the two groups were equal ($F = 0.74$, $Sig > 0.05$). The perception of female respondents on medication history taking ($M = 3.94$, $SD = 0.38$) was not significantly higher ($t = 0.63$, $df = 53$, two-tailed probability > 0.05) than the perception of male respondents ($M = 3.88$, $SD = 0.40$).

4.2.8 Pharmacists' Qualification and knowledge of medication history taking

Table 4.15: Qualification of respondents and their knowledge of medication history taking

Qualification/ Knowledge in Medication History taking	Correlation coefficient	Significance of Association
	0.003	0.983
	Positive association	Not statistically significant

***Correlation is significant at the 0.05 level (2-tailed)**

The results shown in Table 4.15 indicate a positive association between respondents' highest qualification in the field of pharmacy and their knowledge in medication history taking. The strength of the association is, however, weak ($r = 0.003$) and not significant at the 0.05 alpha level ($0.983 > 0.05$).

4.2.9 Pharmacists' Years of hospital pharmacy practice and knowledge of medication history taking

Table 4.16: Respondents' years of hospital pharmacy practice and their knowledge of medication history taking

Years of hospital pharmacy practice/ Knowledge in Medication History taking	Correlation coefficient	Significance of association
	-0.312	0.024
	Inverse association	Statistically significant

***Correlation is significant at the 0.05 level (2-tailed)**

From Table 4.16, a Spearman's Rank correlation coefficient of -0.312 indicates an inverse association between the number of years that respondents have practiced as hospital pharmacists and their knowledge of medication history taking. The association is significant at the 0.05 alpha level ($0.024 < 0.05$).

CHAPTER 5

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 DISCUSSION: INTERVIEW OF PATIENTS/ REVIEW OF DATA FROM PATIENTS' FOLDERS

5.1.1 Quality of medication history information documented with the use of a formalised process.

The results of the study showed that the use of a formalised process in taking medication history has a positive effect on the quality of medication history information documented. Without the use of the formalised approach in taking the medication history, the frequency of documentation of the medication history components outlined for the study was relatively low. For example, when no formalised approach was used, information on prescribed medicines, non-prescribed medicines, sources of medicines and drug allergies were recorded in 72%, 31%, 1.7% and 20% of the patients respectively. This result is similar to that of Yusuff *et al.* (2010) in which prescription drugs, over the counter drugs, source of drugs and drug allergies were recorded in 68.9%, 25.1%, 2% and 18.4% respectively, without the use of a formalised process in obtaining the medication history. Yusuff and Awotunde (2005) also reported the documentation of prescription-only drugs and over-the counter drugs in only 33.3% and 12.9% of patients respectively when no formalised process was used in taking the drug history. These frequencies were also relatively low.

On the other hand, using a structured interview guide to take the medication history of 300 in-patients, the study found a significant increase in the frequency of documentation of all the eight medication history components outlined for the study. The percentage increments in frequency of documentation of the eight medication history components with the use of a formalised process compared to when a formalised process was not used were as follows: prescribed

medications (26% of patients), non-prescribed medications (68%), drug allergies/ adverse drug reactions (76%), non-drug allergies (91%), social drugs (27%), indication for medications (81%), source of medications (69%) and compliance to medications (94%). (Refer to Table 4.3). Hence the frequency of documentation of medication history information increased significantly ($p=0.000$) for all the eight medication history components with the use of a formalised process. Yusuff *et al.* (2010) obtained similar results in a similar study. In that study in which thirteen medication history components were used, $p<0.0001$ for twelve out of the thirteen medication history components.

One probable reason for this observation is that, the interview guide served as a prompt for commonly missed medication history components. It reminded the medication history recorder to ensure that the patients were asked to provide information on all the essential components and the information documented. Since physicians (mostly, house officers) at KATH, who are responsible for the routine documentation of patients' medication history do not use any guide in taking this history, there is a high probability of leaving out very relevant components which may be required in planning the care of the patients. Taking cognizance of the high work burden on physicians and other health care professionals, using an interview guide does not only make the medication history taking process less tedious, it also ensures that the recorder enquires of all the relevant components and documents them.

In recording a patients' medication history, it is not enough to just enquire about the relevant medication history components. It is also essential that all the needed information about the components are acquired and documented. For example, in enquiring about a patient's prescribed medications, the name of the medication, dosage form, dose, frequency of administration and duration of therapy need to be noted. This is what constitutes the depth of the medication history

information documented. The results of the study showed that, the depth of medication history information documented improved significantly for almost all the medication history components when an interview guide was used compared to when the physicians recorded the drug history without using an interview guide. The most significant improvements were recorded in four of the medication history components namely: prescribed medications, non-prescribed medications, social drugs ($p=0.000$) and source of medications ($p=0.025$) as seen in Table 4.5. Similarly, the study by Yusuff *et al.* (2010) found that, the use of an interview guide in obtaining patients' medication led to a significant increase ($p=0.001$) in the depth of medication history information documented for prescription and over the counter drugs, alcohol/cigarette smoking as well as sources of medications as compared to when no interview guide was used. Also, in another study, Yusuff and Awotunde (2005) established that, dose, dose frequency and duration of drug use were documented in only 6.4%, 6.4% and 8.4% of patients' case notes respectively when no formalised process was used. In this study, the physicians in most cases failed to ask about patients' drug and non-drug allergies, indication for medications being used, source(s) of medications and compliance to medications. Even when they did, the information recorded for these components were very inadequate. Inadequate information on the medication history components documented may result in errors such as over-dosage, under-dosage, wrong drug selection, wrong diagnosing and recurrence of adverse drug reactions.

The number of prescribed, non-prescribed and herbal medications as well as drug and non-drug allergies recorded also increased significantly when an interview guide was used compared to when it was not used. A total of 929 prescribed medications, 384 non-prescribed medicines and 165 herbal medicines were recorded with the use of the interview guide, compared to 562, 13 and 54 recorded for prescribed, non-prescribed and herbal medicines respectively without the use

of the interview guide. It can therefore be said that, there was an error of omission (failure to record the names of medications a patient is taking) on the part of the physicians. This confirms the studies of Cornish *et al.* (2005), Mcleoad *et al.* (2008) and Chan *et al.* (2009). These authors reported that the most common error in medication history taking is the error of omission. It is important to get a good record or list of the entire medications a patient has taken within at least, the last three months prior to his/her hospital visit. This helps to avoid preventable errors in prescribing such as unwanted duplication of drugs and drug-related problems such as drug-drug interactions and drug-food interactions (Lau *et al.*, 2000). Again, since some drugs have the potential to mask clinical signs and alter the results of clinical investigations, a complete list of patients' medications on admission will help prevent wrong diagnosing and enhance monitoring of patients' conditions (Grahame-Smith and Aronson, 2002).

The quality of medication histories recorded, in terms of frequency and depth of medication history information recorded and the number of medications and allergies documented, improved significantly with the use of a medication history interview guide compared to when physicians recorded the medication history without the use of an interview guide.

5.1.2 Time involved in taking a medication history with a formalised process

In this study the minimum time for taking patients' medication history was five minutes and the maximum time was twenty minutes. The time variations may be due to the fact that those with multiple disease conditions required a longer period of time for their medication history interviews as compared to patients with only one disease condition. The mean time taken to record a patient's medication history using an interview guide was 10.07 ($SD= 3.21$) minutes. Similar studies (e.g. Yusuff *et al.*, 2010; Gleason *et al.*, 2004; Cradock *et al.*, 1972) reported an average interviewing time of 10 minutes. Akwagyiram *et al.* (1996) and McRobbie *et al.* (2003),

on the other hand, reported a slightly longer mean interviewing time of 13-14 minutes. With the current low doctor to patient ratio in Ghana, physicians may be unable to spend this much time on recording the medication history of each patient. This situation further reinforces the need for more involvement of pharmacists in the medication history taking process.

5.2 DISCUSSION: PHARMACISTS SURVEY

5.2.1 Pharmacists' knowledge of the medication history taking process

Recording a good medication history involves knowing the sources of information available for recording a medication history and identifying which source(s) to use for a particular patient, the components of a good medication history and the right steps to follow during the medication history interview. Majority of the pharmacists at KATH had knowledge of most of the sources of information for taking a good medication history, with 80% indicating that they would use more than two of the sources provided, if those sources were available, in order to ensure that information obtained was correct and comprehensive.

More than 90% of the pharmacists at KATH had a good knowledge of the components of a good medication history. The components that were not listed by most of them (more than 85%) were: mode of acquisition and prescriber's of medications, social/ recreational drug use and compliance to medications. The steps involved in recording a good medication history were very well known by the pharmacists. In all, it can be said that, pharmacists at KATH are very knowledgeable in the medication history taking process. With such background, they are very likely to conduct good medication history interviews.

The study showed that pharmacists who had practiced hospital pharmacy for a greater number of years were more likely to have little knowledge in medication history taking as compared to pharmacists with lesser hospital pharmacy practice years. One reason that might have accounted for this observation is the fact that pharmacists are not involved in the medication history taking process at KATH. Since the knowledge they had acquired in medication history taking during their institutional training is not utilised in practice, they turn to forget these facts with time. Also, most pharmacists are assigned to administrative roles in the hospital as their hospital pharmacy practice years increase. These roles confine them to their offices rather than the wards and pharmacies where their knowledge in medication history taking can be utilised, hence their knowledge in this process diminishes with time.

There was no statistically significant difference between male and female pharmacists in their knowledge of the medication history taking process. Similarly, the study found no statistically significant relationship between the highest qualification of the pharmacists in the field of pharmacy and their knowledge of the medication history taking process. These findings are probably due to the fact that both male and female pharmacists received the same training during the training sessions.

5.2.2 Pharmacists' perception of the medication history taking process

Several studies including that of Nester and Hale, 2002, Cornish *et al.*, 2005 and Carter *et al.*, 2006, have suggested that pharmacists be involved in the medication history taking process. They are known to be more familiar with drug names, characteristics, effects, dosage forms, drug administration, etc. compared to other health care personnel. Also, pharmacists readily identify inconsistencies and mistakes in patients' self-reported medication histories. It is however important that the perception of pharmacists on the medication history taking process and the

suggestion that they should be involved in the process be assessed. The study showed that, generally, pharmacists at KATH had a positive perception of the medication history taking process and their role in it. The pharmacists were aware of their role in the medication history taking process and were willing to be involved in it. They were strongly aware of the importance of accurate medication histories in the care and assessment of patients. Despite their knowledge and expertise in medication history taking, they agreed to the suggestion that a formalised process be used when taking a medication history, even if the history is being taken by a pharmacist. They also indicated that they could allocate more time to this service as compared to physicians. There was no statistically significant difference in the perception of male and female pharmacists on the medication history taking process and their role in it.

With the pharmacists' positive perception of the medication history taking process and their role in it, one would expect that pharmacists at KATH would be dedicated to this service should it be added to their routine work at the hospital. However, policy makers are cautioned not to hurriedly pursue any such decision without thinking about its financial implications. Some of the pharmacists suggested that this service would bring an added burden on them and hence the need for it to attract extra allowance.

5.2.3 Training of pharmacists in medication history taking

The background and training of the health professional conducting a medication history interview greatly affects the accuracy and completeness of the history obtained (Bond *et al.*, 1999; Rozich and Resar, 2001). From the results of the study, 72.7% of the pharmacists at KATH had received training in medication history taking at some point in their training as pharmacists. Even though the content of their training was not assessed, it is expected that, the training they had received, coupled with their knowledge of medications as pharmacists, would

make them capable of recording better medication histories than their counterparts and other health professionals who have not received such training. Since pharmacists at KATH are currently not involved in the routine recording of patients' medication history, the impact of the training they have received on the quality of medication histories they take could not be assessed. However, 63.6% of the pharmacists said they inquired about patients medications at various points in the care of patients such as: when dispensing medications to out-patients, upon discharge of a patient and on ward rounds during drug monitoring. Information gathered during such enquiries is however not documented.

Also, referring to the results of the study, majority (about 80%) of the pharmacists who indicated that they received training in the taking of medication history reported that, they received this training in their undergraduate study and on the job as practicing pharmacists.

5.3 LIMITATIONS OF THE STUDY

The scope of the study could have been expanded to cover all public and private hospitals in the Kumasi Metropolis in order to present a broader, better and more representative picture of medication history taking in health facilities in the metropolis. This was, however, not possible due to time and resource constraints.

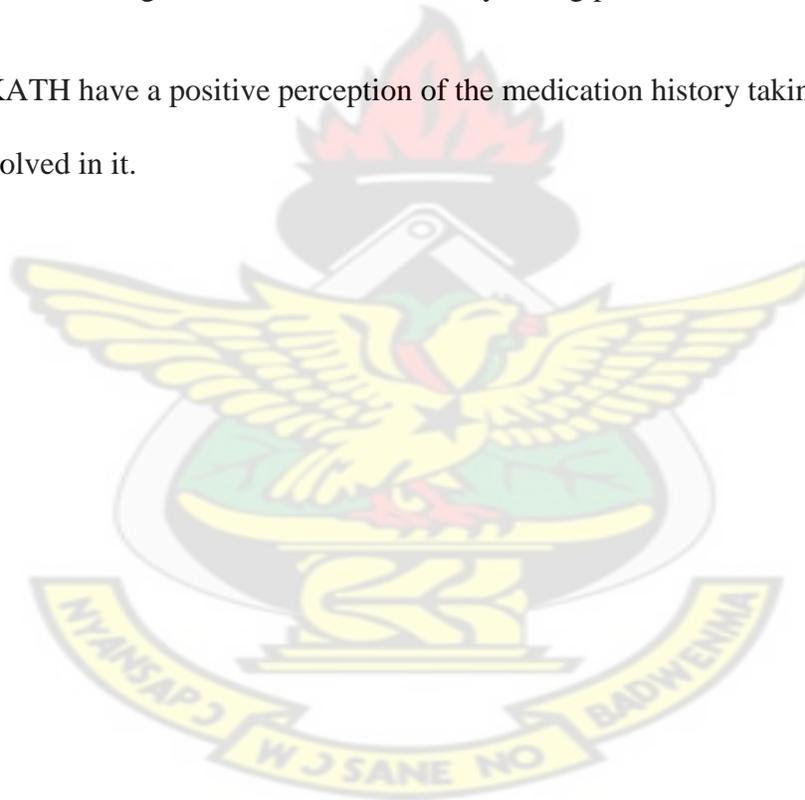
5.4 CONCLUSIONS

The use of an interview guide in taking the medication history of in-patients improves the quality of the medication history information documented.

Pharmacists are knowledgeable in the medication history taking process. This knowledge is unrelated to the pharmacist's gender or educational qualification in the field of pharmacy.

The greater the number of hospital pharmacy practice years of pharmacists, the less likely they are to have a good knowledge of the medication history taking process.

Pharmacists at KATH have a positive perception of the medication history taking process and are willing to be involved in it.



5.5 RECOMMENDATIONS

A well-structured interview guide should be used in the medication history taking process, irrespective of the health professional conducting the medication history interview. The interview guide should be well designed to ensure that all the necessary information about patients' prescribed and non-prescribed medications, social medications, drug and non-drug allergies, adverse drug reactions, indication for medications, source of medications and patients' compliance to medications are well documented.

Pharmacists at KATH should be involved in the medication history taking process since they have shown a high degree of knowledge in this process and are willing to partake in it. This can materialize if the pharmacists are positioned at critical points in the care of the patient where their medication histories need to be taken, such as the accidents and emergency unit and the wards.

Patients should be encouraged to come along with the packs, containers, vials and other packages of medications they have taken or are taking when attending hospital. This will help in recording a full list of their past and present medications, especially for patients who cannot recall or read the names of their medications.

Programmes designed to train health care providers in medication history taking should be put in place to help them upgrade their knowledge of the medication history taking process and sharpen their skills in taking the drug history of patients.

It is also recommended that further research be carried out on:

1. The perception of physicians at KATH on the involvement of pharmacists at the hospital in the medication history taking process;

2. Errors in medication histories taken at KATH; and
3. The effectiveness of an accurate medication history in preventing medication errors.

It is hoped that the findings of such studies would help improve upon the quality of medication histories taken at KATH and also inform management on decisions to take concerning the medication history taking process at the hospital.

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REFERENCES

Akwagyriam I, Goodyer LI and Harding L (1996). Drug history taking and the identification of drug related problems in an accident and emergency department, *Journal of Accident and Emergency Med*; 13: 166-168.

Aspden P, Wolcott J, Bootman JI and Cronenwett IR (2006). Preventing medication errors: quality chasm series. *National Academies Press*.

Ayaaba, D. A. (2013). The Attitude of Students towards the Teaching and Learning of Social Studies Concepts in Colleges of Education in Ghana. *Research on Humanities and Social Sciences*, 3 (9): 83-89.

Badowski SA, Rosenbloom D and Dawson PH (1984). Clinical importance of pharmacist-obtained medication histories using a validated questionnaire. *American Journal of Hospital Pharmacy*, 41:731-2.

Bates DW, Spell N, Cullen DJ, Burdick E, Laird N, Petersen LA, Small SD, Sweitzer and Leape II (1997). The costs of adverse drug events in hospitalized patients. *Journal of American medical association*, 277: 307-311.

Batty GM, Osborne C, Swift C and Jackson S (1997). The use of over-the-counter medication by elderly medical in-patients. *Postgraduate medical journal*, 73: 720-722.

Bedell SE, Jabbour S, Goldberg R, Glaser H, Gobble S, Young-xu Y, Graboys TB and Ravid S (2000). Discrepancies in the use of medications: their extent and predictors in an outpatient practice. *Archives of internal medicine*, 160: 2129-2134.

Beers MH, Munekata M and Storrie M (1990). The accuracy of medication histories in the hospital medical records of elderly persons. *Journal of the American Geriatrics Society*, 38: 1183-1187.

Bond C, Raehl CL and Franke T (2000). Clinical pharmacy services, pharmacy staffing, and the total cost of care in united states hospitals. *Pharmacotherapy: the journal of human pharmacology and drug therapy*, 20: 609-621.

Burridge N (2007). SHPA standards of practice for the provision of medication reconciliation. *Journal of pharmacy practice and research*, 37: 231.

Campbell F, Karnon J, Czoski-Murray C and Jones R. (2007). A systematic review of the effectiveness and cost-effectiveness of interventions aimed at preventing medication error (medicines reconciliation) at hospital admission. *Report for the National Institute for Health and Clinical Excellence as part of the Patient Safety Pilot*.

Carter MK, Allin DM, Scott LA and Grauer D (2006), Pharmacist- acquired medication histories in a university hospital emergency department, *American Journal of Health System Pharmacy*, December 63(24): 2500 – 2503.

Chan EW, Taylor SE, Marriott JL and Barger B (2009). Bringing patients' own medications into an emergency department by ambulance: effect on prescribing accuracy when these patients are admitted to hospital. *Med J Aust*, 191:374-7.

Cipolle RJ, Strand LM, Morley PC, Strand LM and Morley PC (1998). *Pharmaceutical care practice*, mcgraw-hill new york, 1: 190-198.

Cobbold, C. (1999). *Implementation of the Social Studies Programme in Teacher Training Colleges in Ghana: An Evaluation*. M.Phil Thesis, Faculty of Education, University of Cape Coast.

Cohen J, Wilson C and Ward F (1998). Improve drug history taking. *Pharmacy in Practice*, 1:13-6.

Cohen L, Manion L and Morrison K (2007). *Research Methods in Education*, Routledge: London and New York, 3: 101-120.

Coombes ID, Storie W, Radford J and Pillans P (2001). Quality of medication ordering at a large teaching hospital. *Australian Journal of Hospital Pharmacy*, 31: 102.

Cornish PL, Knowles SR, Marchesano R, Tam V, Shadowitz S, Juurlink DN and Etchells EE (2005). Unintended medication discrepancies at the time of hospital admission. *Archives of internal medicine*, 165: 424-429.

Council APA (2005). Guiding principles to achieve continuity in medication management. *Australian Pharmaceutical Advisory Council*.

Covington TR (1972). Interviewing and advising patients. In Francke DE, Whitney HAK Jr. eds. *Perspectives in Clinical Pharmacy*, 1: 34-50

Cradock JC, Whitefield GR and Menzie JW (1972). Post-admission drug allergy histories recorded by pharmacists. *American Journal of Hospital Pharmacy*, 29: 250-252

Creswell JW (2009). *Research design: qualitative, quantitative and mixed methods approaches*, 3: 88-95

Crook M, Ajdukovic M, Angley C, Soulsby N, Doecke C, Stupans I and Angley M (2007). Eliciting comprehensive medication histories in the emergency department: the role of the pharmacist. Thesis, Scielo espana.

De Winter S, Spriet I, Indevuyst, Vanbrabant P, Desruelles D, Sabbe M, Gillet JB, Wilmer A and Willems L (2010). Pharmacist – versus physician – acquired medication history: a prospective study at the emergency department, *Quality and Safety in Health Care*, 19: 371-375.

Dobrzanski S, Hammond I, Khan G and Holdsworth H (2002). The nature of hospital prescribing errors. *British Journal of Clinical Governance*, 7:187-93.

Drewett NM. Stop regular medicine errors. *Pharmacy in Practice*, 1998; 8:193-6.

Duguid M (2012). The importance of medication reconciliation for patients and practitioners. *Australian Prescriber*, 35: 15-19.

Ellington AM, Barnett CW, Johnson DR and Nykamp D (2002). Current methods used to teach the medication history interview to doctor of pharmacy students. *American Journal of Pharmaceutical Education*, 66: 103-107.

Fertleman M, Barnett N and Patel T (2005). Improving medication management for patients: the effect of a pharmacist on post-admission ward rounds. *Quality and safety in health care*, 14: 207-211.

Fitzgerald RJ (2009). Medication errors: the importance of an accurate drug history. *British journal of clinical pharmacology*, 67(6): 671-675.

Fraenkel JR and Wallen NE (2000). *How to design and evaluate research in education*, 4th edition, McGraw Hill Higher Education: New York, pages 55-77.

Gandhi TK, Weingart SN, Borus J, Seger AC, Peterson J, Burdick E, Seger DL, Shu K, Federico F and Leape LL (2003). Adverse drug events in ambulatory care. *New England Journal of Medicine*, 348: 1556-1564.

Gleason KM, Groszek JM, Sullivan C, Rooney D, Barnard C and Noskin GA (2004). Reconciliation of discrepancies in medication histories and admission orders of newly hospitalized patients. *American Journal of Health System Pharmacy*, 61:1689 - 95.

Grahame-Smith DG and Aronson JK (2002). The drug history and the clinical examination and investigation of drug effects. In: *The Oxford Textbook of Clinical Pharmacology and Drug Therapy*, 3rd edition, ed. Grahame-Smith DG, Aronson JK. Oxford: Oxford University Press, 167-70.

Halapy H and Kertland H (2012). Ascertaining problems with medication histories. *The Canadian Journal of Hospital Pharmacy*, 65: 360.

Hittchcock G and Hughes D (1995). *Research and the teacher*, 2nd edition, Routledge: London, page45-49.

Hocking G and Kalyanaraman R (1998). Better drug history taking: an assessment of the drugs mnemonic. *Journal of the Royal Society of Medicine*, 91: 305-306.

Lau HS, Florax C, Porsius AJ and de Boer A (2000). The completeness of medication histories in hospital medical records of patients admitted to general internal medicine wards. *British Journal of Clinical Pharmacology*, 49: 597-603.

Mazer M, Deroos F, Hollander JE, Mccusker C, Peacock N and Perrone J (2011). Medication history taking in emergency department triage is inaccurate and incomplete. *Academic Emergency Medicine*, 18: 102-104.

McLeod SE, Lum E and Mitchell C (2008). Value of medication reconciliation in reducing medication errors on admission to hospital. *Journal of Pharmaceutical Practice Research*, 38:196-9.10.

McRobbie D, Bednall R and West T (2003). Assessing the impact of re-engineering of pharmacy services to general medical wards. *Pharmaceutical Journal*, 270: 342-345.

Merriam SB (2002). *Qualitative research in practice: examples for discussion and analysis*, Jossey-Bass: San Francisco, page 22.30.

Monney, K. A. (2009). Perceptions of Science Teachers about Factors Affecting their Retention in Senior Secondary Schools in Ghana. *Ghana Journal of Education: Issues and Practice*. 1(1) 22-28.

Montpetit I and Roy (1988). Evaluation of a patient-completed versus health professional-conducted medication history. *Drug Intelligence & Clinical Pharmacy*, 22: 964-969.

Nester TM and Hale LS (2002). Effectiveness of a Pharmacist Acquired Medication History in promoting patient safety, *American Journal of Health system Pharmacy*, 59(22): 22-30.

Oppenheim, A. N. (1992). *Questionnaire Design, Interviewing and Attitude Measurement*. London: Printer.

Price K, Beilby J, Mcelroy H, Wilkinson D, Best J, Morey S and Mott K (2002). Uptake of health assessments, care plans and case conferences by general practitioners through the enhanced primary care program between november 1999 and october 2001. *Australian Health Review*, 25: 1.

Pronovost P, Weast B, Schwarz M, Wyskiel RM, Prow D, Milanovich SN, Berenholtz S, Dorman T and Lipsett P (2003). Medication reconciliation: a practical tool to reduce the risk of medication errors. *Journal of Critical Care*, 18: 201-205.

Rozich, J and Resar R (2001). Medication safety: one organization's approach to the challenge. *JCOM-WAYNE PA-*, 8, 27-34.

Santell JP (2006). Reconciliation failures lead to medication errors. *Joint Commission journal on quality and patient safety/Joint Commission Resources*, 32: 225.

Stake RE (2003). Case studies. In Denzin NK and Lincoln YS (Eds.). *Strategies of qualitative inquiry*, 2nd edition, Sage: Thousand Oaks, page 12-20.

Tam VC, Knowles SR, Cornish PL, Fine N, Marchesano R and Etchells EE (2005). Frequency, type and clinical importance of medication history errors at admission to hospital: a systematic review. *Canadian medical association journal*, 173(5): 510-515.

Taylor KJ and Datta ML (1992). Adverse drug reactions as a cause of hospital admission. *Care of the Elderly*, 4: 110-6.

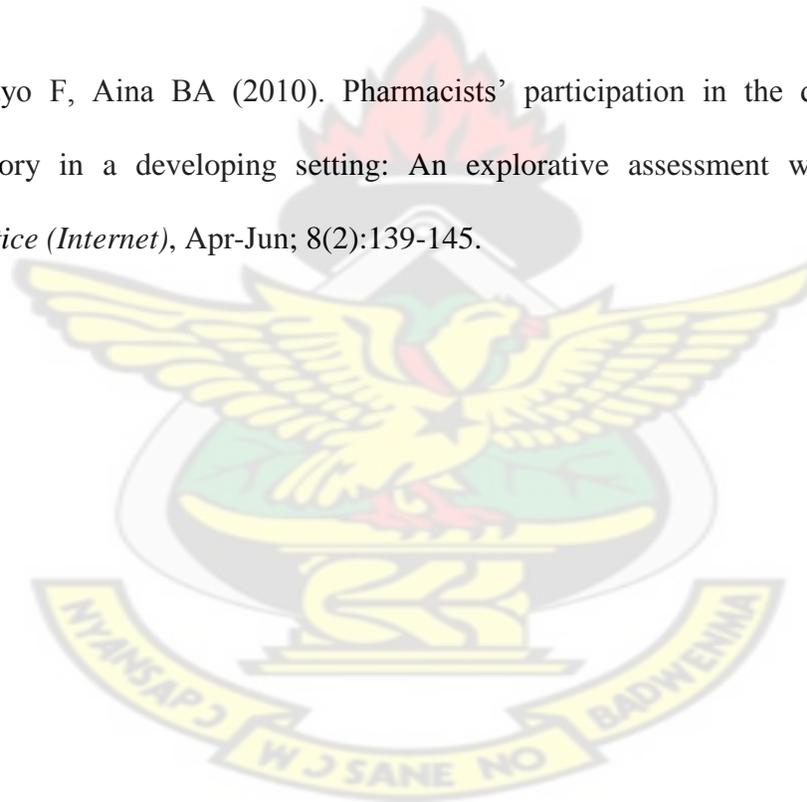
Tietze KJ (2011). Clinical skills for pharmacists: a patient-focused approach, *Elsevier health sciences*, 3: 15.20.

Wang T and Biederman S (2012). Enhance the accuracy of medication histories for the elderly by using an electronic medication checklist. *Perspectives in health information management/ahima, american health information management association*, 9: 21-30.

Yin RK (2003). *Case study research: design and methods*, Sage: Thousand Oaks.

Yusuff K and Awotunde M (2005). The frequency of drug history documentation in an institutionalized tertiary care setting in Nigeria. *Journal of Pharmacy and Pharmaceutical sciences*, 8, 140-145.

Yusuff KB, Tayo F, Aina BA (2010). Pharmacists' participation in the documentation of medication history in a developing setting: An explorative assessment with new criteria. *Pharmacy Practice (Internet)*, Apr-Jun; 8(2):139-145.



APPENDICES

Appendix A: Questionnaire for Pharmacists

**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF PHARMACY AND PHARMACEUTICAL SCIENCES
DEPARTMENT OF CLINICAL AND SOCIAL PHARMACY**

THE MEDICATION HISTORY TAKING PROCESS

QUESTIONNAIRE FOR PHARMACISTS

Dear Sir/Madam,

This is to solicit your help for a research project on Medication History Taking in health facilities. The project is being undertaken as part of an academic programme in the university, and is being supervised by Mrs. Afia Asare Marfo.

We would be very grateful to have you participate in the project by responding to this questionnaire. Please, be assured that any responses given will be used solely for the purpose of the project and treated with utmost confidentiality. Your candid opinion and cooperation will be deeply appreciated. Should you require any further information about the project, please do not hesitate to contact the following persons. Thank you.

Mrs. Afia Asare Marfo (0244723472)

Miss Constance Caroline Cobbold (0246605790/0266545624)

INSTRUCTIONS FOR RESPONDENTS

Kindly tick [v] the response that best corresponds to your opinion or write your response in the space provided.

SECTION A: DEMOGRAPHIC DATA

- 1. Gender: Male [] Female []
- 2. Age Group:
 - 25 years or below [] 26-30 years [] 31-35 years [] 36-40 years []
 - 41-45 years [] 46-50 years [] 51-55 years [] > 56 years []
- 3. Your highest qualification in the field of Pharmacy:
 - B. Pharm [] M.Phil/M.Pharm/M.Sc [] D.Pharm/Pharm.D []
 - Ph.D [] Other (please, specify).....
- 4. For how many years have you been practicing as a hospital pharmacist?
 - 1-5 years [] 6-10 years [] 11-15 years [] 16-20 years [] > 20 []
- 5. Have you had any training in medication history taking? Yes [] No []
- 6. If you answered 'Yes' to Question 5 above, at what stage in your training as a Pharmacist did you have the training in medication history taking? Tick all the responses that apply to you.
 - a. I took a course in medication history taking during:
 - i) My undergraduate programme [] ii) My postgraduate programme []
 - b. I learnt medication history taking:
 - i) during my internship at the undergraduate level []
 - ii) during my internship at the postgraduate level []
 - iii) on the job as a practicing Pharmacist [] iv) Other (please,specify):.....

SECTION B: THE MEDICATION HISTORY TAKING PROCESS

- 7. Currently do you, as a pharmacist, undertake medication histories? Yes [] No []
- 8. If yes, under what circumstances? Tick all the responses that apply to you.
 - a) On admission of a patient [] b) when dispensing medications to out-patients []
 - c) Upon discharge of a patient [] d) Other (please, specify):
- 9. Sources of Information for Medication History include: Tick all the responses that apply to you.
 - a) Patient [] b) Family members [] c) health care professionals involved in patient's care []
 - d) Patient's previous health records [] e) vials and other medication packages []
- 10. What questions would you ask a patient when taking his or her medication history?

.....

.....

.....

.....

.....

 Please, tick [v] the response which approximates your level of agreement with each statement.
 The responses are *Strongly Agree, Agree, Uncertain, Disagree* and *Strongly Disagree*.

Statement	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
a. Identify the source of information to be used prior to the interview					
b. Introduce yourself to the patient					
c. Tell the patient/ care giver about the purpose of the interview					
d. Obtain as much background information as possible about the patient prior to seeing him/ her					
e. Counsel the patient on his/ her medications.					

SECTION C: PERCEPTION OF MEDICATION HISTORY TAKING

For each of the statements below, tick [v] the response which approximates the extent of your agreement or disagreement to the statement. The responses are *Strongly Agree, Agree, Uncertain, Disagree* and *Strongly Disagree*.

Statement	Responses				
	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
1. A record of an accurate and detailed medication history is an important part of patient assessment and should be encouraged in health facilities					
2. There should be a formalised process(eg: the use of interview guides, electronic checklists) for taking medication histories					
3. Recording a patient’s medication history is far from simple and requires a lot of expertise and training					
4. Pharmacists can elicit a more complete medication history than physicians					
5. Pharmacists can allocate more time to the medication history taking process than physicians					
6. Medication history interviews at the hospital should be the duty of the hospital pharmacist					
7. If medication histories are recorded by pharmacists, it will bring an added burden on them, hence it must attract extra allowance					
8. Since physicians take a patient’s medical history, taking the drug history should also be their duty and not the duty of pharmacists					

Appendix B: Interview guide

PATIENT'S MEDICATION HISTORY

INTERVIEW GUIDE

Name of patient.....Gender..... Age.....
 Current diagnosis.....Contact number.....
 Sources of information used.....Date.....

MEDICATIONS									
Start Date/ End date	Name of medication/ Strength/Dosage form/	How to take				Purpose	Comment		Prescribed By
		Quantity	Route	Frequency	Food		A	N/A	
dd/mm/yyyy	Brand/ Generic name (if available)								
1. Prescribed medicines taken prior to hospital visit (in the last 3 - 6 months)									
2. Non-prescribed medicine taken prior to hospital visit (in the last 3-6 months) (Including dietary supplements, herbal/ alternative medicines, analgesics etc.)									
3. Social or Recreational Drug use (eg: alcohol, sexual enhancers etc)									
ALLERGIES AND ADVERSE DRUG REACTIONS									
Medication/Agent name/ Strength/ Dosage form	How medication/ agent was taken			Purpose	Nature of allergy/ reaction	Number of episodes	Management	Outcome	
	Brand/ Generic if available	Quantity	Route						Frequency
Drug allergies									
Non- drug allergies									
General information on patient's medication taking behaviour									
Preferred medication dosage form									
Preferred times for taking medications									
Possible causes of non- compliance									

Appendix C: Medication History Evaluation Form

Criteria for evaluating depth of medication history information documented

Medication history component	Depth of information	Maximum score for depth of information
Prescribed medications	Name/ description, dosage form, dose, frequency, duration	5 points
Non-prescribed medications	Name/ description, dosage form, dose, frequency, duration	5 points
Drug allergies/ adverse drug reactions	Drug name/ description, description of reaction, how it was managed	3 points
Non-drug allergies	Agent name/ description, description of reaction, how it was managed	3 points
Social drugs	Name or description, amount, duration	3 points
Indication(s) for all medications	Name/ description, cause of disease condition	2 points
Source of medications	Prescriber, place of purchase or collection	2 points
Compliance to medication regimen	Dosage form preferred, time of drug administration preferred	2 points

Appendix D: Participant information Leaflet and Consent Form

Committee on Human Research Publication and Ethics
School of Medical Sciences, Kwame Nkrumah University of Science and Technology
Kumasi, Ghana. Tel: 233 3220 63248 or 233 20 5453785. Email: chrpe.knust.kath@gmail.com

Participant Information Leaflet and Consent Form

This leaflet must be given to all prospective participants to enable them know enough about the research before deciding to or not to participate

Title of Research: Ensuring the documentation of accurate and comprehensive medication histories: a study at Komfo Anokye Teaching Hospital

Name(s) and affiliation(s) of researcher(s): This study is being conducted by Miss Constance Caroline Cobbold, a post-graduate student at the Department of Clinical and Social Pharmacy, KNUST.

Background (Please explain simply and briefly what the study is about): The background and knowledge of personnel conducting the medication history interview of a patient, as well as the method used in the collection of information is said to influence the quality of the medication history obtained greatly. This has led to the suggestion that a structured approach and, pharmacists, known to be the experts in medicine, are used in obtaining a patient's medication history. Assessing the effect of the use of a formalised or structured process in acquiring a patient's medication history on the quality of history obtained in health facilities in Ghana is essential in implementing this practice in such facilities. Again, documented information on the knowledge of the Ghanaian pharmacist in medication history taking and their attitude towards being involved in this practice is crucial for the adoption of such a practice in health facilities within the country.

Purpose(s) of research: The purpose of the study is to find out the differences between medication histories taken with and without a formalised approach and assess which method provides a better history. Also the research will help to assess the knowledge of pharmacists in the medication history taking process and their perception of this practice

Procedure of the research, what shall be required of each participant and approximate total number of participants that would be involved in the research: Pharmacists will be given a questionnaire each to fill. Data gathered from the questionnaire will be used to assess the knowledge of pharmacists in medication history taking process and their attitude towards it.

Recruited patients will be required to answer simple questions about the medications they are currently taking or have currently taken. In total, I expect to recruit about 60 pharmacists and 300 patients.

Risk(s): There are no risks involved in this study, except that few minutes of your time will be required to complete the questionnaire or answer questions verbally.

Benefit(s): This research seeks to help the healthcare team in knowing the best way to obtain the best possible medication history for patients in order to avoid situations such as adverse drug reactions, drug interactions and iatrogenic diseases. This will ensure that patients receive the best possible care.

Confidentiality: No name will be recorded and data collected will not be linked to you in anyway. Also no identifier will be used in any publication or reports from this study.

Voluntariness: This research is entirely voluntary. You will be recruited as a result of your own willingness to be a part of the study and not by compulsion.

Alternatives to participation: Your choice, whether or not to participate in this study will not influence any treatment given to you in this facility, or your role and benefits as a pharmacist in this facility.

Withdrawal from the research: You are at liberty to withdraw from the research at any anytime without having to explain yourself. You may also choose not to answer any question you find uncomfortable or private. However, giving me genuine answers to all questions will be much appreciated so as to come out with concrete findings.

Consequence of Withdrawal: Upon withdrawal from this research, there will be no consequence eg: loss of benefit or care.

Costs/Compensation: There are no compensations involved in this study. However, your participation will be very much appreciated

Contacts: If you have any questions concerning this project, please do not hesitate to contact Miss Cobbold on 0246605790.

Further, if you have any concern about the conduct of this study, your welfare or your rights as a research participant, you may contact:

**The Office of the Chairman
Committee on Human Research and Publication Ethics
Kumasi
Tel: 03220 63248 or 020 5453785**

CONSENT FORM

Statement of person obtaining informed consent:

I have fully explained this research to _____ and have given sufficient information about the study, including that on procedures, risks and benefits, to enable the prospective participant make an informed decision to or not to participate.

DATE: _____ NAME: Constance Caroline Cobbold

Statement of person giving consent:

I have read the information on this study/research or have had it translated into a language I understand. I have also talked it over with the interviewer to my satisfaction.

I understand that my participation is voluntary (not compulsory).

I know enough about the purpose, methods, risks and benefits of the research study to decide that I want to take part in it.

I understand that I may freely stop being part of this study at any time without having to explain myself.

I have received a copy of this information leaflet and consent form to keep for myself.

NAME: _____

DATE: _____ SIGNATURE/THUMB PRINT: _____

Statement of person witnessing consent (Process for Non-Literate Participants):

I _____ (Name of Witness) certify that information given to _____ (Name of Participant), in the local language, is a true reflection of what I have read from the study Participant Information Leaflet, attached.

WITNESS' SIGNATURE (maintain if participant is non-literate): _____

MOTHER'S SIGNATURE (maintain if participant is under 18 years): _____

MOTHER'S NAME: _____

FATHER'S SIGNATURE (maintain if participant is under 18 years): _____

FATHER'S NAME: _____

KNUST

