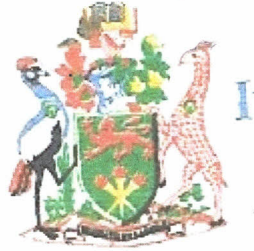


357

UNIVERSITY OF NAIROBI



FACULTY OF PHARMACY

ASSESSMENT OF NATURE AND QUALITY OF PHARMACEUTICAL SERVICES AT KENYATTA NATIONAL HOSPITAL (KNH)

PRESENTED BY: CHEPKECH NOAH KIPKURUI
U29/1789/00
BPharm IV



SUPERVISED BY: DR. F. N. KAMAU
SENIOR LECTURER,
PHARMACEUTICAL CHEMISTRY DEPT
FACULTY OF PHARMACY
UNIVERSITY OF NAIROBI

A dissertation submitted in partial fulfillment of the requirements for the award of the degree of Bachelor of Pharmacy of the University of Nairobi.
AUGUST 2004



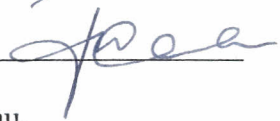
DECLARATION

I hereby declare that this is my original work and that to the best of my knowledge has not been submitted by any other student to this university or to any other university.

Signed: 

Chepkech Noah Kipkurui.

I declare that I have supervised this work and accepted it

Signed: 

Dr. F. N. Kamau.

ACKNOWLEDGEMENT

The success of this research demonstrates the power of teamwork in an environment of academic freedom. I want to acknowledge the people who helped me from when the idea of this project was conceived to its finality.

Dr. F.N. Kamau is the reason behind the success of this project. His acceptance for me to do a project outside his speciality touched me. Furthermore, he made every effort to offer invaluable advice, guidance and support (both financial and moral) throughout the project.

I greatly appreciate the interest and efforts made by Dr. P.N. Karimi during the initial steps of development of the concept of the project.

The assistance by Prof A. N Guantai in the clearance by the Ethics committee of KNH ensured the project took off in good time. The Chief pharmacist and the pharmacy dept staff of K N H were very cooperative.

I am grateful to them all.

Finally, I owe a major debt to Beatrice Muriithi for assistance offered during results analysis and editing scripts; Peter Kariuki for the typesetting; Frank Wafula and Sichei Chamngei for Printing and Healthinfo Network for the secretarial services offered.

Thank you very much to you all.

DEDICATION

To my dear family for being the force behind the success of my aspirations.

To all my friends who have continued to be the joy of my living especially Ole, Boiyo, Janam and BMM.

To all those who have made it their business to contribute to positive change in the pharmacy profession.

ABSTRACT
The nature of
the study

TABLE OF CONTENTS

| | <u>Page</u> |
|--|-------------|
| Declaration..... | i |
| Acknowledgements..... | ii |
| Dedication..... | iii |
| Table of contents..... | iv |
| ABSTRACT..... | 1 |
| CHAPTER ONE: INTRODUCTION..... | 2 |
| CHAPTER TWO: LITERATURE..... | 4 |
| CHAPTER THREE: OBJECTIVES..... | 23 |
| CHAPTER FOUR: MATERIALS AND METHODOLOGY | 25 |
| CHAPTER FIVE: RESULTS, DISCUSSION AND RECOMMENDATION..... | 26 |
| CHAPTER SIX: CONCLUSION | 57 |
| REFERENCES | 58 |
| APPENDIX: QUESTIONNAIRES..... | 60 |

ABSTRACT

The nature and quality of pharmaceutical services in very healthcare facility determines to a great extent whether the facility achieves its objective of provision of quality and efficient healthcare.

It was found out that in KNH more than 80% of pharmacists participate in inpatient dispensing, clinical pharmacy service, drug information and outpatient dispensing. 55% of pharmacists participated in cytotoxics reconstitution. Less than 50% participated in manufacturing, preparation of specifications in drug purchase, pharmacy and therapeutics committee, and dispensing of narcotics. None of the pharmacists participated in total parenteral nutrition.

Stock cards were used in stock management in all the pharmacies. Stock inventory was done at least once weekly in 88% of pharmacies. Stock inventory minimizes the expiry of drugs.

Adequate refrigeration, lockable cabinets, dispensing space, electricity supply was present in all pharmacies. Adequate compounding equipments were absent in all the pharmacies.

Drug arrangement is an important component of stock management. The generally accepted arrangement based on pharmacology was found in 69% of pharmacies. Interestingly 77% of pharmacies still had arbitrary arrangement of some drugs. More than 40% of pharmacies inspected the ward drug stores at least once a month.

Only 22% of pharmacists participated in ward rounds daily. Although they offered clinical pharmacy service, there was no mode of documentation that can be verified that was in place.

Effective drug information service requires a reliable source of information such as textbooks, journals and Internet. All the pharmacies visited had no textbooks of therapeutics or pharmacy practice. More than 50% of pharmacists visited the Internet weekly.

Cytotoxic reconstitution had the highest daily participation of pharmacists (87.5%) attendancies of ward rounds (100%) and an impressive rate of pharmacist evaluation of patients (50%). Only 25% of pharmacists felt well protected from cytotoxics.

In many hospitals TPN services are provided as part of clinical pharmacy service. In KNH pharmacists do not participate in this critical service.

A manufacturing unit exist with a pharmacist in charge. It lacks a quality control lab. Currently it is not in operational

63.6% of pharmacists participated in the preparation of specifications for purchase of drugs. Quotation, tendering and direct purchase were the methods of purchase. 57% of personnel felt the method were efficient. Analytical testing (periodically) of procured drugs is not done.

A pharmacy and therapeutic committee has been revived. Most of the personnel interviewed were not aware of its existence.

Good records of narcotics dispensed as well as their accounting was well-done. However, auditing of these narcotics was not done in over 50% of pharmacies.

Apart from coartem^R most of pharmacies felt that drugs available were sufficient.

Only 37.5% of pharmacists and 25% of pharmltech were aware of good dispensing practices.

CHAPTER ONE

INTRODUCTION

Kenyatta National Hospital serves as the largest referral hospital not only to Kenya but also the entire sub-saharan africa (North of river. Limpopo, South of Sahara). Therefore it serves a very large number of patients with advanced as well complicated disease conditions.

One of the major services that is provided to these patients is pharmaceutical services since this serves as the remedy for most conditions in a majority of cases. The nature and quality of these pharmaceutical services determines both directly and indirectly therapeutic outcome of the patients hospitalisation.

The nature of pharmaceutical services in a hospital may include:

- a) In-patient dispensing services.
- b) Clinical pharmacy services
- c) Drug information services
- d) Cytotoxic reconstitution services
- e) Total parenteral reconstitution services
- f) Pharmaceutical manufacturing services (e.g. sterile products, mouth washes, disinfectants) and extemporaneous preparations.
- g) Preparation of specifications for purchase of ALL drugs, pharmaceutical as well as biological preparations (vaccines)
- h) Pharmacy and therapeutic committee services
- i) Dispensing of narcotics
- j) Out-patient dispensing services

This study, therefore, partly endeavored to establish which of the above services are provided at K.N.H and if qualified pharmacists closely supervise or participate in the service provision.

The assessment of the quality of service delivery in health facilities is receiving growing attention as a strategy for monitoring and evaluating health care programs in developing countries. The provision of essential drugs is one of the eight primary healthcare components (PHC) strategy. Assessing the quality of pharmaceutical services in a standard and objective way has been a

difficult task until recently when WHO action program on essential drugs (APED) developed a manual on “How to investigate drug use in health facilities.”

The indicators developed can be used to assess potential problems in drug use and to prioritise and focus subsequent efforts to correct these problems.

Kenyatta National Hospital being the largest hospital in the country serves as the model for the rest of the hospitals in the country apart from being a major referral facility.

Successful healthcare programs in a referral hospital would be difficult to achieve without quality pharmaceutical services. Such quality services can be achieved and maintained by first of all having a proper description of what is already available before any suggested improvements can be made.

The study, therefore, set out to provide a checklist of available pharmaceutical services at K.N.H. as well as their quality .

2.0 CHAPTER TWO

LITERATURE REVIEW

2.0 GENERAL INFORMATION REVIEW

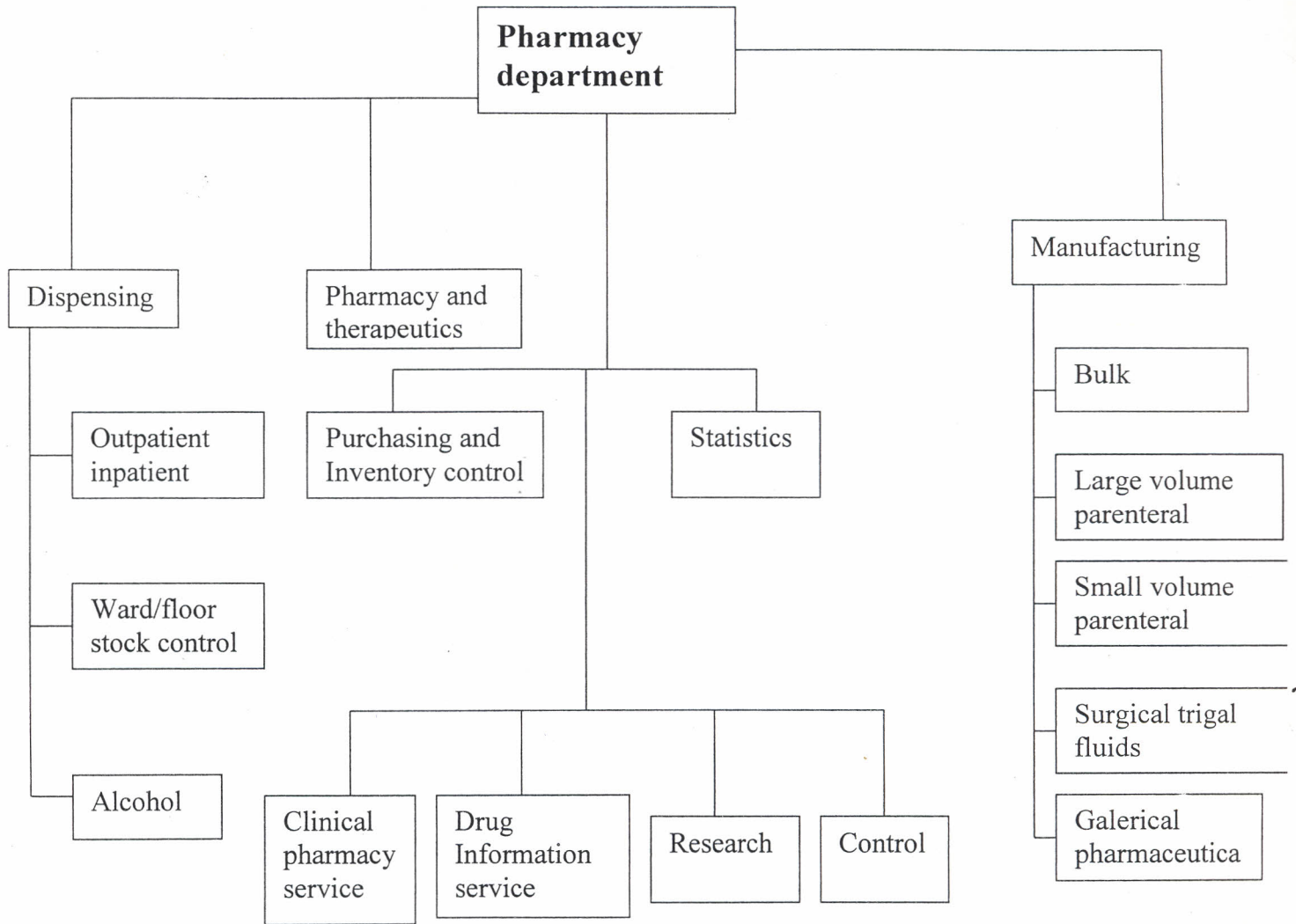
The Hospital Pharmacy¹ is a department/service in a hospital which is under the direction of professionally competent, legally qualified pharmacists, and from which all medications are supplied to the nursing units and other services; where special prescriptions are filled for patients in the hospital; where prescriptions are filled for ambulatory patients and outpatients, where pharmaceuticals are manufactured in bulk, where narcotics and other prescribed drugs are dispensed, where injectable preparations should be prepared and sterilised and where professional supplies are often stocked and dispensed.

The hospital pharmacists benefit both the patients and staff. This is because by manufacturing various pharmaceutical products as well as parenteral solutions they reduce the cost of medication if compared to commercial purchase. They act as pharmacological advisors to the physicians concerning pharmacological, toxicology and posology of drugs. This ensures patients are given the most competent remedy. Pharmacists are on the forefront developing hospital formularies which make prescription and dispensing such simplified chores.

Standards which have been suggested for a pharmacy dept. in a hospital are¹: -

- Proper organisation of the department under the direction of a professionally, competent, legally qualified pharmacist whose training conforms to the standards.
- The pharmacist (Chief) shall initiate and develop rules and regulations pertaining to the administrative policies of the department as well as professional policies.
- The personnel should be well-trained in the specialized functions of hospital pharmacy. They should participate in societies. Their employment must be on recommendation of the chief pharmacist. Non-professionally trained persons are not to be assigned to duties which should be assigned to professionally-trained pharmacists.
- There should be adequate facilities in the department. These include compounding dispensing and manufacturing equipments. Space as well as storage facilities should be adequately available. Special locked storage space that meet legal requirements should be there.

- Responsibilities should be clearly designated to ensure pharmacists are neither overworked nor under-utilized.
- There shall be a pharmacy and therapeutics committee. The committee shall hold at least 2 regular meeting per year. The secretary of the committee shall be a pharmacist.



The responsibilities of each personnel (lay and professional)be clearly defined to avoid legal problems

The facilities in this pharmacy department should be adequate. Lockable cabinets should be available in all drug storage points to ensure theft/ abuse are avoided especially for narcotics. Refrigerators should be available to ensure fast degrading pharmaceuticals are protected from adverse environments.

There should be adequate floor space to ensure good and comfortable working environment for the pharmacy staff. Ventilation should be adequate to avoid damp conditions in drug storage points. Shelves should be reachable yet strong. The shelves should enhance good arrangement of drugs especially pharmacologically for ease of traceability.

LITERATURE REVIEW ON THE SPECIFIC SERVICES IN A HOSPITAL

A survey of services rendered by various hospitals around the world reveals that there are 10 basic services that are rendered by the pharmacy department. [www.phosm.com²;www.Ha.org.hk³;www.fip.org⁴;www.hospitalpharmacy.com⁵;www.cshp.ca⁶]

These basic services, however, vary in presence and magnitude depending on the speciality and goals of the hospital. This literature review seeks to highlight these services with a more in-depth analysis.

2.1. INPATIENT DISPENSING SERVICE

This is common to all the hospitals who have in-patients. The increased demand for utilisation of hospitals coupled with the growing shortage of professional personnel, nurses, pharmacists, dieticians, and social workers has stimulated thought and research in work simplification through establishment of criteria which define each and every job performed by this category of personnel. A great deal of nursing time was consumed by frequent trips to pharmacy to obtain medications and other auxiliary supplies. As a direct result thereof, many administrators have requested the hospital pharmacists and nursing administrators staff to scrutinize present procedures and develop new systems for the distribution and dispensing of drugs.

In the interim many stopgap measures were taken simply because they appeared to be most expedient but which, when viewed in the light of experience and reasoning, were in reality a direct violation of the law.

One such approach is the indiscriminate stocking of drugs on the nursing station in bulk quantities thereby eliminating the pharmacist control. For here the physician prescribed, the nurse dispensed it and the nurse administered. Clearly, in a situation such as this, nurse in performing the dispensing act is infringing upon the professional as well as the legal prerogatives of the pharmacist.

Achambaulte, in the Law of Hospital Pharmacy (1958)⁷ stated that drug administration is a nursing act which consists of the removal or withdrawal of a single dose from a drug container and its administration to a patient. He has further stipulated that dispensing is a pharmacy act and consists of the pharmacist removing two or more doses from bulk container and placing them in another container for subsequent use.

A rationale approach to dispensing to in patients is the installation of a messenger service between the pharmacy and nursing station, installation of a mechanical conveyor systems or pneumatic tube systems or to develop emergency boxes or placing of floor stock on the pavilion after a limited selection of drugs for this use.

Methods of dispensing

The various means employed by the hospital pharmacists to dispense and distribute include: -

- A) The envelope method is a method used to dispense drugs to the nursing station. Under this system the pharmacists fills pre-labelled envelopes with specific drugs and places a predetermined quantity on the nursing unit. When the drug is administered to the patients, the nurse places the patients name and room number on the envelope and places in her out basket. This is latter picked up by the messenger service and is delivered to the pharmacy where it is priced and forwarded to the accounting office.
- B) Mobile dispensing unit method is one, which uses especially constructed stainless steel truck. Under this system, two mobile unit are put into operation in order to permit one unit to be in use while the other one is being serviced. The frequency of delivery and the hours during which mobile unit will visit the pavilion can be selected in cooperation with the nursing services.

The pharmacists/ pharmacist aid manning mobile unit will inventory the pavilion drug cabinets and check off the drug quantities of supplies left. The method ensures the drugs are under constant supervision of professional pharmacists

- C) Unit dose dispensing – A unit dose are those medications which are ordered, packaged handled, administered and charged in multiples of single dose units containing a predetermined amount of drug or supply sufficient for one regular dose, application or use.

The adaptation of unit dose dispensing system dose dispensing system in the hospital can save personnel time both in the pharmacy and on the nursing service; provide contamination free positive identification of the medication up to the time of administration; eliminate labelling errors; permit for more accurate medication changes; and prevent loss of partially used medication.

Availability of basic drugs and supplies

The presence of basic or life-saving drugs and supplies should be ensured in the hospital throughout the year. The ones considered as life-saving are amoxycillin, gentamicin, procaine penicillin, chloramphenicol, co-trimoxazole, metronidazole antimalarials, ORS, fluids and electrolytes, adrenaline as well as syringes and needles and gloves (Essential Drug list by WHO)

Arrangement of the drugs in the shelves

The most advisable way of arranging drugs within the shelf is pharmacologically. This is because it enables one to keep track of available drugs and to easily pick on the next efficacious agent in case one is over. Moreover it helps one to clearly note the most preferred drugs in a therapeutic class.

Antidotes

Drugs are poisons. Therefore, basic antidotes MUST be kept at all times to reverse the effects of these drugs in case of any overdose of poisoning.

N-acetylcysteine is an antidote for paracetamol and cyclophosphamide. Activated charcoal is a wide spectrum antidote which can be used to absorb a wide variety of drugs administered; in reversal of organophosphate (during agricultural use). Ethanol is a good antidote for the methanol poisoning. Methanol has caused high rates of mortality amongst the part from causing poor blindness. Ethanol, being relatively cheap, MUST be kept in anticipation of such eventuality in any referral hospital in Africa. Protamine sulphate is an antagonist for warfarin, which can cause excessive bleeding if effects are not counteracted.

This is important based on the fact that most in-patients are on warfarin since they are bed-ridden.

Inspection of nursing drug stations

This exercise MUST be done periodically for the purpose of removing deteriorated and expired drugs. During the process, it's the responsibility of the pharmacists to ensure all drugs available have clearly legible labels including auxiliary warnings. Moreover, the inspection should be monthly as most drugs have the month being the least figure of expiry date.

Administration of drugs

The administration of drugs is a nursing act and should be done by a nurse. However, pharmacists should periodically monitor the process as well as educate the nurse on suitable drugs and administrative criterion. It's also the responsibility of the pharmacists to ensure drugs are adequate in all wards/ pharmacies all –year round for conditions present.

2.2. CLINICAL PHARMACY SERVICES

Clinical pharmacy is a health science speciality whose mission is the application of pharmaceutical sciences in prevention and management of diseases. A clinical pharmacist devotes most of his time in patient care activities hence is mostly found in the consultation room and wards.

Clinical pharmacists are supposed to advocate for appropriate pharmacotherapy in patients including monitoring of adverse drug reactions, therapeutic drug monitoring (TDM), providing nutritional support, screening for common diseases, getting drug history and monitoring drugs therapy in patient with chronic diseases. He/she also provides consultancy services to the health professionals as well as patient education.

Inpatients

Clinical pharmacists perform the following to inpatients:

- Ensure that established policies and procedures are followed
- Check the accuracy of doses prepared for intravenous mixtures and unit doses
- Provide proper drug control
- Ensure good techniques are used in compounding
- Provide proper recording
- Maintain professional competence especially in drug stability and incompatibilities
- Ensures new personnel are trained properly on policies and procedures
- Provide drug information when necessary to the medical, nursing and pharmacy staff
- Supervise drug administration, review and interpret each individual dose and in administration order ensure it is accurately entered
- Review each patient drug form (treatment sheet) periodically to ensure each patient's drugs are given correctly; review all missed doses; reschedule missed doses; reschedule doses as necessary and sign.
- Ensure proper drug administration techniques are used
- Obtain patient medication history and communicate all pertinent information
- Assist in drug product and entity selection
- Assist the physician in selecting dosage regimens and schedules
- Assign drug administration times for these schedules
- Monitor patients total drug therapy for anti-effectiveness
- Counsel patients on medication to be administered in hospital and discharge medication

The practice of clinical pharmacy, therefore, requires focused people who are willing to undergo additional responsibilities. Specialization is the key to better service and progress.

2.3. DRUG INFORMATION SERVICES

The pharmacist is considered as the most specialized and knowledgeable drug expert in a hospital. In order to practice his profession successfully, the modern pharmacist must have at his command a vast store of detailed information.

In a recent study(Dryer report on Lifetime learning for physicians)⁸ there are two major observations:

1. Continuing education of physicians (pharmacists and nurses) is a major problem which confronts medical education.
2. The results of basic research are not brought to bear clinically quite as fast as they should because of the problem of dissemination of research results to the person who is to apply them.

Therefore, it would seem a well planned pharmaceutical library can play a major role in the continuation of medical education, the rapid dissemination of basic pharmacological research and can be a source of research reference materials.

Of late, editors, physicians, pharmacists and administrators have published much data concerning the use and need for adequate patients. The clinical staff must be provided with vital information concerning use and abuse of drugs as well as information concerning drug chemical nature, mode of action, side effects, dosage forms, costs and literature pertinent to its clinical use.

Moreover, the pharmacist is in a position to alert the physician and nurse of any untoward reactions encountered within the hospital from the use of the particular drug. The information is provided in the hospital through the pharmacy library.

This is possible because in addition to the latest texts and journals, the hospital pharmacist is in daily touch with the medical service representatives of the major drug producers. Much vital literature and information can be gathered from this source if the hospital pharmacist will only avail himself of it. Once gathered, it should be properly catalogued and filed in such a manner as to make it readily available to all those desirous of making use of it.

2. 4. CYTOTOXIC RECONSTITUTION AND ADMINISTRATION

There has been increased incidence of benign and malignant conditions in the recent times. The discovery of highly efficacious agents to manage these conditions has been one of the puzzles science has failed to unravel.

The most common neoplasms include leukaemia, lymphomas and solid tissue tumors. To ensure success of therapy, combination therapy is normally instituted over an extended period. These agents have adverse side effects which must be continuously monitored lest they cause detrimental effects. Notable side effects are bone marrow suppression, gastro intestinal tract symptoms(eg stomatitis, liver damage) as well as allergic reactions eg anaphylactic shock (eg due to use of asparaginase). Levels of haemoglobin, white blood cells and liver function tests should be done frequently.

Cytotoxic reconstitution would best be done by a pharmacist daily. He/ she is to offer technical support to ensure reconstitution is done accurately and aseptically. It is also prudent that the pharmacist is involved in the administration in collaboration with physicians as any laxity will slow/abolish effects of the therapeutic response.

The choice of therapeutic regimen is done during the general ward rounds. The pharmacists in the oncology unit should thus be consistently present in the ward rounds to offer the best in put that only a pharmacist can offer on the pharmacotherapeutics of each drug.

Moreover, the pharmacist should be available to the other team members in order to enable them seek the necessary advice from him/her. The pharmacist should find time to evaluate each patient alone. This time could be crucial in obtaining information that can't be obtained during the general ward round.

The administration and reconstitution of these cytotoxic drugs could be hazardous to the personnel too. Therefore, they should be well protected eg by using special gloves, or the reconstitution be done in a negative isolation room. A clean (aseptic) room should be used for the reconstitution process while the drugs should be kept in a refrigerator to avoid degradation.

2.5 TOTAL PARENTERAL NUTRITION (TPN)

Total parenteral nutrition involves the provision of nutrition through intravenous route ie the central line route .The aim is to provide sufficient nutrients to meet energy requirements to promote tissue anabolism. The fundamental elements of the nutrition are water, carbohydrates, fat, minerals and vitamins. The fluids requirement is 20-35 ml/kg per day. TPN is indicated for patients who require it for at least a week. This is when the gut is not properly functioning or when the benefit of therapy is uncertain/ questionable or for immunocompromised patients.

Monitoring of TPN patients⁹

Monitoring of TPN involves: -

- i) Baseline lab studies
 - Differential platelet count, RBC indices, iron and albumin status
 - Lymphocyte count,
 - Delayed Hypersensitivity skin test
- ii) For patient with acute conditions who are unstable, they are given early nutrition support. The following are monitored:
 - Electrolytes, BUN, serum creatinine for 3 times a week.
 - Ca^{++} , Mg^{++} , PO_4^{3-} for 3 times a week
 - Liver functions test, Total Protein, and Albumin once weekly.
 - Triglycerdes for once a week
- iii) For stabilised patients on prolonged parenteral nutrition support, the following are monitored:
 - Electrolytes, BUN
 - Ca^{++} , mg^{++} , PO_4^{+++} once a week
 - Liver functions tests, Total proteins,
 - Albumin every 2-4 weeks
 - Differential platelets count, RBC indices every 2-4 weeks

Moreover, nutritional assessment by a dietician should be done for calories to assess height, weight, ideal body mass and percentage weight loss. Anthropometrics measurements (extend of depletion) should also be done.

The recommended patient care monitoring parameters include:

- Vital signs every 8 hours

- Intake and output every day
- Daily weights
- Blood sugar every 6 hours till patient is stable than that at least every day.

SOLUTIONS AND ADDITIONS IN TPN

Standard TPN

- This is recommended for general use since it can fulfil most patient's nutritional requirements and it's cost effective
- The final concentration should have 4.25% amino acids and 25% dextrose
- Calorie: Nitrogen ratio is 125:1. This is equivalent to 1 Kcalorie /cc solution

Additives

Standard electrolytes

Na⁺ (35Meq/L) K⁺(30Meq/L) Ca⁺(5 Meq/L) Mg⁺ (5Meq/L) Cl⁻ (47.5Meq/L)
 PO₄ (14.3 Meq/L) Acetate(67.74 Meq/L)

VITAMINS

Every day: Vit C(100mg), Vit A(330Iu) Vit D(20Iu) Vit B₁ (3.0mg) Vit B₂(3.6mg) Vit B₆(4.0mg)

Nicotinamide (40mg) Pantothenic acid(15mg) Biotin(60ug) Folic acid(400ug) Vit B₁₂(5ug)

Weekly : Vit K 10mg

Trace elements

| | | |
|----|-------|---------|
| Zn | 5mg | } Daily |
| Cu | 1mg | |
| Mn | 0.5mg | |
| Cr | 10ug | |

Note

- Insulin can be added to total parenteral nutrition to minimise hyperglycaemia
- Heparin is routinely used as they reduce vein thrombosis
- Lipids be given; it's used as calorie and it can be used to prevent fatty acid deficiency.

The pharmacists should play a leading & integral role in ensuring appropriate use and monitoring of total parenteral nutrition

2.6 PHARMACEUTICAL MANUFACTURING

STATISTICAL data on manufacturing or bulk compounding in hospitals¹⁰ (Mirror to hospital pharmacy by Franke et al) revealed that approximately 41 per cent of 1853 hospital pharmacies in USA operate a manufacturing program. The survey further demonstrated that 78 per cent of the sample group prepared galenical pharmaceuticals; 74 per cent, products not commercially available; 42 per cent, sterile solutions for topical use; 33 per cent, sterile pharmaceuticals such as ointments etc.; and 30 per cent, small volume injectable solutions.

In addition, the same survey showed that hospital pharmacists were also active in the preparation of sterile products such as surgical irrigating fluids, large volume injectable solutions, and special sterile products for investigational use.

This volume of hospital manufacturing may surprise the neophyte pharmacist particularly when viewed in the light of magnitude of the American Pharmaceutical industry. Obviously, there must be some explanation to this paradox. Those knowledgeable in the ways of the profession have advanced a number of reasons the more important of which are (a) that there exists a close relationship between doctors and pharmacists in hospitals, (b) that commercially available products are not often suited for the treatment of certain unusual illness which the physician with a hospital practice is expected to cope with, and (c) that, because of the physician-pharmacist relationship in the hospital, doctors feel at ease in requesting the pharmacist to prepare a special pharmaceutical form either for clinical or experimental use.

Also worthy of consideration here is the fact that hospital pharmacists engaged in this type of practice often encourage and promulgate its expansion and growth because they are of the consensus that such an activity promotes economy within the hospital, compliments the operation of the formulary system, increases the prestige of the hospital pharmacist, and provides the research clinician with the opportunity to develop new pharmaceutical formulations.

Those responsible for the education and training of future hospital pharmacist consider a manufacturing or bulk compounding program to be an extremely useful endeavour which draws together the classroom concepts of courses in product development, physical chemistry, instrumental methods of analysis, and preservation and stabilization of pharmaceutical products.

A manufacturing program within the development of pharmacy is also of interest to trustees and administrators because of its ability to reduce the cost of pharmaceuticals to patients and , therefore, encouraged by them, whenever the pharmacist shows the desire and the ability to undertake such an endeavour.

For the purposes of this study, a manufacturing program for the hospital pharmacy shall be deemed to encompass both bulk compounding of pharmaceuticals and the preparation of sterile products. In my opinion, the same meticulous standards and principles should apply to the preparation of both classes of products.

Control, in General

The word “control” is defined as¹¹(Webster s New Collegiate Dictionary ,2 nd Edition p181) “To test or verify (a statement or experiment) by counter or parallel evidence or experiment.”

“To exercise directing, guiding or restraining power over.”

Klemme¹² in Manufacturing Control Systems in Hospital Pharmacy suggested that hospital pharmacists should consider control of their manufacturing program from two vantage points – “quality control” to govern the quality, purity and strength of the manufactured product and “budgetary control” to regulate the economic aspects of the program. All too often, the hospital pharmacist devotes a great deal of thought and effort to the quality control aspect of the manufacturing program only to learn that he has a technically and professionally sound program but at the same time one which is in economic distress.

The manufacturing unit should be headed by a pharmacist since he is the most competent person to implement good manufacturing practices (GMP). Furthermore, he should have a group of people under him to supervise who are competent enough to implement the GMPs.

Good manufacturing practices dictate that for all procedures in the manufacturing unit, standard operating procedures (SOP) should be prepared, clearly displayed and strictly followed.

The process of good manufacturing would be incomplete without in-process control as well as fully equipped and adequate quality control lab for all the raw materials, finished products and packaging equipments.

2.7. PREPARATION OF SPECIFICATIONS FOR PURCHASE OF DRUGS

The purchase and inventory control of pharmaceuticals is a special and important phase of the operation of a successful hospital pharmacy. The specialized drugs should thus be left for the pharmacist's specification of purchases while the others can be purchased by the administrative staff.

In general, the pharmacy inventory should be adapted to the individual hospital's needs taking into consideration its distance from a source of supply, storage facilities and rapidity of inventory turn-over.

The purchase of drugs and pharmaceuticals is a speciality, which can be carried out to the best advantage by a pharmacist trained in managing a hospital pharmacy. This is the only department in the hospital in which it's usually advisable not to have purchasing done by a general purchasing agent.

One of the principles enunciated in the American Society for Hospital Pharmacists is that... "the pharmacist in charge shall be responsible for specifications both as to the quality and source for purchase of all drugs, chemicals, antibiotics, biologicals (e.g. vaccines) and pharmaceutical preparations used in the treatment of patients even though the purchasing agent may do the actual procurement through a centralized department." This exercise is done as often as need arises.

Drug procurement could be done through the tendering system, quotation or direct cash purchasing. Whichever the system adopted, it should ensure faster and reliable delivery of drugs for patients use.

The quality of drugs should periodically (or always) be ascertained. Primarily, the hospitals should make attempts to ensure drugs are purchased from a reliable manufacturer (ARB=Any Reliable Brand class). A small control laboratory should be available for the purpose of periodic analysis of these firms' products.

The pharmacists, moreover, should get involved in:

1. Maintenance of a list of contacts of drug manufacturers and wholesalers to ensure they are easily contacted in case of emergency need for pharmaceuticals.
2. Preparation of detailed specifications for the purchase of drugs
3. Preparations of receiving memos if drugs are received
4. Preparation of Return Goods Memos where applicable.

2.8 PHARMACY AND THERAPEUTICS COMMITTEE SERVICES

HOSPITALS ORGANIZE AND MARSHAL the best professional skills and judgment available to provide care and treatment of patients. The treatment of these patients in many cases is dependent upon the effective use of drugs. The multiplicity of drugs available today makes it mandatory that an organized sound program of activity be developed within the hospital to ensure that patients receive the best care and protection possible.

One of the most effective ways of providing this kind of care and protection is by organizing a Pharmacy and Therapeutics Committee. This committee is designed to make maximum use of available professional skills and judgment. The establishment of a pharmacy and Therapeutics Committee is strongly recommended to all hospital. It is a measure which supports and enhances the principle of self-governance in the area of high drug standards and practices for the medical staff connected with a hospital. Ultimate benefits accrue to the patient in improved patient care and treatment as established voluntarily by the medical staff.

The pharmacy and Therapeutics Committee¹

The pharmacy and Therapeutics Committee is an advisory group of the medical staff and serves as the organizational line of physicians and the pharmacists and is selected under the guidance of the medical staff and to the administration of the hospital on all matters related to the use of drugs. (This committee does not have intrinsic authority or power of action unless specifically granted such authority.)

PURPOSES

The primary purposes of the Pharmacy and Therapeutics committee are:

a) Advisory

The committee recommends the adoption or assists in the formulation of broad professional; policies regarding evaluation, selection, procurement, distribution, use, safe practices, and other matters pertinent to drugs in hospitals.

b) Educational

The committee recommends or assists in the formulation of programs designed to meet the needs of the professional staff (doctors, nurses and the pharmacist) for complete current knowledge on matters related to drugs and drug practices.

ORGANIZATION:

While the composition of pharmacy and Therapeutics Committee may vary from hospital to hospital, the following is offered as a guide:

- A. The Pharmacy and Therapeutics Committee of the medical staff should be composed of no less than three physicians and the pharmacist, appointed by a governing unit or elected official of the organized medical staff. The hospital administrator or his designated representative should be ex officio member of the committee.
- B. A chairman from the physician representatives should be appointed. The pharmacist is generally designated secretary.
- C. The pharmacy and Therapeutics Committee should meet regularly, no less frequently than twice per year and should meet on call when necessary.
- D. The committee should feel free to invite to its meetings persons within or without the hospital who can contribute from their specialized knowledge or experience.
- E. An agenda is desirable and should be prepared and submitted to members of the committee in sufficient time before the meeting.
- F. Minutes should be kept by the secretary and should be maintained in the permanent hospital.
- G. Recommendations of the Pharmacy and Therapeutics Committee shall be presented to the medical staff or its appropriate committee for adoption or recommendations.

FUNCTIONS AND SCOPE

The basic organization of the hospital and medical staffs will determine the functions and scope of the Pharmacy and Therapeutics committee. The following list, which is not necessarily comprehensive, is offered as a guide.

- A) To serve in an advisory capacity to the medical staff and hospital administration in all matters pertaining to the use of drugs.
- B) To serve in an advisory capacity to the medical staff and the Pharmacist in the selection or choice of drugs which meet the most effective therapeutic quality standards.
- C) To evaluate objectively clinical data regarding new drugs or agents proposed for use in the hospital.
- D) To prevent unnecessary duplication of the same basic drug or its combinations.
- E) To recommend addition and deletions from the list of drugs accepted for use in the hospital
- F) To develop a basic drug list or formality of accepted drugs for use in the hospital and to provide for its constant revision.
- G) To make recommendations concerning drugs to be stocked in hospital patients units or services.
- H) To establish or plan suitable educational programs for the professional staff on pertinent matters related to drugs and their use.
- I) To recommend policies regarding the safe use of drugs in hospitals, including a study of such matters as investigational drugs, hazardous drugs, and others.
- J) To study problems involved in proper distribution and labelling of medications for inpatients and outpatients.
- K) To study problems related to the administration of medications
- L) To review reported adverse reactions to drugs administered.
- M) To evaluate periodically medical records in terms of drugs therapy.

2.9. DISPENSING OF NARCOTICS

Narcotics means any of the following whether produced directly or indirectly origin, or independently by means of chemical synthesis, or by combination of extraction and chemical synthesis:

1. Opium, isopecaine, cocoa leaves and opiates
2. Any compound, manufactured, salt, derivation or preparation of opium, isopecaine, coca leaves, or opiate.
3. Any substance which is chemical in any of the substances above.

Therefore, narcotics are considered to include morphine preparations, cocaine preparations, tincture of opium and codeine preparations having more than 30mg

According to CAP 244¹³ and CAP 245¹⁴ of the Kenyan laws, it's only the registered pharmacists who are entitled to dispense narcotics. Moreover, all narcotics dispensed from the hospital should be accounted for by the dispensing pharmacists as well as the nurse administering the narcotics.

Practitioners should sign all narcotics prescriptions as legal documents. The pharmacists are responsible for the proper safeguarding and the handling of narcotics within the hospital. It is their responsibility to purchase, store, account for, and ensure their proper dispensing. The matron/nurse in charge is responsible to proper storage and use of narcotics within the nursing unit.

All narcotic orders and records must be typed or written in ink or indelible pencil and signed in ink/indelible pencil. A requisition of ward stock narcotics is completed by placing a check mark opposite the name, strength and form of narcotic desired. The completed form is sent to the pharmacy along with the empty containers and nurse's inventory sheet.

Before any new narcotics are issued to a ward, the previous supply must be fully accounted for.

Wherever a dose of narcotic is lost or wasted, the nurse in charge must prepare a report to cover the incident.

Narcotics which are not stocked in the nursing stations may be ordered from the pharmacy on written prescription only. Narcotic prescriptions over three days old can't be filled. Moreover, a doctor may not write a prescription for his own use.

2.10. DISPENSING TO OUTPATIENTS

Nature of patients

64% of hospitals in the USA provide outpatient prescription service with the number of prescription being more 32 million. The nature of patients varies from hospital to hospital. Majority of patients served at the pharmacy could either be patients from outside (private) patients ,patients from outpatient clinic or inpatients who have been discharged.

This kind of service would be rendered either as:

- a) A separate outpatient pharmacy
- b) A combined inpatient and outpatient unit with service from the same window.
- c) A combined inpatient and outpatient unit with service provided from separate windows.

The good dispensing practices(GDP)

The dispensing pattern involved in providing in-patient as well as those being discharged with 'take home' drugs is identical with that carried on by a community pharmacy. In both instance, a prescription is written by the physician and the patient takes it to the pharmacy where it's compounded and dispensed by a pharmacist. Once in the hands of the pharmacist, the prescription and labels are numbered by a numbering machine, the direction and other pertinent information are placed on the label, auxiliary labels are affixed, proper medication is then placed in the container, a check for accuracy is then conducted and finally the prepared prescription is wrapped and dispensed.

These form the backbone of good dispensing practises as specified by FIP (International Federation of Pharmacists).

Essential drugs

The essential drugs should always be present in adequate amounts in every healthcare facility. These drugs include penicillin (ie amoxycillin), metrondeazole, anti-malarials (latest), ORS, co-trimoxazole, chloramphenicol, NSAIDs (eg. paracetamol) gentamicin, cloxacillin, and anti-fungals(eg. clotrimazole).

Arrangement of drugs

The drugs should be arranged pharmacologically for easy traceability. Moreover, pharmacological arrangement ensures a suitable alternative can be obtained with ease. The inspection for expired drugs should be done monthly since most drugs expiry has the month as the smallest unit of expiry date.

CHAPTER THREE

OBJECTIVES

3.1 GENERAL OBJECTIVES

- Find out the nature of pharmaceutical services at KNH
- Find out the number of personnel as well as their qualifications in pharmacy department
- Find out the number of pharmacy premises.
- Find out the presence of the following pharmacy facilities.
 - a) Lockable cabinets
 - b) Refrigerators
 - c) Adequate floor space and ventilation
 - d) Shelves
 - e) Equipment like weighing balance and measuring cylinders.

3.2 SPECIFIC OBJECTIVES

- a) In-patient dispensing services.
 - to find out the extent to which pharmacists are involved in in-patient dispensing services.
- b) Clinical pharmacy services
 - To develop a checklist on clinical functions services carried out at K.N.H
- c) Drug information services
 - To establish the level of involvement of pharmacy in providing drug information services at K.N.H
- d) Cytotoxic reconstitution services.
 - find out if pharmacist is supervising/ involved.
 - Find out if personnel are protected from cytotoxic drug contamination e.g.
 - i. Negative pressure isolation.
 - ii. Protective gloves.
- e) Total parenteral nutrition reconstitution services.
 - Find out if pharmacists are involved.

Pharmacy and therapeutics committee services

- Find out if the committee is in place
- Find out if pharmacists is involved
- Find out if evaluation of clinical data of drugs is used in the hospital.
- Find out if it recommends the drugs to be stocked at the pharmacies and nursing units

f) Preparation of specification for purchase of ALL drugs and pharmaceutical agents

- Find out if pharmacist is involved in the specification preparation
- Find out if process is done regularly
- Find out what is the basis for choice of drugs

g) Drug manufacturing and extemporaneous preparation

- Find out if hospital carries out manufacture of some pharmaceuticals, sterile products, soaps, soaps, detergents etc.
- Find out if pharmacist is involved actively

h) Narcotics dispensing services

- Find if certain narcotics are present.
- Find out auditing of narcotics records is done

i) Outpatient services

- Find out nature of clients
- Find out to which extend pharmacists

CHAPTER FOUR

MATERIALS AND METHODS

Operational definitions- In this study, a pharmacist refers to a registered graduate pharmacist and pharmacist interns.

Study area : - The study was carried out at K.N.H pharmacy department as well as the facilities where pharmaceutical services are provided. K.N.H was chosen due to its referral nature as well as proximity to the faculty hence convenient to the researcher.

Study population – the research involved the filling questionnaires by pharmacy personnel as well as the inventory of available facilities at pharmacy department.

Data collection – the data collection was between June 2004 to July 2004 through structured and semi-structured questionnaires and observations. The questionnaires consist of open and closed ended questions. Before interviews and observations are carried out informed consent from each interviewee was sought. Filling of the questionnaire was done in the presence of the researcher. The questions required all pharmacists to indicate the nature of service they are involved in. All pharmacists are required to indicate whether they have knowledge of good pharmacy practices and to mention few requirements of good dispensing practices.

Some questions sought to know whether the pharmacists has access to reference library as well as scientific, professional and technical services. The researcher sought to find out the presence of pharmacists in the ward rounds as well as if pharmacists review the patient's therapeutic progress from time to time. The researcher finds out if pharmacists were available to provide drug information when and as required. The research sought to find out also if the pharmacists were available to nurses to advices on drug administration.

Therefore prescribed forms for data collection were made as to meet the objectives outlined in chapter three.

CHAPTER FIVE

RESULTS, DISCUSSION AND RECOMMENDATION

5.1 RESULTS

5.1.G1 Number of pharmacists interviewed = 11

(Pharmacist = pharmacists + pharmacy interns)

Number of pharmaceutical technologist interviewed = 8

Table 1 Participation in pharmaceutical services

| | Service | Pharmacists | | Pharm techs. | |
|-----|--|-------------|------|--------------|----|
| | | No | % | Number | % |
| 1. | In-patient dispensing | 10 | 90.9 | 6 | 75 |
| 2. | Clinical pharmacy | 9 | 82 | 3 | 38 |
| 3. | Drug information | 10 | 91 | 6 | 75 |
| 4. | Cytotoxic reconstitution | 6 | 55 | 0 | 0 |
| 5. | Total parenteral nutrition | 0 | 0 | 0 | 0 |
| 6. | Pharmaceuticals manufacturing | 2 | 18 | 1 | 13 |
| 7. | Preparation of specification for purchase of drugs | 4 | 36 | 0 | 0 |
| 8. | Pharmacy & therapeutics committee | 1 | 9 | 0 | 0 |
| 9. | Dispensing of narcotics | 5 | 45 | 3 | 38 |
| 10. | Outpatient dispensing | 9 | 82 | 7 | 88 |

5.1.G2 Number of personnel in the department

| | | |
|----------------------------------|---|----------|
| Pharmacists | - | 10 |
| Pharmacy inters | - | variable |
| Pharmaceutical technologists | - | 40 |
| Pharmacy assistants/ subordinate | - | 30 |

| | | |
|--------------------|---|------------|
| Stock management | | |
| Use of stock cards | - | 8/8 (100%) |

Other methods of stock management

- Bin cards ✓
- Registers ✓
- Receiving books ✓
- S11 forms

Table 2 Stock inventory

| | No | % |
|---------|-----|------|
| Daily | 3/8 | 37.5 |
| Weekly | 4/8 | 50 |
| Monthly | 1/8 | 12.5 |

Table 3 Presence of facilities in the pharmacy

| | No | % |
|--|-----|-----|
| Refrigeration | 8/8 | 100 |
| Adequate shelves | 4/8 | 50 |
| Lockable cabinets | 8/8 | 100 |
| Regular electricity supply | 8/8 | 100 |
| Ventilation fans | 1/8 | 13 |
| Adequate dispensing space | 7/8 | 88 |
| Adequate equipment e.g. weighing balances, measuring cylinders | 0/8 | 0 |

5.1.S1

Table 4 In-patients dispensing service

| | No | % |
|-----------------------|----|----|
| Number of pharmacists | 6 | 46 |
| Number of pharm techs | 7 | 54 |
| Total | 13 | |

Table 5

| Methods of dispensing | No | % |
|------------------------|------|----|
| Envelop method | 7/13 | 54 |
| Mobile dispensing unit | 2/13 | 15 |
| Unit dose dispensing | 9/13 | 69 |

Table 6 Presence of the following drugs in the pharmacy

| Drug | No | % |
|-----------------------|-------|----|
| Amoxicillin | 12/13 | 92 |
| Gestamicin injections | 12/13 | 92 |
| Procaine penicillin | 5/13 | 38 |
| Chloramphenical | 12/13 | 92 |
| Cotramoxazole | 12/13 | 92 |
| Metronidazole | 12/13 | 92 |
| Quinine | 11/13 | 85 |
| ORS | 12/13 | 92 |
| Fluids & Electrolytes | 11/13 | 85 |
| Adrenaline injection | 12/13 | 92 |
| Syringes & needles | 0/13 | 0 |
| Gloves | 2/13 | 15 |

Table 7 Arrangement of drugs in the shelves

| | No | % |
|--|-------|----|
| Pharmacologically | 9/13 | 69 |
| Alphabetically | 0/13 | 0 |
| Others | | |
| Classes in ARVS at Comprehensive care centre | 1/13 | 8 |
| Arbitrarily depending on the availability of space | 10/13 | 77 |

Table 8 Presence of Antidotes

| Antidote | No | % |
|--------------------|-------|----|
| N Acetylcysteine | 0/13 | 0 |
| Activated charcoal | 0/13 | 0 |
| Atropine sulphate | 12/13 | 92 |
| Ethanol | 6/13 | 46 |
| Protamine sulphate | 6/13 | 46 |

Table 9 Drug Inspection in the Wards

| | No | % |
|---|-------|----|
| Inspection of all nursing stations to remove deteriorated / expired drugs | 11/13 | 85 |
| Checking for legibility of labels, in the wards inspected | 9/11 | 82 |

Table 10 Frequency of Inspection

| | No | % |
|------------|------|----|
| Daily | 0/13 | 0 |
| Weekly | 2/13 | 15 |
| Monthly | 4/13 | 31 |
| Biannually | 1/13 | 8 |
| Annually | 4/13 | 31 |
| Never | 2/13 | 15 |

Table 11 Interviewee's opinion on who should do Drug Administration

| | No | % |
|-------------|-------|----|
| Nurse | 11/13 | 85 |
| Pharmacists | 7/13 | 54 |
| Pharm techs | 5/13 | 38 |

Interviewee's opinion on adequacy of drugs for conditions present 7/13 (53.8%)

5.1.S2

Table 12 Clinical Pharmacy service.

| | No | % |
|--|------|----|
| Number of Pharmacists participating | 9/11 | 82 |
| Number of Pharm techs who feel they should participate | 2/8 | 25 |

Table 13 Frequency of Participation

| | No | % |
|----------------|-----|----|
| Daily | 2/9 | 22 |
| Every two days | 4/9 | 44 |
| Weekly | 1/9 | 11 |
| Other (> week) | 2/9 | 22 |

Table 14 Finding time regularly to give drug information (e.g. drug - drug interactions) to physician

| | No | % |
|------------------|-----|----|
| Daily | 2/9 | 22 |
| Every two days | 1/9 | 11 |
| Weekly | 0/9 | 0 |
| When need arises | 8/9 | 89 |

Table 15 Delivery of the following service in past 1 week

| Services | No | % |
|--|-------|----|
| Monitoring of medical administration records | 9/11 | 82 |
| Checking of drug dosages to in-patients | 9/11 | 82 |
| Checking drug-drug interactions | 8/11 | 73 |
| Supervision of medication delivery to the wards | 5/11 | 45 |
| Counselling of patients | 10/11 | 91 |
| Provision of drug information during ward rounds | 8/11 | 73 |

There was no mode of documentation for any of the clinical pharmacy services done by the pharmacists.

5.1 S3 Drug information service

Number of pharmacists - 7

Number of pharm techs - 12

Presence of library section in the pharmacy - none

Who should be eligible to use - everyone (pharmacists, pharmaceutical technologist, nurses and physicians)

Presence of the following books in the pharmacy:

BNF - Presence in all

Editions 44th edition - all pharm techs and 6/7 of pharmacist (86%)
46 - 1/7 of pharmacists (14%)

Mertindale 4/7 of pharmacists; 31st Edition (57%)(Extra Pharmacopoeia)

6/12 of pharm techs 31st edition (50%)

1/12 of pharm techs 27th edition (8%)

Supply of latest pharmaceutical journal in the pharmacy

Pharmacists 2/7 (29%)

pharm techs 4/12 (33%)

Journal supplied - only PSK journal \, the March 2004, issue.

Visiting internet for pharmaceutical information

Pharmacists 4/7 (57%) pharm techs 5/12 (42%)

Frequency of visiting the internet

Daily - none

Twice weekly - none

Weekly 2/4 (50%) of pharmacists; 1/5 of pharm techs (20%)

Occasionally (as convenient) - 2/4 (50%) pharmacist, 4/5 (80%) pharm techs

5.1. S4: Cytotoxic reconstitution and administration

Direct involvement in reconstitution and administration (pharmacists + pharmacy interns) - 8/11

Table 16 Frequency of participation

| | No | % |
|--------------------|-----|------|
| Daily | 7/8 | 87.5 |
| Biweekly | 1/8 | 12.5 |
| Weekly | 0/8 | 0 |
| Bimonthly, monthly | 0/8 | 0 |

Attendance of ward rounds of oncology dept - 8/8 (100%)

Table 17 Frequency of attendance of Oncology Ward Rounds

| | No | % |
|----------------|-----|------|
| Daily | 3/8 | 37.5 |
| 3 x weekly | 1/8 | 12.5 |
| 2 x weekly | 2/8 | 25 |
| Every 2-3 days | 2/8 | 25 |

Table 18 Frequency of Giving Advice to physicians on best regimen

| | No | % |
|-----------|-----|------|
| Always | 1/8 | 12.5 |
| Sometimes | 6/8 | 75 |
| Rarely | 1/8 | 12.5 |

Other members of the team seeking advice on therapeutics from the pharmacist

Yes - 7/8 (87.5%)

No - 1/8(12.5%)

Table 19 Frequency of the other members seeking advice from the Pharmacist

| | No | % |
|-----------|-----|------|
| Always | 1/8 | 12.5 |
| Daily | 0/8 | 0 |
| Sometimes | 6/8 | 75 |

Pharmacists finding time to evaluate each patient in oncology unit alone: 4/8 (50%)

Table 20 Frequency of evaluating each patient

| | No | % |
|--------------|-----|----|
| Once a week | 3/4 | 75 |
| Twice a week | 1/4 | 25 |

Pharmacists who feel well protected from cytotoxic contamination: 2/8 (25.0%)

5.1 S5: Total Parenteral Nutrition services

“Participation of pharmacists is in procurement and distribution only”

(Source Chief Pharmacist)

Duration of stay of most patients on TPN: Between 1 – 2 weeks

Table 21 Major reasons why patients are on TPN at KNH

| | No | % |
|--|--------------------|-------|
| GIT mal-absorption | 1/3 (Nutritionist) | 33.3 |
| Immunocompromised | 0/3 | 0 |
| Terminally ill | 1/3 (Nutritionist) | 33.3 |
| All the above | 2/3 (Pharmacists) | 66.7% |
| Others (critically ill patients who can't be fed orally) | 1/3 (Nutritionist) | 33.3% |

Table 22 Monitoring of parameters (weekly)

| | No/Yes |
|-----------------------|--------|
| Electrolytes | Yes |
| Liver Functions Tests | Yes |
| RBC and WBC count | Yes |
| Triglycerides | No |
| Platelet Count | No |

Table 23 Monitoring of Parameters (Daily)

| | |
|------------------------------|-----|
| Body weight | No |
| Vital functions (Heart rate) | Yes |
| (Respiratory rate) | Yes |
| Input / out put ratio | Yes |
| Blood sugar | Yes |

Table 24 Inclusion of the following in the TPN

| | |
|-------------------------------|----|
| Vit C 100mg daily | No |
| Vit A 3300 ug daily | No |
| Folic and 400mg daily | No |
| Vit B ₁₂ 5mg daily | No |
| Vit K 10mg every week | No |

5.1 S6: Pharmaceutical manufacturing

No of pharmacists participating in Pharmaceutical Manufacturing: 2
 (i.e. chief pharmacist and the Pharmacist who heads the unit)

The unit is not operating currently but modalities of revival

Table 25 Formulations being manufactured

| | |
|---|---|
| Liquid dosage forms | No |
| Sterile solutions for topical Use | No |
| Sterile pharmaceuticals such as ointments | Yes |
| Small and large volume injectables | No (Ready made is Purchased) |
| Product not commercially available | Yes (E.g. metronidazole cream for superficial wounds) |

Head of manufacturing unit: Pharmacist
 SOPS prepared and clearly displayed: Yes
 Fully equipped quality control lab in manufacturing unit: None

It was proposed strongly that there should be collaboration between the manufacturing unit and the faculty for the purpose of QC.

5.1. S7: Preparation of specifications for purchase of drugs/ pharmaceuticals

Pharmacists involved: 7/11 (63.6%)
 Pharm techs involved: 0/11 (0%)

Table 26 Frequency of Participation:

| | No | % |
|-------------------|-----|----|
| Annually | 3/7 | 43 |
| When needs arises | 6/7 | 86 |

Table 27 Methods of procuring drugs

| | No | % |
|-------------------|-----|-----|
| Tendering | 7/7 | 100 |
| Quotation systems | 4/7 | 57 |
| Direct purchase | 2/7 | 29 |

Table 28 Opinion on procurement methods

| | Number agreeing | % |
|---|-----------------|----|
| methods above ensures faster and reliable delivery of drugs | 4/7 | 57 |
| methods above does not ensure faster and reliable delivery of drugs | 3/7 | 43 |

The participants in selection and purchase of drugs and pharmaceuticals products

Pharmacists - 6/7(86%)
 Purchasing dept - 7/7 (100%)

Pharmacists make specifications while purchasing dept executes these decisions

Pharmacists actively participate actively in purchasing dept - 3/6 (50%)

Table 29 Analytical testing of drugs procured

| | No | % |
|---------------------|-----|----|
| Testing is done | 0/7 | 0 |
| Testing is not done | 6/7 | 86 |
| Not sure | 1/7 | 14 |

Table 30 Pharmacists participating in respective roles in Procurement

| | No | % |
|---|-----|-----|
| Maintenance of a list of contacts of drug manufacturers and wholesalers | 5/7 | 71 |
| Preparation of detailed specifications fro purchase for drugs | 7/7 | 100 |
| Preparation of request for purchase forms | 7/7 | 100 |
| Preparation of receiving memo if drugs are received | 5/7 | 71 |
| Preparation of return goods memo where applicable | 5/7 | 71 |

5.1 S8: Pharmacy and Therapeutics committee

Pharmacists involved: 1 (chief pharmacist)

Pharm techs: None

Awareness of the Existence of a therapeutics committee: 1/11 (Chief Pharmacist only)
 (9%)

The Chief Pharmacist also acts as the secretariat of the Pharmacy and Therapeutics Committee

The committee had not been in place but it has been revived

Frequency of meeting – Envisaged to be once a month

Activities involved in:

- ◆ Development of formulary of drugs for use in the hospital.
- ◆ Serve as advisory group to pharmacist (in-charge) on choice of drugs to be purchased
- ◆ Evaluation of clinical data concerning drugs to be / being used in the hospital
- ◆ Addition / deletion of certain drugs for use in the hospital
- ◆ Making recommendation on drugs to be used in the hospital

Activities not involved in:

- ◆ Supervision of investigational (research) use drugs
- ◆ Development of a programme for reporting and investigating adverse drug reactions

These may be included in future.

The chief pharmacist isn't aware of any drug under investigational / research use.

The pharmaceutical technologists were not aware of the Pharmacy and Therapeutics Committee

5.1. S9 Dispensing of Narcotics

5 – Pharmacist participated in the dispensing of narcotic

3 – Pharmaceutical technologists participated in the dispensing of narcotics

Table 31 The presence of Narcotics in the Pharmacies

| | | |
|---|-----|-------|
| Morphine preparations | 8/8 | 100% |
| Cocaine preparation | 8/8 | 100% |
| Tincture of opium | 8/8 | 100% |
| Codeine preparation having more than 30mg | 7/8 | 87.5% |

All the respondents reported that :

Pharmacists, pharmaceutical technologists and nurses could dispense the narcotics. However, nurses were only entitled to dispense only in the wards.

Accounting of Narcotics

Well accounted for 7/8 (88%)

The keeping of good records for the narcotics

Yes - 8/8 (100%)

Table 32 Auditing of the narcotics records

| | | Number | % |
|-----------|---|--------|------|
| Weekly | - | 1/8 | 12.5 |
| Bimonthly | - | 0/8 | 0 |
| Monthly | - | 0/8 | 0 |
| Yearly | - | 2/8 | 25 |
| Never | - | 4/8 | 50 |

Table 33 5.1 S10: Outpatient dispensing

| | No | % |
|-----------------------|------|-----|
| Number of pharmacists | 8/11 | 73 |
| Number of pharm techs | 8/8 | 100 |

Table 34 Nature of clients served in the pharmacy

| | No | % |
|------------------|---------------------------------|----|
| KNH outpatients | 15/16 | 94 |
| KNH in patients | 14/16 | 88 |
| Private patients | 1/16(Comprehensive care centre) | 6 |

Table 35 5.1S10 Drugs in the outpatient pharmacy

| | Pharmacists | | Pharm techs | |
|---|-------------|------|-------------|------|
| | No | % | No | % |
| Amoxicillin | 8/8 | 100 | 8/8 | 100 |
| Metronidazole | 7/8 | 87.5 | 8/8 | 100 |
| Coartem (R) (Artemesinine / Lumefantrine) | 5/8 | 62.5 | 3/8 | 37.5 |
| ORS | 7/8 | 87.5 | 7/8 | 87.5 |
| Co-trimoxazole | 7/8 | 87.5 | 8/8 | 100 |
| Chloramphenicol | 7/8 | 87.5 | 8/8 | 100 |
| Paracetamol | 7/8 | 87.5 | 8/8 | 100 |
| Gentamicin Injection | 7/8 | 87.5 | 7/8 | 87.5 |
| Clotrimazole Cream | 7/8 | 87.5 | 8/8 | 100 |
| Cloxacillin | 7/8 | 87.5 | 8/8 | 100 |

Table 36 Basis of arrangement of drugs in the shelf

| | No | % |
|---|-----|------|
| Pharmacology | 5/8 | 62.5 |
| Alphabetically | 0/8 | 0 |
| Other (As convenient in terms of space) | 7/8 | 87.5 |

Table 37 Frequency of Pharmacy Inspection for expired drugs, according to the personnel

| | Pharmacist | | Pharm. Tech | |
|------------|------------|----|-----------------------|-----|
| | No | % | No | % |
| Daily | 0/8 | 0 | 0/8 | 0 |
| Monthly | 2/8 | 25 | 0/8 | 0 |
| Biannually | 2/8 | 25 | 0/8 | 0 |
| Annually | 4/8 | 50 | 8/8 (board of survey) | 100 |

Table 38 Opinion on adequacy of drugs available

| | No | % |
|-------------|-----|------|
| Pharmacists | 2/8 | 25 |
| Pharm Techs | 3/8 | 37.5 |

Table 39 Awareness of good dispensing practise as specified by International Pharmacist Federation (FIP)

| | No | % |
|-------------|-----|------|
| Pharmacists | 3/8 | 37.5 |
| Pharm techs | 2/8 | 25.0 |

Good dispensing practices mentioned: -

PHARMACISTS

- a) Proper labelling and instructions
- b) Validation for prescriptions raised
- c) Hygienic handing of drugs
- d) Proper understanding and interpretation of prescriptions

PHARM TECHS

- a) Prescriptions should be legal
- b) Clearly label the dispensed medications
- c) Working area should be body and well arranged
- d) Drugs should be carried out of hand.

5.2 DISCUSSIONS AND RECOMMENDATIONS

5.2.G1: Over view on pharmaceutical services at KNH.

The pharmacy department of KNH renders actively 9 out of the 10 basic services that a hospital pharmacy department can offer. Table 1 shows clearly that the pharmacists and pharmaceutical technologists are involved in the following services:

- In-patient dispensing
- Clinical pharmacy
- Drug information
- Cytotoxic reconstitution and administration
- Pharmaceutical manufacturing
- Preparation of specifications for the purchase of drugs
- Pharmacy and therapeutics committee
- Dispensing of narcotics
- Outpatient dispensing

90.9% of pharmacists interviewed participated in in-patient dispensing. This is commendable because KNH has its core role in in-patients management. This ensures that the dispensing of drugs is handled more by the more qualified personnel. 75% of pharmaceutical technologists dispense to in-patients. This ensures that pharmacists have adequate personnel who can dispense the medications under their direct supervision.

82% of pharmacists are involved in clinical pharmacy services. This is commendable too. This is because, the pharmacists are able to assess patients medication vis-à-vis patients condition and the adverse drug reactions. Most of these pharmacists, however, have no post-graduate training. Post-graduate training of these pharmacists in clinical pharmacy will ensure better service delivery. Pharmaceutical technologists do not participate in clinical pharmacy but 38% of them have the desire to do so. This quest should be met by offering training to them on the basic services of clinical pharmacy. They could assist the pharmacists in service delivery.

Drug information should be the epitome of service of hospital pharmacists. It is encouraging to note that 91% of pharmacists and 75% of pharmaceutical technologists are involved in provision of drug information. This is because these cadre of personnel have unmatched expertise on drug

information. In fact efforts should be made to ensure 100% of these personnel are actively involved in provision of appropriate information on drugs- for that is essentially their role.

55% of pharmacists were involved in reconstitution and administration cytotoxics while 0% of pharmaceutical technologists were involved. This could be a pointer to the fact that the hospital preferred pharmacists to handle this crucial role due to their expertise.

0% of pharmacists and pharmaceutical technologists are involved total par-enteral nutrition reconstitution, administration or monitoring. This need to be addressed to ensure pharmacists and pharmaceutical technologists are involved. In indeed it is recommended internationally that pharmacists play a leading and integral role in TPN to ensure appropriate use and monitoring of total parental nutrition.

18% of pharmacists and 13% of pharmaceutical technologists interviewed reported participation in pharmaceutical manufacturing within the hospital. This could be indicative of the fact that the hospital gives less emphasis to internal manufacturing of drugs / pharmaceuticals.

36% of pharmacists and 0% of pharmaceutical technologists intervened were involved in preparation of specifications for purchase of drugs. The pharmacists participation in preparation of specifications for purchase of drugs is paramount. This is because their expertise on drugs makes them the best to handle all aspects relating to drug purchase and selection. More pharmacists should be encouraged to participate in this process.

9% of pharmacists and 0% of pharmaceutical technologists were involved in pharmacy and therapeutics committee. The pharmacy and therapeutics committee in any hospital, or it's equivalent is organizational keystone in maximizing rational drug use. The low number of personnel involved in this committee is worrying. This is because it is the policy-recommending body to the medical staff and the administration of the hospital on matters related to the therapeutic use of drugs. The committee should increase the participation of pharmacists and ensure its message reaches other members of pharmacy staff.

45% of pharmacists and 38% of pharmaceutical technologists are involved in dispensing of narcotics. The dispensing of narcotics should be under strict control preferably under a pharmacist to ensure it's not misused / abused.

82% of pharmacists and 88% of pharmaceutical technologists are involved in outpatients dispensing in KNH. There are more pharmaceutical technologists involved in outpatient dispensing than pharmacists. Given the fact that KNH serves many outpatients than in any other section, more pharmacists should be involved in this service.

5.2.G2. Overview on pharmacy personnel & facilities

Distribution of pharmacists in KNH

10 pharmacists are employed in the pharmacy department in KNH. The number of outpatient served by the hospital annually is a minimum of 80,000 while the in-patients are a minimum of 10,000. The implication is that each pharmacist serves an average of 270 outpatients daily assuming they are not involved in any other service. However, half of the pharmacists are in other sections viz: administration (Chief pharmacists), cytotoxics reconstitution (2), manufacturing (1) and private wing (1). This leaves only 5 of the pharmacists in outpatient and in-patient dispensing. The implication is that each pharmacist is supposed to directly supervise the dispensing of medications to 540 patients daily. This is overwhelming work indeed.

Recommendation: KNH should recruit more pharmacists to ensure the dispensing of drugs is more in the hands of qualified personnel-the pharmacists.

Stock management

Stock management is done by stock cards (100%). This could suggest that the method has received wide acceptance. Other methods used for stock control are bin cards, register books and S11forms. All these suggest that there is a tight control of stock at K.N.H hence reduced losses through theft and expiry.

38% of pharmacies carry out stock inventory daily while 50% do it weekly and 13% monthly. This supports the argument that stock control is taken seriously in KNH. It would be interesting to find out how deficiency after inventory is dealt within the hospital.

Table 3: facilities

Adequate facilities should be present in any pharmacy as a fulfilment of good pharmacy practices

Refrigerators

100% pharmacies in KNH had working refrigerators. This is commendable because most drugs/ pharmaceuticals need low temperature for longevity. It was worthwhile to note this facility was utilised.

Shelves

50% of pharmacies in KNH had adequate shelves to arrange / store the drugs. This could influence drug arrangement in the pharmacy hence ease of picking the needed drug and reduced dispensing time.

Recommendation

The department should provide adequate shelves for appropriate drug arrangement in all pharmacies.

Electricity supply

It was realised that 100% of pharmacies had regular electricity supply. This is recommended. This is because facilities such as refrigerators need consistent supply of power for them to fulfil their designate function.

Recommendation: This electricity supply should be sustained

Ventilation fans

Only 13% of pharmacies in KNH had ventilation fans. Most drugs are recommended to be kept in a cool dry place. Absence of fans could imply that the humidity and warmth of the pharmacy cannot be maintained at optimum levels.

Recommendation: The hospital needs to install ventilation fans in all the pharmacies (preferably automated types).

Dispensing space

88% of pharmacies in KNH had adequate dispensing space. This implies the pharmacists and pharmaceutical technologists had ample space to professionally give proper information to the patient while dispensing.

Recommendation: There is need to maintain this. There is a need too to ensure adequate space is available in the remaining 12% of pharmacies.

Equipments

0% of pharmacies in KNH had adequate equipments (e.g. measuring cylinders, weighing balances). This implies that compounding procedures such as extemporaneous preparations are not done or cannot be easily done in KNH by the pharmacists. This is the historical role of pharmacists and must be sustained by provision of tools of this trade-adequate equipment.

Recommendation: KNH needs to urgently provide adequate pharmacy equipments to enable pharmacists carry out extemporencious preparations to enable individualization of doses of many preparations.

5.2S1: In-patient dispensing services

Table 4 Personnel in in-patient dispensing

46% of personnel involved in in-patient dispensing are pharmacists while 54% are pharmaceutical technologists. This is encouraging since the number of pharmacists seems favourably high compared to the number of pharmaceutical technologists. However, a visit to the in-patient pharmacies (pharmacy 3, pharmacy 5, pharmacy 8 and pharmacy 10) found out that pharmacists are NEVER in the wards except pharmacy 10 (private wing) where there were 3 pharmacists (1registered pharmacist and 2 pharmacy interns. This implies that dispensing to all in-patients in KNH is done by pharmaceutical technologists without the direct supervision of pharmacists except in private wing. According to the pharmacy law (Cap 244) and ethics, all dispensing should be done under the direct supervision of pharmacists

Recommendation: There is urgent need for KNH to post pharmacists to the in-patient pharmacies [pharmacy 3, pharmacy5 & pharmacy 8] since the current trend is illegal.

Table 5: Methods of dispensing

The methods of dispensing to in-patients are more of a hybrid system. 54% of pharmacies used envelop method 15% mobile dispensing and 69% unit dose dispensing. It was encouraging to note that unit dose dispensing is the most populous. This is because unit dose dispensing ensures each patient has his/hers dispensing done straight from the pharmacy. This gives the patients the benefit of pharmacists' expertise.

Recommendations: There's need to take further steps to adopt a "unit- dose dispensing only" policy in in-patient dispensing. This might imply additional employment of pharmacists and pharmaceutical technologists

Table 6 :Essential drugs

Basic or life-saving drugs and supplies should be made available in health institutions throughout the year. As shown in table 6, most of the basic drugs and supplies were well supplied except procaine penicillin (38%), syringes and needles (0%) and gloves (15%). The absence of gloves in 85% of pharmacies clearly indicate that an important aspect of good dispensing practises is not adhered. This is because tablets and capsules are counted using bare hands that poses the threat of contamination of patients. The absence of needles and syringes implies that in case of emergency in in-patient pharmacy help cannot be provided.

Recommendation: All pharmacies in KNH should be urgently and consistently be supplied with gloves. A number of needles and syringes should also be kept in all the pharmacies

Table 7: Arrangement of drugs

Proper drug arrangement is an important component of stock management. This survey revealed that drug arrangement was based on a hybrid system, too. The arrangement in 69% of pharmacies was pharmacological, 0% of pharmacies used alphabetical arrangement and still 77 % arranged arbitrarily depending on availability of space. This arbitrary arrangement could be blamed on inadequate shelves earlier pointed out in table 3.

Recommendation: All the pharmacies should strive to arrange its drugs pharmacologically only. However, this can only be possible if adequate shelves are provided in all the pharmacies.

If drugs are arranged pharmacologically, tracing a specific drug is not only made easy but more importantly, it would simplify inventory taking and minimise the number of drugs that may expire. Moreover, it also assists in dispensing the right drugs or to provide patients with suitable substitutes.

Table 8:Presence of antidotes in the pharmacy

Antidotes are an essential component of every pharmacy. This is because all drugs are poisons. There is always a possibility of poisoning hence the need for antidotes. N-acety/cysteine is an antidote for paracetamol poisoning while activated charcoal can be used for lavage of drugs taken orally. It is unfortunate these antidotes aren't present in all the pharmacies in KNH.

92% of pharmacy had atropine sulphate (an antidote for cholinergics and anticholinesterases), 46% had ethanol (antidote for methanol) and 46% had protamine sulphate (an antidote for heparin poisoning)

Recommendation: Efforts should be made to equip the pharmacies with the antidotes that are absent (notably N-acetylcystein and activated charcoal).

Table 9 Drug inspection in the wards

85% of the pharmacies in the in-patient section made efforts to inspect the wards drug storage points to check for expired drugs. 82% of those who inspected the wards checked for legibility of labels. This is important because poorly labelled drugs can be used for purposes not intended for. This could be particularly hazardous for drugs with low therapeutic index.

The frequency of inspection (table 10) was varying from one pharmacy to the other. 15 % did the inspection weekly; 31% monthly. 8% biannually 31% annually and 15%, never did any inspection. Inspection of the wards for expired drugs should be done monthly while inspection for legibility should be done at least weekly.

Recommendation: There is need for the pharmacies (15%), which do not do inspection in the wards to start the exercise. Those who do it need to adopt a month-based inspection. All pharmacies should ensure all drugs in the wards are properly labelled at any given time.

Table 11: Opinion on drug administration

The staff in the pharmacy had varying opinion on who should administer drugs to the patients. 85% agreed that nurses should be the ones carrying out this duty. This confirms the historical belief that drug administration is the nurse domain.

However, 54% had the opinion that pharmacists should play a role in drug administration. Some felt that pharmacists should supervise and educate the nurses on proper drug administration. 38% felt that pharmaceutical technologists had a role to play too.

Recommendation: Drug administration, should continue being done by nurses. There is need, however, for pharmacists to play an educational and supervisory role, as they are the drug experts.

Availability of drugs

53.8% of personnel in the pharmacy dept felt that the drugs available were adequate to manage the patients in the hospital. This underscores the need for adequate health care. The implication of this is that any patient in KNH has only slightly above half chance of getting adequate and proper

medication. This could undermine drastically the ability to manage patients professionally.

Recommendation: KNH should take the necessary steps to ensure adequate stocks of drugs are available in the hospital.

5.2. S2: Clinical pharmacy services

Table 13: Personnel

82% of pharmacists in the hospital reported to participate in provision of clinical pharmacy service. This was an encouraging number given the fact that clinical pharmacy is an emerging field in hospital pharmacy. Most of these pharmacists had no post-graduate specialization.

Recommendation: This participation should be sustained. Post-graduate training of these pharmacists needs to be encouraged.

Frequency of participation

22% of these pharmacists participated daily, 44% every two days, 11% weekly while 22% participated once in more than a week.

Clinical pharmacists should be resident in the wards all day long. Therefore, they are supposed to participate *daily* in provision of clinical pharmacy services

Recommendation: All the clinical pharmacists should participate *daily* in provision of clinical pharmacy services. Efforts should also be made to station these pharmacists in the wards on a full time basis.

Table 14: Frequency of giving drug information

22% of clinical pharmacists found time to give drug information to physicians daily, 11% did it every two days while 89% did it only when the need arises. It would be worthwhile if the physician had access to this critical role of pharmacists.

Recommendations: The physicians should be encouraged to freely get any drug information they need whenever the need arises. as pharmacists are readily willing to provide information

Table 15: Services of clinical pharmacists

The services provided by these pharmacists are commendable. This is because 82% participated in monitoring of medical administration records, 82% in checking of drug dosages to in-patients,

73% in checking drug-drug interactions in the wards 45% in supervision of medication delivery to the wards, 92% in counselling of patient and 73% in provision of drug information during ward rounds.

All these duties need to be sustained and enhanced.

Documentation of clinical pharmacy services

None of the duties of clinical pharmacists were documented as having been delivered. The impact of the pharmacists' contribution cannot be quantified nor his job justified if proper documentation is not done.

Recommendation: The duties delivered by the clinical pharmacists need to be recorded to ensure the services of the pharmacists are documented. This could involve introduction of pharmacist's notes form in the patients' file.

5.2. S3: Drug information service

A library in the pharmacy

Provision of drug information and education should be the epitome of pharmacists' role in a hospital. Every effort should be taken to enhance the provision of this crucial service.

There is no library within the pharmacy department of K.N.H. However, it was reported that there is a general library for all hospital staff which is situated far away from the hospital hence out of reach for quick reference.

Recommendation: A well equipped library needs to be established within the pharmacy department of KNH. All of those interviewed concurred that all the hospital staff should be at liberty to use the library once established.

Presence of books in the pharmacy:

BNF was found to be present in all pharmacies. 100% of pharmaceutical technologists and 86% of pharmacists had 44th edition while 86% of pharmacists had 44th edition of BNF while 14% of pharmacists had 46th Edition (Latest edition)

57% pharmacists had Extra Pharmacopoeia by Martindale 31st Edition, 50% of pharmaceutical technologists had 31st Edition while 8% of pharmaceutical technologists had 27th edition.

This confirmed the fact that the pharmacists play the leading role in soliciting of the latest of information and using the latest editions of textbooks

However, in all the pharmacies visited there were no textbook of pharmacology and therapeutics or pharmacy practise. Moreover, the personnel neither had access to these books in private.

Recommendation:

The department needs to provide the latest editions of textbooks of pharmacology, therapeutics and pharmacy practise as a stop gap before a library is established within the department.

Journals

29% of pharmacists and 33% of pharmaceutical technologists received latest pharmaceutical journals. This could be a pointer to the reluctance by pharmacists to search for latest information from journals

This fact is confirmed by the fact that the only journal supplied was the PSK Journal of March, 2004 which is distributed free. The culture of subscription to reputable journals (both local and international) seems to have died.

Recommendation:

The pharmacy staff should subscribe to reputable journals so as to keep abreast with emerging trends in pharmacy practise. This could be facilitated by the department itself subscribing to such journals and allowing it's staff to use them

Use of internet

52% of pharmacists visit the internet for pharmaceutical information while 42% of pharmaceutical technologists do so too. Out of these, 50% of pharmacists visit the internet weekly while 20% of pharmaceutical technologists visited the internet weekly. 50 % of pharmacists visited the internet occasionally (when not doing anything else) and 80% of the pharmaceutical technologists visited the internet occasionally too.

This asserts the argument that pharmacists are on the search for the latest information. The high number of pharmacists visiting the Internet could also explain why they no longer subscribe to journals since these journals are now readily available in the internet.

Recommendation:

The preference of internet over journals by pharmacists should prompt the administration to establish an internet facility in the hospital preferably to within reach of each pharmacists from their work points.

5.2. S4: Cytotoxic reconstitution and administration

Table 16: frequency of participation

Cytotoxics reconstitution and administration is a sensitive area and should be handled carefully by highly qualified personnel -pharmacists. It was encouraging to find out that only the pharmacists from the pharmacy department were involved in this process. These pharmacists participated daily (87.5%) or at least twice weekly(12.5%). This points out to the fact that these pharmacists took their work very seriously.

This is further confirmed by the 100% attendance of general ward rounds of oncology department by these pharmacists. In deed a significant number of these pharmacists attended these ward rounds daily(37.5%) while the rest attended these ward rounds at an encouraging interval (table17):

3xweekly (12.5%), 2xweekly (25%), every 2-3 days (25%). This further confirms the weight these pharmacists give to their duties.

Table 18

12.5% of these pharmacists advised the physician always while 75% did it sometimes while a 12.5% did it rarely. This suggests that pharmacists give a free hand to physicians to decide on the best regimen but when need arises they are ready to offer the advice. The best practice is where the physician makes the best diagnosis then decides the best regimen in consultation with the pharmacist.

Recommendation: Efforts should be made to ensure pharmacists are always involved in choosing of the best therapeutic regimen for the oncology patients.

Advice

87.5% of the personnel of oncology wards sought advice from the pharmacists on therapeutic regimens. This confirms the high esteem pharmacists are held as drug experts. Table 19 shows that 12.5% of the team sought advice always while 75% sought advice sometimes. This could be due to several reasons e.g. pharmacists having a busy schedule.

Patient evaluation by pharmacists

50%of pharmacist found time to evaluate patients in oncology unit alone. This is an important exercise since it gives the pharmacist a chance to evaluate these patients without undue influence of other members of the team.

This evaluation (table 20) was one once a week by 75% of these pharmacists while 25% did it twice a week.

Recommendation: The pharmacists should be encouraged to continue with the trend of evaluating each patient may be at least twice weekly. Those who don't do so should be encouraged to do so.

Contamination by cytotoxics

25% of pharmacists felt they were protected from cytotoxic contamination. This should be addressed since contamination by cytotoxics could be fatal as they have serious side effects.

Recommendation: Protection should be provided for the personnel who handled cytotoxics eg provision of adequate gloves, negative pressure isolation room and proper disposal of breaks.

5.2 S5 Total parental nutrition (TPN)

This is the section that was found that to have the least benefit of the pharmacist expertise. According to the chief pharmacist the only role pharmacists participated in TPN is in procurement and distribution of these products

Most patients on TPN were found to stay on TPN for between 1-2 weeks. This was reasonable because TPN use has several risks hence it should only be used once it has been ascertained that the patient needs it for more than a week.

.It (table 21) was felt that the major reasons why patients were on TPN at KNH are: GIT (33.3%) mal -absorption (33.3%), immune-compromised and other critically ill patients who can't feed orally (33.3%).

Table 22 shows that triglycerides and platelet count aren't monitored weekly but the electrolyte, liver functions tests and RBC / WBC count are monitored as recommended.

The chief nutritionists reported that body weight, vital functions (heart rate respiratory rate), input/output ratio and sugar (blood) levels were monitored daily (table 23).

The monitoring of these parameters ensures that the patients are well-taken care of as they are a pointer to the appropriateness and safety of TPN on these patients.

Table 24 shows that none of the recommended vitamins are included on the TPN of long-term patients in KNH eg Vit C, Vit A, Vit B-12, Folic acid and Vit K. These vitamins are quite essential especially in avoidance of anaemia and coagulation disorders hence should be added.

Recommendation: Pharmacists should be incorporated in the administration and monitoring of patients who are on TPN as well as peripheral nutrition.

Meanwhile, patients on TPN should be monitored for triglycerides levels and platelet levels as recommended internationally

The TPN should include Vit C 1000mg daily, Folic acid 400mg daily; Vit B-12 (5mg daily) and Vit K 10mg every week.

5.2 S 6: Pharmaceutical manufacturing

Manufacturing of pharmaceuticals within the hospital encourage and promulgate the expansion and growth of hospital pharmacy. This is because it promotes economy within the hospital and leads to production of medication that are not easily available commercially which in turn increase the prestige of pharmacists albeit saving lives.

The research revealed that, in deed, KNH has an expansive manufacturing unit with many types of equipment. Moreover, the unit is under the control of a pharmacist and the chief pharmacist.

However, the unit is not operating currently. It was encouraging to be informed that the revival procedures are at advanced stages.

When operating, the unit specializes in preparation of pharmaceuticals such as ointments and products not commercially available e.g. metronidazole cream for superficial wounds/ burns.

The unit doesn't manufacture liquid dosage forms, sterile solutions for topical use, small and large volume injectibles (e.g. infusion) as they purchase the ready made ones.

The research revealed that standard operating procedures (SOPs) have been prepared and clearly displayed in the various sections of manufacturing unit. This is in line with the demands that SOPs be in place in all entities doing pharmaceutical manufacturing.

However, the manufacturing unit doesn't have a quality control laboratory. This has serious implications. This is because, it implies that the quality of all products manufactured in KNH can not be ascertained. Good manufacturing practices (GMP) doesn't allow manufacturing without the presence of quality control laboratory.

Nevertheless, KNH proposed strongly that there should be a collaboration between the manufacturing unit and the faculty of pharmacy, University of Nairobi for the purpose of quality control (QC) as the faculty has a fully equipped lab.

Recommendation: KNH should revive its manufacturing unit as this will save on the cost of medications. Furthermore, the unit should expand its areas of productions to include liquid dosage forms like syrup, which are popular with in-patients and injectibles (infusions) as they are cheap to manufacture yet used very much within the hospital.

While reviving the unit, efforts should be made to establish a fully equipped quality control laboratory in the unit to ensure only pharmaceuticals that meet validated standards are used in the hospital.

Meanwhile, a stopgap measure such as memorandum of understanding (MOU) with the faculty's DARU could come in handy.

5.2.S7. Preparation of specifications for the purchase of drugs / pharmaceuticals.

The purchase and inventory control of pharmaceuticals is a special and important phase of the operation of a successful hospital pharmacy. The specialized drugs should thus be left to the pharmacist specifications of purchases while others can be purchased by the administrative staff.

63.6% of pharmacists were involved in this important exercise. This was a favourably high percentage. It implies that the specifications to the purchase of drugs is under the control of experts -the pharmacists. 43% of these pharmacists (table 26) participated in the process annually while a staggering 86% did the exercise whenever need arises.

Table 27 indicate the procurement methods these pharmacists used were: tendering (100%) quotation (57%) and direct purchase 29%. In table 28, 57% of these pharmacists had the opinion that the above methods ensured faster and reliable delivery of drugs while 43% did not believe so.

The reasons advanced for this dissatisfaction was that some of the people who won the tenders did not supply as reliably as they had promised. It was recommended that the tendering committee should carefully scrutinize the bidders for tenders for drug supply.

It was encouraging to learn that then pharmacists make specifications for drugs to be purchased while purchasing department executes the actual purchase. It was encouraging to learn that pharmacists actively participated in the purchasing department (50%). This is commendable because pharmacist's participation, further, in the purchasing department adds value to the process.

Analytical testing of drug procured is not done as confirmed by 86% of these who answered the questionnaires and 14% of those who were not sure (table 29)

Recommendation: There is need for the analytical testing to be done periodically just to be reassured of the quality of drugs used in the hospital even those of Any-Reliable-Brand (ARB) category.

Table 30 sought to ascertain the extent of pharmacists' participation in procurement exercise. It was commendable that 71% of pharmacists had the contacts of manufactures and wholesalers. This is vital because it will enable any pharmacists to contact these companies in case of emergency need for drugs.

100% of pharmacist were involved in preparation of detailed specifications for purchase of drugs, 100% of request for purchase forms, 71% of receiving memo if drugs are received and 71% in return goods memo. This confirms the drug procurement and purchase in KNH is under safe and able hands of pharmacists.

5.2.S8- Pharmacy and Therapeutics committee.

This committee is designed to make maximum use of available professional skills and judgements. The committee is an advisory group of the medical staff and serves as the organizational line to marshal the best provision of appropriate care and treatment of patients.

According to the chief pharmacist of KNH the hospital has not been having such a committee. He says that the committee was started recently. However, 0% of pharmaceutical technologists are aware of the existence of such a committee while 9% (chief pharmacist) of the pharmacists interviewed were aware of the existence of the committee.

The chief pharmacists act as the secretary of the committee. According to him the committee is envisaged to be meeting once a month. According to international standards, such a committee should meet at least twice a year. It would be interesting to see how the KNH committee copes with the once a month schedule.

Amongst the activities the committee is already undertaking are:

- ◆ Development of formulary of drugs for use in the hospital.
- ◆ Serves as an advisory group to the chief-pharmacists on the choice of drugs to be purchased.
- ◆ Evaluation of clinical data concerning drugs to be/ being used in the hospital.
- ◆ Addition/ deletion of certain drugs for use in the hospital.
- ◆ Making recommendations on drugs to be used in the hospital.

However the committee currently doesn't

- 1) Supervise investigational (research) use drugs This could suggest there is no research going on in KNH or such researches are left at the discretion of the researchers. In deed the chief pharmacists isn't aware of any drug on research use within the hospital.
- 2) Develop a programme for reporting or investigating adverse drug reactions. The committee should pursue the duty vigorously. This is because late adverse drug reactions can only be discovered once the drug has been in the market. The committee should do surveillance and convey such adverse reactions to the manufacturing /innovator companies & regulatory authorities

Recommendations: The pharmacy & therapeutic committee should be strengthened. Furthermore its deliberations, aspirations and decisions should be brought to the attention of all medical and pharmacy staff as often as they meet.

The committee should develop a programme for reporting & investigating adverse drug reactions.

5.2.S9 Dispensing of narcotics

Narcotics are frequently used to manage pain that is unresponsive to non-steroidal and steroidal anti-inflammatory drugs. Such pain is rampant in referral facilities such as KNH hence the higher need for narcotics in KNH than in other hospitals in the country

Narcotics have physical and psychological dependence potential both to the staff and patients. This implies that there should be strict control measures to ensure they are not abused. They should be kept under lock and key to avoid their theft and subsequent abuse.

According to table 31, 100% of pharmacies had morphine preparations, 100% had cocaine, 100% had tincture of opium while 87.5% had preparations with more than 30mg codeine. All these are narcotics that are potent enough to warrant strict control measures to avoid their abuse.

The fact that pharmacists, pharmaceutical technologists and nurses (albeit in the wards) had the authority to dispense them meant the more the need for strict control.

It was encouraging that 88% of those interviewed felt that narcotics were well accounted for in KNH and 100% felt that good records of accounting were kept.

Auditing of narcotics could be the only means to ascertain that narcotics are spent for the purpose meant for. 12.5% of those interviewed thought it was done weekly while 25% thought it was done yearly while 50% said it was never done.

The chief pharmacists confirms that indeed audit of narcotics is never done since the Pharmacy & Poisons board doesn't come to do so

This has serious implications. This is because even if good records are kept without an external independent body doing the auditing, theft and abuse of narcotics could still be perpetrated as the personnel could create means of cover up.

Recommendations: Auditing of narcotics in KNH be carried out frequently by an independent external body e.g. PPB.

5.2.510 Out patient dispensing :

Personnel

73%of pharmacists interviewed participated in dispensing to outpatients while 100% of pharmaceutical technologists participated. This shows that most pharmaceutical technologists

in KNH had their core role in dispensing while pharmacists had other roles other than dispensing.

Nature of clientele

The nature of clients (Table 34) served in KNH outpatient pharmacies was such that 94% of outpatient pharmacies served KNH outpatients, 88% served KNH in-patients while only 6% served patients from outside (private patients). This was in comprehensive care centre, which serves HIV positive patients. It is recommended that hospitals could increase its revenue by serving private patients in its pharmacies which seems not to be the case in K.N.H.. For such patients, subsidization shouldn't be done.

Recommendation: KNH should serve private patients in some of its pharmacies to increase its revenue base

Presence of essential drugs in the pharmacy

According to table 35 most essential drugs are present in outpatient pharmacies in KNH. These drugs included: Amoxicillin(100%), Chloramphenicol (100%), Paracetamol (100%), Gentamicin injection (87.5%) Clotrimazole cream (100%) and Cloxacillin (100%).

The government recently recommended the use of artemesinin/ lumefantrine (Coartem) as a first line treatment of malaria-one of the major killer diseases in sub-Saharan Africa. However, in KNH only 37.5% of pharmacies visited had artemesinin –based anti-malaria's

Recommendations: KNH should sustain the presence of essential drugs in its pharmacies. It should supply artemesinin -based antimalarials to all its pharmacies.

Drug arrangement in the pharmacies

Proper drug arrangements are an important component of stock management. The survey revealed that drug arrangement is a sort of hybrid system where some drugs were arranged pharmacologically while some are arranged as conveniently as space is available. 62.5% of pharmacies had pharmacological arrangement to some extent while 87.5% employed an arbitrary arrangement. This sort of arrangement could result in increased number of expired drugs in the hospital as they are not used systematically due to their arbitrary arrangement. This translates to loss of resources for the hospital as well as inadequacy of drugs for proper patient management.

Recommendation: All the pharmacies should have a pharmacological arrangement for all the drugs they stock

Inspection for expired drugs

Table 37 indicates that 25% of pharmacies are inspected monthly for expired drugs, 25% biannually and 50% annually according to the pharmacists interviewed. However 100% pharmaceutical technologists reported that the inspection was done only annually by the board of survey.

The pharmaceutical technologists are the ones who are actually present in the outpatient pharmacy. Therefore, the annual inspection seems to be the reality. The pharmacists choice of monthly reflect their consciousness of the excise being done monthly. This reveals that the pharmacists might not be in touch with the day to day operations of the pharmacies.

Recommendations: The department should ensure drug inspection is done monthly as this ensures drug are removed as they expire at the end of each month.

Adequacy of drugs available

25% of pharmacists interviewed believed the drugs available were adequate for the conditions faced while 37.5% of pharmaceutical technologists believed the drugs available were adequate. The difference could show that the pharmacists see greater need for better and more drugs for managing of the conditions present.

There seems to be a near consensus that the drugs available are inadequate for the management of the patients conditions.

Recommendations: The department should take the necessary steps to ensure adequate amount of drugs are available in the hospital. Perhaps revival of manufacturing unit could be one of the solution.

Awareness of good dispensing practises(GDP)

Good dispensing practice ensures professional and quality service to the patient. It caters for the welfare of the pharmacist; supply of medication of assured quality; promotion of rational prescribing and use of drugs and appropriate information and advice for patient together with monitoring the effects of drug use.

37.5% of pharmacists in KNH knew good dispensing practices compared to 25% of pharmaceutical technologists. In a similar study in private pharmacies in Dar-es-salam, 75% of pharmacists were aware of good dispensing practices compared to 50% of pharmaceutical technologists. [Quality of pharmacy practise Among Dispensers in private practice: Dar es salam, by Mugoyela et al]

These observations confirm that it is important that dispensing of pharmaceuticals should be done under the supervision of pharmacists.

The low level of awareness of GDP by Kenyan pharmacist compared to their Tanzania counterparts should serve as a wake up call for the KNH pharmacists

Recommendation: all the dispensing points at KNH should be under a qualified and duly registered pharmacists

6.0 CHAPTER SIX

CONCLUSION

The Pharmacy department of KNH provide the following services;

1. In-patient dispensing
2. Clinical pharmacy
3. Drug information
4. Cytotoxic reconstitution and administration
5. Pharmaceutical manufacturing
6. Specifications for purchase of drugs
7. Pharmacy and therapeutics committee
8. Dispensing of narcotics
9. Outpatient dispensing

Pharmacists are not involved in reconstitution and administration of total parenteral nutrition.

The quality of the services offered was found to be varied. The services that were found to be well-done were: -

1. Cytotoxic reconstitution and administration
2. Preparations of specifications for the purchase of drugs
3. Dispensing of narcotics
4. Outpatients dispensing to some extent

The following services need urgent improvement: -

1. In patient dispensing
2. Clinical information
3. Pharmaceutical manufacturing
4. Pharmacy and therapeutics committee
5. Reconstitution and administration of total parenteral nutrition (TPN)

The recommendations specified in chapter five if implemented will go a long way in improving the quality of pharmaceutical services at KNH

REFERENCES

1. William E. Hassan Jr, Hospital Pharmacy, 1965 pg 1 – 21; 40-43: 135-185; 224-225;
2. www.pharm.com
3. www.ha.org.hk
4. www.fip.org
5. www.hospitalpharmacy.com
6. www.chshp.ca
7. Archambault GF; The law of Hospital Pharmacy, Am J of Hospital pharmacy, and 5:593,1958
8. Dryer. B.V.; Lifetime learning for physicians, J med, Ed37; pt 2,1962.
9. www.totalparenteralnutrition.com
10. Frank et al; Mirror to Hospital pharmacy, Washington D.C, American society of Hospital pharmacists p122
11. Webster's New collegiate Dictionary; 2nd Edition; Springfield Mass, G & C Merriam Co. p181.
12. Klemme et al: Manufacturing control systems in Hospital pharmacy; The Bulletin A.S.H .P; 6:278 1984.
13. Cap 244 of The laws of Republic of Kenya
14. Cap 245 of The laws of Republic of Kenya
15. Mugoyela V. et al, The Quality of Pharmacy Practices. Among dispensers in private pharmacies, A case study in Dar-es- salaam Tanzania; East African Journal of Pharmaceutical sciences. Vol5 No 2 August 2002, pg 24-27.
16. G. Teferi et al, The Assessment of quality of pharmaceutical services in the primary Healthcare facilities of Ethiopia; The East Africa Journal of pharmaceutical services; Vol 4 No. 2 August, 2001. pg 30-35.

17. Dr. Atieno Ojoo; The hospital pharmacy practice; The pharmaceutical Journal; Vol 12 No. 7
March 2004, pg 24, 26.
18. Dr. P.N. Karimi; Clinical Practice; NUPHARMA Journal, March 2004, pg 6-7.
19. Wilson Major; Patient compliance; NUPHARMA, Journal; March 2004, pg 9.
20. www.who.org/aped.
21. Husa William; Pharmaceutical dispensing 3rd Edition; pg 779-799.
22. WHO Manual/How to investigate drug use in healthcare facilities.

APPENDICES: QUESTIONNAIRES

RESEARCH ON PHARMACEUTICAL SERVICES AT KNH
QUESTIONNAIRE FORM G1

DESIGNATION ___ Pharmacist
 ___ Intern pharmacist
 ___ Pharmaceutical Technologist
 ___ Pharmacy Assistant

Which of the following services do you participate in while discharging your duties at K.N.H?

(Tick the one you participate in)

1. In-patient dispensing services
2. Clinical pharmacy services
3. Drug information services
4. Cytotoxic reconstitution services
5. Total parenteral reconstitution
6. Pharmaceutical manufacturing services e.g. manufacture of infusions, detergents, mouthwashes or extemporaneous preparation
7. Preparation of specifications for purchase of drugs, pharmaceutical and biological products (e.g. vaccines)
8. Pharmacy and therapeutics committee services
9. Dispensing of narcotics (e.g to terminally ill patients)
10. Out-patient dispensing services

RESEARCH ON PHARMACEUTICAL SERVICES AT K.N.H

QUESTIONNAIRE FORM G2

Pharmacy no. _____

Number of personnel in the pharmacy

Pharmacists _____

Pharmacy interns _____

Pharmaceutical technologists _____

Pharmacy assistants _____

Stock management

Use stock cards Yes _____ No _____

Other method _____

How often is stock inventory done?

Weekly _____ Monthly _____ Bi-annually _____ Annually _____ Never _____

Facilities in the pharmacy premise

| FACILITY | PRESENT | ABSENT | NOT SURE |
|---|---------|--------|----------|
| Refrigerator | | | |
| Adequate shelves | | | |
| Lockable cabinets | | | |
| Regular electricity supply | | | |
| Ventilation fans | | | |
| Adequate dispensing space (in your opinion) | | | |
| Adequate equipment e.g weighing balances, measuring cylinders, gloves | | | |

RESEARCH ON PHARMACEUTICAL SERVICES AT K.N.H

QUESTIONNAIRE FORM S1 A

In-patient dispensing services

Pharmacy no. _____

Designation _____

1. Do you dispense to in-patients? Yes ____ No ____
2. If yes, which method of dispensing is employed
 - a) Envelop method (there's a messenger between the pharmacy and the ward)
 - b) Mobile dispensing unit (mobile ward dispensing to all patients)
 - c) Unit dose dispensing (pharmacy dispenses to each patient then nurses administer the dose to the individual patient)
3. Are the following drugs/materials available in the pharmacy

| DRUG/SUPPLIES | YES | NO |
|-------------------------|-----|----|
| Amoxicillin | | |
| Gentamicin | | |
| Procaine penicillin | | |
| Chloramphenicol | | |
| Co-trimoxazole | | |
| Metronidazole | | |
| Quinine | | |
| ORS | | |
| Fluids and electrolytes | | |
| Adrenaline | | |
| Syringes and needles | | |
| Gloves | | |

4. How are the drugs arranged in the shelves

- a) Pharmacologically
- b) Alphabetically
- c) Other (specify _____)

5. Are the following antidotes present?

- a) N-Acetylcysteine
- b) Activated charcoal
- c) Atropine
- d) Ethanol
- e) Protamine sulphate

6. i) Are all nursing drug stations periodically inspected for the purpose of removing deteriorated and expired drugs?

Yes ____ No ____

ii) If yes to 6 i) are labels of drugs checked for legibility?

Yes ____ No ____

ii) How often is the inspection?

Daily ____ Weekly ____ Monthly ____ Bi-annually ____ Yearly ____ Never ____

7. Who do you think should administer drugs to patients?

- A. Nurse
- B. Pharmacist
- C. Pharmaceutical technologist
- D. Self medication by patient
- E. Other (specify _____)

8. Do you think adequate drugs are available for the conditions present?

Yes ____ No ____

RESEARCH ON PHARMACEUTICAL SERVICES AT KNH

Questionnaire (Form S2)

Clinical Pharmacy Services

Designation: _____

Pharmacy No./Unit _____

1. Do you participate in ward rounds

Yes No

If Yes, how often?

- Daily
- Every two days
- Weekly
- Other

2. Do you find a chance to give drug information (e.g., drug-drug reactions) to physicians regularly?

- Daily
- Every two days
- Weekly
- Other(Specify.....)

3. In the past 1 week have you done any of the following activities?

(a) Monitoring of medical administration records (i.e. treatment sheets) of patients in the wards

Yes No

Mode of documentation.....

(b) Checking of drug dosages to inpatients

Yes No

Mode of documentation.....

(c) Checking drug-drug interactions

Yes No

Mode of documentation.....

(d) Supervision of medication delivery to the wards

Yes No

Mode of documentation.....

(e) Counselling of patients

Yes No

Mode of documentation.....

(f) Provision of drug information during ward rounds

Yes No

Mode of documentation.....

RESEARCH ON PHARMACEUTICAL SERVICES AT KNH

Questionnaire (Form S3)

Drug Information Services

Designation:-

Pharmacy No.

1. Is there a library section within the pharmacy?

Yes No

2. If yes is it adequate as a resource centre for pharmacists?

Yes No

3. Who are eligible to use the Library?

- a) Pharmacists
- b) Pharmacists, physicians and nurses
- c) Physicians and pharmacists

4. Which of the following books are available in the pharmacy? (Tick the ones available)

USNF /BNF yes no state Edition

Mertindale EP/USP yes no state Edition

A textbook of pharmacology Yes No Name ----- Edition

A textbook of on Pharmacy Yes No Name----- Edition

5. i Are latest practice the Pharmaceutical journals supplied to the pharmacy?

Yes No

ii If yes in 5 (i) name 2 of the latest journals indicating month / year of publication

I

II

6. i Do you visit the internet for the latest pharmaceutical information?

Yes No

ii If yes to 6 (i), how often?

- a) Daily
- b) Twice weekly
- c) Weekly
- d) Monthly
- e) Yearly

RESEARCH ON PHARMACEUTICAL SERVICES AT KNH

Questionnaire (Form S4)

Cytotoxic reconstitution Services

Designation:

Pharmacy No.:

1. Are you directly involved in reconstitution and administration of cytotoxics
Yes No
2. If yes to 1), how often?
 - a) Daily
 - b) Bi-weekly
 - c) Weekly
 - d) Bi-monthly
 - e) Monthly
3. (i) Do you attend ward (General) rounds of the oncology department?
Yes No
(ii) If yes to 3 (i)
 - a) How often _____
 - b) Do you get an opportunity to advise other members of the team on the best regimen?
 - Always
 - Sometimes
 - Rarely
 - Never
4. (i) Do other members of the team seek advice from your on therapeutic regimen?
Yes No
(ii) If yes, how often?
 - Always
 - Daily
 - Sometimes
5. (i) Do you find enough time to evaluate each patient in your oncology unit alone
Yes No
(ii) If yes, how often do you carry out the evaluation _____
6. (i) Do you feel well protected from cytotoxic contamination?
Yes No

5. Are the following parameters monitored daily?

- | | | |
|------------------------------------|-----|----|
| A. Body weight | Yes | No |
| B. Vital signs i.e. – Heart rate & | Yes | No |
| Respiratory rate | Yes | No |
| C. Intake/output ratio | Yes | No |
| D. Blood sugar | Yes | No |

6. Are the following included in the TPN for chronic patients

- | | | |
|-----------------------------------|-----|----|
| A. Vit C 100mg daily | Yes | No |
| B. Vit A 3300I μ daily | Yes | No |
| C. Folic acid 400Mg daily | Yes | No |
| D. Vit B ₁₂ 5 Mg daily | Yes | No |
| E. Vit K 10mg every week | Yes | No |

RESEARCH ON PHARMACEUTICAL SERVICES AT KNH

QUESTIONNAIRE FORM S6

PHARMACEUTICALS MANUFACTURING & EXTEMPORANEOUS PREPARATIONS

Designation _____

Pharmacy NO./ UNIT _____

1. Does KNH operate a manufacturing programme?

Yes

No

2. If yes to 1) which of the following are manufactured?

- | | | |
|--|-----|----|
| a. Liquid dosage forms | Yes | No |
| b. Sterile solutions for topical use | Yes | No |
| c. Sterile pharmaceuticals such as ointments | Yes | No |
| d. Small and large volume injectible solutions | Yes | No |
| e. Products not commercially available. | Yes | No |

3. Who heads the manufacturing unit?

Pharmacist Yes No

Nurse Yes No

Physician Yes No

Other (specify) _____

4. Have standard operating procedures (SOPs) been prepared and clearly displayed in the manufacturing unit?

Yes

No

5. Is there a fully equipped quality control lab in the manufacturing unit?

Yes _____.

No _____.

RESEARCH ON PHARMACEUTICAL SERVICE AT KNH

Questionnaire Forms S7

Preparation of specifications for purchase of drugs, pharmaceutical and biological products (e.g. vaccines)

Designation

Pharmacy No. _____

1. Do you participate in the preparation of specifications for the purchase of drugs, pharmaceuticals or biological products e.g. vaccines

Yes No

2. If yes in 1) how often

(a) Weekly

(b) Monthly

(c) Biannually

(d) When need arises

(e) Other specify _____

3. What method is used for procurement of the drugs to be purchased?

(a) Tendering system

(b) Quotation system

(c) Other (specify) _____

4. Do you think the process in 3) above ensures faster and reliable delivery of the drugs?

Yes No.

5. Who is in charge of selection and purchase of drugs and other pharmaceutical products?

(a) Pharmacists

RESEARCH ON PHARMACEUTICAL SERVICES AT KNH

Questionnaire (Form S8)

Pharmacy and Therapeutic Committee Services

Designation No.: _____

Pharmacy No.: _____

1. Is there a pharmacy and therapeutic committee?
Yes No

2. Do you participate in the committee?
Yes No

3. How often does the committee meet? _____

4. If yes to 2), does the committee do the following:
 - a) Develop a formulary for drugs accepted for use in the hospital
Yes No
 - b) Serve as an advisory group to the pharmacists on choice of drugs to purchase
Yes No
 - c) Evaluate clinical data concerning drugs requested for use in the hospital
Yes No
 - d) Add/delete certain drugs for use in the hospital
Yes No
 - e) Make recommendations on drugs to be used in hospital
Yes No
 - f) Supervise investigational (research) use drugs
Yes No
 - g) Develop a programme for reporting and investigating adverse drug reaction
Yes No

5. If No to 2), do you think there is need for such a committee?
Yes No

RESEARCH ON PHARMACEUTICAL SERVICES AT KNH

Questionnaire Form S9

DISPENSING OF NARCOTICS SERVICES (E.G. TO TERMINALLY ILL PATIENTS)

Designation _____

Pharmacy NO./Ward NO. _____

1. Are any of the following present in the pharmacy?

- | | | |
|---|-----|----|
| A. Morphine preparations | Yes | No |
| B. Benzodiazepines eg Diazepam | Yes | No |
| C. Dihydrocordein (DF 118) | Yes | No |
| D. Codeine preparation having more than 30 mg | Yes | No |

2. If yes to any of the above answers in 1 who among the following can dispense them?

- A. Pharmacists
- B. Pharmacy technologists
- C. Nurses
- D. All the above
- E. Other (specify _____)

3. Do you think all narcotics are accounted for in the hospital?

Yes No

4. Are good records kept for the narcotics?

Yes

No

5. How often is the auditing of narcotics records done?

- a. Weekly
- b. Bi-monthly
- c. Monthly
- d. Yearly
- e. Never

RESEARCH ON PHARMACEUTICAL SERVICES AT KNH

Questionnaire Form S10

Outpatient dispensing Services

Designation: _____

Pharmacy No. _____

1. What is the nature of client served in the pharmacy?

- (a) KNH outpatient's only
- (b) Some KNH in patients
- (c) Private patients (i.e. patients from outside)

2. Are the following drugs present in the Pharmacy?

| | Yes | No |
|---------------------------------------|-----|----|
| (a) Amoxycillin | | |
| (b) Metronidazole | | |
| (c) Artemesinine/lumefantre (Coartem) | | |
| (d) ORS | | |
| (e) Cotrimoxazole | | |
| (f) Chloramphenicol | | |
| (g) Paracetamol | | |
| (h) Gentamicin | | |
| (i) Cloxacillin | | |
| (j) Clotrimazole | | |

3. How are the drugs arranged in the shelves?

- (a) Pharmacologically
- (b) Alphabetically
- (c) Other specify _____

4. How often is the pharmacy inspected to remove expired drugs?

- (a) Bimonthly
- (b) Monthly
- (c) Biannually

(d) Annually

(e) Never

5. Do you think the drugs available are adequate?

Yes No

6. Are you aware of good dispensing practices as specified by International pharmacists federation (FIP)?

Yes No

7. If Yes to 6i) above, name 2 requirements of good dispensing practices.

(a)

(b)