EVALUATION OF DRUG THERAPY PROBLEMS AND PHAMACIST'S INTERVENTION AT TWO PRIMARY HEALTH CARE FACILITIES IN DALA, KANO STATE

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By

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APRIL, 2017

DECLARATION

I declare that the work in this dissertation entitled: “Evaluation of drug therapy problems and pharmacist’s intervention at two primary health care facilities in Dala, Kano state” has been carried out by me in the department of clinical pharmacy. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this dissertation was previously presented for another degree or diploma at this or any other institution.

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Name of student	Signature	Date

CERTIFICATION

This dissertation entitled "EVALUATION OF DRUG THERAPY PROBLEMS AND PHARMACISTS INTERVENTION AT TWO PRIMARY HEALTH CARE FACILITIES IN DALA KANO STATE" by Najib BELLO meets the regulations governing the award of the degree of Master of Science Clinical Pharmacy of the Ahmadu Bello University and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This work is dedicated to Almighty Allah, then to my loving mother **Hindatu Ibrahim Albasu** and then my entire family

ACKNOWLEDGEMENT

My gratitude goes to Almighty Allah for enabling me with the life and strength to carry out this work. My multiple thanks and acknowledgement goes to my supervisors, Prof. B.B. Maiha, and Dr. S. Mohammed for their support, encouragement, sacrifice and constructive criticism. My sincere gratitude goes to my wife Pharm. Aishatu Shehu for her advisory role, guidance, support, patience, tolerance, endurance, sacrifices and support to achieve this work. My unreserved gratitude goes to the Head of Department of both Dala MCH and PHC Kurna (Ali Musa and Mairo Adamu Siya siya respectively) with their entire staffs, for their unique co-operation towards achieving this work. Let me acknowledge the supportive role the entire staffs of Najbel Pharmacy in Data collection and entry in both facilities, notable amongst them are Yusuf, Abubakar, Asma'u, Maimuna, Umma and Sister Olanike Obadare. I also acknowledge my mother Hajiya Hindatu Ibrahim Albasu and my father, Alhaji Bello Nasir, for their motherly and fatherly role respectively.

ABSTRACT

The consequences of drug related problems from Primary Healthcare facilities in Kano are so huge that there is need to address these issues. The aim of this study was to evaluate the types and frequency of drug therapy problems (DTPs), identify patient risk factors to DTPs as well as assess the impact of pharmacists' intervention on the observed DTPs. A prospective study was carried out in two primary health care centers using outpatient prescriptions to identify the DTPs and self-assessment questionnaires to assess risk factors to DTPs on the clients. Out of the total number of prescriptions sampled (400) from each of the two PHCs, about 75% of the prescriptions had DTPs before pharmacist's intervention, and after the intervention, the DTPs reduced to about 7%. Potential drug interaction was found to be the most prevalent DTP, followed by contraindication for drugs, then inappropriate duplication of therapeutic group. Other DTPs found present were insufficient awareness of health and diseases. These DTPs identified could be attributed to inadequate knowledge on drugs, disease processes and drug interaction. The self-assessment questionnaire indicated a high risk to drug related problems. The Pharmacists intervention had an impact on the DTPs identified and risk factors assessed. Findings suggest significant incidence of DTPs in PHC facilities indicating the need for comprehensive medication management approach by pharmacists.

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LIST OF ABBREVIATIONS AND ACRONYMS

%	Percentage
AIDS	Acquired Immune Deficiency Syndrome
CDC	Centre For disease control and prevention
CHEW	Community Health Extension Worker
CHO	Community Health Extension Worker
DTPs	Drug therapy problems
e.g	Examples
e.t.c	eccetera
FMOH	Federal ministry Of Health
LGA	Local Government area
PHC	Primary Healthcare
PHCs	Primary healthcare centres
SMOH	State Ministry Of Health
STG	Standard Treatment Guidelines
WHO	World Health Organization
NPHCDA	National primary healthcare development agency
WHO	World health organization
PCNE	Pharmaceutical care network Europe
MCH	Maternal and child health

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Primary Healthcare

Primary Health Care (PHC) is driven by a political philosophy that emphasizes a radical change in both the design and content of conventional health care services. It also advocates an approach to health care principles that allow people to receive health care that enables them to lead socially and economically productive lives (Dennil *et al*., 1999).

The Alma-Ata declaration of September, 1978 defined the concept of PHC as "essential care based on practical, scientifically sound and socially acceptable health care methods and technology, made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination". It forms an integral part both of the country's health system, of which it is the central function and main focus, and of the overall social and economic development of the community. It is the first level of contact for individuals, the family and the community within the national health system, bringing health care as close as possible to where people live and work, and constitutes health care services (WHO 2008). In addition, Alma-Ata declaration states that "any PHC program should include at least the following components, namely; education about prevailing health problems and methods of preventing and controlling them; the promotion of food supply and proper nutrition; an adequate supply of safe water and basic sanitation; maternal and child health care, including family planning and care of high risk groups; immunization against the major infectious diseases; prevention and

control of locally endemic diseases; appropriate treatment of common diseases and injuries and the provision of essential drugs, including vaccines". "Health is wealth" is not an understatement and the ultimate goal of primary health care is good health for all. Health care delivery is the fundamental responsibility of any government. Health care system in Nigeria is divided into three categories which are Primary, Secondary and Tertiary. The Tertiary health institutions are operated by the Federal Government involving Teaching hospitals and Federal Medical Centres in the country, the Secondary takes care of state hospitals referred to as general hospitals run by state governments while the last tier which is the primary is operated by the local governments.

Primary health care system has a wider coverage and is operated mostly in rural communities. It aims at improving the health status of patients at the grass roots through diagnosis and treatment of common diseases as well as other services as counselling and referrals. Other areas covered by PHC include health education, disease prevention and screening. In a nutshell a primary health care centre or facility is a small unit which provides a family with the health services other than those which can only be provided in a hospital. Primary health care covers, the primary health care centre, the primary health care clinic and the primary health care post (Alo *et al*., 2015). Health care delivery at the LGA is headed politically by a supervisory councillor then technically and administratively by a PHC coordinator and assisted by a deputy coordinator. The PHC coordinator reports to the supervisory councillor who in turn reports to the LGA chairman (Federal Ministry of Health, 2004). The different components of the LGA PHC are manned by personnel of diverse speciality. The LGA is running her PHC services delivery in compliance with the principles or

framework of the National Health Policy (Adeyemo, 2005). The LGA is divided into various health districts or wards so as to enhance maximum benefit of the principle of decentralisation of the health sector whereby people are involved to participate and mobilised in the PHC processes (Abdulraheem *et al*., 2012).

Despite the commitment of the Federal Government of Nigeria towards the implementation of PHC services there are a lot of factors militating against its development, among which has to do with inadequate training and re-training of medical personnel in the rural and urban areas as well as their uneven distribution. There has been too much concentration of medical personnel at the urban to the neglect of the rural areas. Another significant problem in the management of PHC is transportation. It has been reported in LGA PHCs that there are not enough vehicles for workers to perform their task especially to the rural areas. For example, Immunization outreach services are inadequately conducted. The maintenance culture of the existing vehicles is poor while PHC vehicles were used for other purposes other than health related activities. To put succinctly, many of the PHC vehicles donated by UNICEF in the 1980s are totally non-functional (Wunsch and Olowu, 1996).

Access to many parts of the communities is a function of natural topographical and weather conditions, inadequate finance; over dependence of the LGA on federal, state and international agencies for support because the internally generated revenue of the LGA is meager (Adeyemo, 2005); low level of community involvement (Omoleke, 2005), general misuse and abuse of the scarce resources by some political and administrative leadership and high leadership turnover at LGAs (Adeyemo, 2005).There are innumerable problems within primary health care delivery system which affect the whole population. An assessment of these problems and needs is

important to assure easy accessibility to health care services by rural people. Apparently, people living in remote areas show an adaptability that allows them to adjust to adverse conditions critical observation of some groups of nomads, for example the Fulanis and fishermen from the core northern states, the migrant Tiv farmers from Benue State, reveals satisfactory physical health and increasing resistance to disease or illness, but they are not without health problems (Adeyemo, 2005). The health and health-related problems of nomads, migrant farmers and rural people include the following:

i. Poverty associated with poor housing, unsatisfactory environmental sanitation, polluted water and food which predispose to malnutrition and infectious diseases.

ii. Uneven distribution of health services, and shortage of physicians, nurses and trained health personnel in rural areas.

iii. High mortality and low average life expectancy results partly due to lack of access to health services.

It is unfortunate that systematically collected data are lacking about levels of morbidity and mortality in rural communities. Despite the availability of PHC services, some rural dwellers in Nigeria tend to underuse the services due to perceptions of poor quality and inadequacy of available services (Abdulraheem *et al.,* 2012). Various reasons can be adduced for the underuse of the services provided: such as, difficulties associated with transportation and communications, high rates of illiteracy among rural peoples, traditional conservatism and resistance to ideas from outside, deep rooted traditions and customs, including health beliefs and practices, which increase the patronage of the services of traditional healers, lack of understanding of PHC among health professionals and decision-makers resulting in

poor quality services; and health worker attitude to work (frequent abstinence from the work place) (Adeyemo, 2005).

iv. A tendency to press older children into adult responsibilities early, resulting in psychological problems due to role conflicts.

v. Endemic diseases prevalence, such as malaria and trachoma.

vi. Zoonotic diseases as a result of their close contact with animals as part of their way of life.

Clearly most of the problems and needs of rural areas are multi-factorial in origin and require multidisciplinary interventions (Abiodun *et al*., 2010).

1.1.1 Role of pharmacists in primary healthcare

Pharmacists involved in primary health care participate in a team with other team members in the management of patients for whom medications are a focus of therapy. Pharmacists' responsibility is to optimize patients' medication therapy. Primary care pharmaceutical services recommendation should be designed to support the various components of the medication-use process (ordering, dispensing, administering, monitoring, and educating) as individual steps or as they relate to one another in the continuum of care. Pharmacists should evaluate all components of the medication-use process to optimize the potential for positive patient outcomes.

In general, pharmacists who participate in providing primary care to individual patients perform the following functions in collaboration with physicians and other members of the primary care team:

• Perform patient assessment for medication-related factors.

• Order laboratory tests necessary for monitoring outcomes of medication therapy.

• Interpret data related to medication safety and effectiveness.

• Initiate or modify medication therapy care plans on the basis of patient responses.

• Provide information, education, and counselling to patients about medication-related care.

• Document the care provided in patients' records.

• Identify any barriers to patient compliance.

• Participate in multidisciplinary reviews of patients' progress.

• Communicate with payers to resolve issues that may impede access to medication therapies.

• Communicate relevant issues to physicians and other team members.

Expanded primary care functions of pharmacists include all the functions previously described as well as:

• Provide individualized health promotion and disease prevention, including administration of immunizations where this is legally and organizationally authorized.

• Perform limited physical assessment and supervise medication therapy with appropriate collaborative drug therapy management authority (Abiodun *et al*., 2010).

1.2 Statement of Research Problem

1. DTPs have been identified to occur most frequently in children, women and geriatrics considering their vulnerability and proneness to ailments
2. DTPs have been established to influence therapeutic outcomes in various ways such as therapeutic failure, morbidity, economic burden and diseases complications.
3. There is anecdotal information as to the high frequency of DTPs in Primary Healthcare facilities due to the inadequacy of train personnel and high turnover of clients

4. Most of the DTPs are not the medical problem before visiting the facilities, but they arise in the course of therapy. The causes of these DTPs are numerous so prevention strategies should be designed and implemented to reduce the frequency to which they occur.

1.3 Justification for the Study

Drug-induced morbidity and mortality include all adverse effects for which drugs are the underlying cause (Minimo *et al*., 2008), including those attributable to acute poisoning by drugs (drug overdoses) and deaths from medical conditions resulting from chronic drug use (e.g., drug-induced Cushing's syndrome). A drug in this context includes illicit or street drugs (e.g., heroin and cocaine), as well as legal prescription and over-the-counter drugs; alcohol is not included. Deaths from drug overdose have increased sharply in the past decade (Minimo *et al*., 2008). This increase has been associated with overdoses of prescription opioid pain relievers, which have more than tripled in the past 20years, escalating to 16,651 deaths in the United States in 2010 (Jones *et al*., 2010). Most drug-induced deaths are unintentional drug poisoning deaths, with suicidal drug poisoning and drug poisoning of undetermined intent comprising the majority of the remainder (FMOH, 1992).

In 1984, it was discovered in Nigeria that an estimated 200,000 children died annually from preventable diseases of measles, tetanus, poliomyelitis, tuberculosis, whooping cough, and diphtheria (FMOH, 1992). A new approach was developed and implemented in all the states in 1985, with the goal of immunising 80% of children under two years of age, 50% of women against tetanus, and to reduce mortality from these diseases by 50% by 1990. Results of a nation-wide 1991 survey show that 95%

of children 12-23 months old were vaccinated with BCG, 81.1% with DPT 3\ OPV 3 and nearly 85% had measles vaccine. Nationally, the 80% target immunisation coverage was attained. Borno State had 85.9% coverage for BCG, DPT and measles (FMOH, 1992).

In terms of health situations, recent findings suggest little improvement in child survival in the 1980s, with child mortality 115 per 1000 exceeding infant mortality of 87 per 1000 during these periods which is rather unusual. A disheartening reality is the persistent high incidence of various infectious diseases, for example in 1985, 727 cases of cholera was reported, 838 in 1988, 1,057 in 1989 and 4,101 in 1991. Similarly, between 1986 and 1989, cerebrospinal meningitis ravaged many states, that by December of 1990 there were 78,904 reported cases. Between 1986 and 1990, major Yellow Fever epidemic occurred which affected about 21 states, with an estimated 16,126 reported cases and 3,633 deaths, with a case fatality rate of 22.5%. Some people suggested that these are conservative numbers, possibly 4 to 10 times higher. An epidemic thought to have started in June 1986 but only recognised in March 1987 (FMOH, 1991). There had been ten such epidemics since 1913, the most recent being the 1986 to 1990 occurrence. Yet, it was difficult to provide details of the epidemiology and control of a five year long problem. Ministry of health officials suggest epidemic was poorly controlled due to poor disease surveillance and notification, poor diagnosis and response time, insufficient vaccine, and poor logistic support for vaccination campaigns. A situation attributed to poor management, decision-making process and ineffective information system (FMOH, 1991).

In Kano State a recent study indicated that good compliance with drug treatment was observed in 54.2% of respondents and poor compliance among the remainder. Poor

compliance was found to be mainly due to ignorance on need for regular treatment (32.7%), lack of funds to purchase drugs (32.7%) and side effects of drugs (12.1%). Patients with formal education, and higher monthly income were more compliant to treatment. In addition, those on single drugs were more compliant compared to those on two or more drugs. Poor compliance was found to be mainly due to ignorance and lack of funds to purchase drugs (FMOH, 1991). In another research, as a comparison between a primary healthcare facility and a secondary healthcare facility in Kano state on drug utilisation studies, it was discovered that children are more vulnerable to drug adverse events related to use of drugs. The average number of drugs per prescription was significantly lower in secondary health facility compared to primary health facility. Also, the average consultation time was shorter in primary health facilities compared to secondary health facilities. Furthermore, the Percentage of drugs prescribed from Nigerian essential drug list was 89.78% and 91.79% in primary and secondary health facilities respectively. The use of injectables stands at 8.32% in primary health facilities as against 3.74% in secondary health facilities. Analysis of dispensing indicators showed that the secondary health facilities were significantly better than the primary health facilities (Chedi *et al*., 2015).

These are indicators that DTPs could be wide spread in PHC facilities, moreover, considering the non availability of pharmacists in those PHCs in Kano State.

1.4 Aim of the Study

The aim of this study is to identify and assess patients' risk factors to DTPs, as well as the impact of pharmacist intervention in two primary healthcare facilities in Dala Local Government Area, Kano State.

1.5 Specific Objectives

The specific objectives are to:

1. Identify the types and frequency of DTPs in two primary healthcare facilities in Dala L.G.A, Kano state.
2. Assess patients' risk factors to the DTPs in primary healthcare facilities.
3. Evaluate common factors causing DTPs in primary health care facilities.
4. Evaluate pharmacist's intervention outcomes.

1.6 Statement of Research Hypothesis

Pharmacists Intervention has no significant effect on the occurrence of DTP

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Pharmaceutical Care

Pharmaceutical care is defined as the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve the patient's quality of life. These outcomes include alleviation of symptoms and prevention, cure or slowing of progression of a disease. Other outcomes of interests include patient satisfaction, knowledge of disease state and management and improved health related quality of life (Hepler and Strand, 1990).

In pharmaceutical care, the direct relationship between pharmacists and patients is that of a professional covenant in which the patient's safety and wellbeing are entrusted to the pharmacist, who commits to honouring that trust through competent professional actions that are in the patient's best interest. As an accountable member of the health care team, the pharmacist must document the care provided. Economically, through pharmaceutical care, pharmacists prevent wastage of financial resources caused by prescription of wrong drugs and poly-pharmacy. Also when an expensive drug that could not be afforded by a patient is prescribed, the pharmacist brings his professional knowledge in choosing an alternative drug that is cheaper but equally effective (Hepler and Strand, 1990).

A pharmacist is required to review a patient's medication with reference to the physician's diagnoses and prescriptions, laboratory tests results and patient's information. The pharmacist must therefore work very closely with the physician and patient in order to gain a correct understanding of the relevance and impact of the various medications on the patient's pathology. It is the pharmacist's responsibility to

ensure that the patient is able to adhere to medication instructions in order to produce positive outcomes. Pharmacists have an important role to play in identifying DTPs, resolving actual DTPs, and preventing potential DTPs. This is achieved through collaboration with the patient, and other health care providers. In a DTP case, the patient, the physician, and the pharmacist must all agree that there is a problem and therapy is changed as a result. Pharmaceutical care is thus a multidisciplinary process, with regards to all the members of the healthcare delivery team. Potential and actual drug therapy problems can be identified through medication profile reviews. Prescriptions and a number of actual drug therapy problems can be resolved with patient counselling and recommendations to prescribers. A DTP if left unresolved prevents patients from realizing the full benefits of their drug therapy.

Adverse drug reactions are well documented in hospitalized and non-hospitalized patients, and they contribute substantially to morbidity and mortality. A study has shown that adverse drug reactions affect approximately 10-20% of hospitalized patients and around 7% of the general population (Onifade *et al*., 2013). In another study on the contribution of a clinical pharmacist to the improvement of medication at a geriatric hospital in Norway, drug-related problems identified were associated with drug choice including use of an unnecessary drug, non-optimal drug used, inappropriate drug name and route of administration (Onifade *et al*., 2013).

Many studies have shown that, through pharmaceutical care, the inclusion of a pharmacist in the evaluation of a patient's drug therapy regime improves therapeutic outcomes. The documentation of these drug therapy problems and the type of interventions taken by the pharmacists and the resultant outcomes of these interventions are of primary importance to assess the impact of pharmacists on patient

care. Evidence for this is lacking in the Nigerian pharmacy practice setting except for few studies on drug therapy problems associated with specific ailment such as diabetes in which wrong drug and adverse drug reaction were found to be the most frequently encountered drug therapy problems, and drug therapy problems in the elderly in which poly-pharmacy was the most encountered drug therapy problem (Onifade *et al*., 2013).

2.2 Drug Therapy Problems

A Drug Therapy Problem is an event or circumstance involving drug therapy that actually or potentially interferes with desired health outcomes. Prescription of drugs, which is done solely by the physicians in the hospitals, is intended for the treatment, prophylaxis or diagnosis of ailments. However, erroneous prescriptions may not only lead to therapeutic failure but cause other DTPs including exacerbation of patient health conditions and adverse drug reactions. (Ruscin *et al*., 2014)

The basic classification now has 6 primary domains for problems, 6 primary domains for causes and 5 primary domains for interventions

However, on a more detailed level there are 21 grouped sub domains for problems, 33 grouped sub domains for causes and 17 grouped sub domains can be regarded as explanatory for the principal domain (PCNE V5.01, 2006).

2.2.1 Drug-disease interactions

A drug given to treat one disease can exacerbate another disease regardless of patient age, but such interactions are of special concern in the elderly. Distinguishing often subtle adverse drug effects from the effects of disease is difficult and may lead to a prescribing cascade (Oparah, 2010).

A prescribing cascade occurs when the adverse effect of a drug is misinterpreted as a symptom or sign of a new disorder and a new drug is prescribed to treat it. The new, unnecessary drug may cause additional adverse effects, which may then be mis-interpreted as yet, another disorder and treated unnecessarily.

Many drugs have adverse effects that resemble symptoms of disorders common among the elderly or changes due to aging. The following are examples:

- Anti-psychotics may cause symptoms that resemble Parkinson disease. In elderly patients, these symptoms may be diagnosed as Parkinson disease and treated, possibly leading to adverse effects from the anti-Parkinson drugs (e.g., orthostatic hypotension, delirium, nausea).
- Cholinesterase inhibitors (e.g., donepezil) may be prescribed for patients with dementia. These drugs may cause diarrhoea or urinary incontinence. Patients may then be prescribed an anticholinergic drug (e.g., oxybutynin) to treat the new symptoms. Thus, an unnecessary drug is added, increasing the risk of adverse drug effects and drug-drug interactions. A better strategy is to reduce the dose of the cholinesterase inhibitor or consider a different treatment for dementia (e.g., memantine) with a different mechanism of action.

In elderly patients, prescribers should always consider the possibility that a new symptom or sign is due to drug therapy.

2.2.2 Drug-drug interactions

The elderly often take many drugs which often results to vulnerability to drug-drug interactions. The elderly also frequently use medicinal herbs and other dietary

supplements and may not tell their health care providers. Medicinal herbs can interact with prescribed drugs and lead to adverse effects. For example, *Ginkgo biloba* extract taken with warfarin can increase risk of bleeding and St. John's wort taken with a Selective Serotonin Re-uptake Inhibitors (SSRIs) can increase risk of serotonin syndrome. Therefore, physicians should ask patients specifically about dietary supplements, including medicinal herbs and vitamin supplements.

Drug-drug interactions in the elderly differ little from those in the general population. However, induction of cytochrome P-450 (CYP450) drug metabolism by certain drugs (e.g., phenytoin, carbamazepine, and rifampin) may be decreased in the elderly; therefore, the change (increase) in drug metabolism may be less pronounced in the elderly. Many other drugs inhibit CYP450 metabolism and thus increase the risk of toxicity of drugs that depend on that pathway for elimination. The elderly typically use a larger number of drugs, they are at greater risk of multiple, difficult-to-predict CYP450 interactions. Also, concurrent use of drug with similar adverse effects can increase risk or severity of adverse effects. (Ruscin *et al*., 2014)

2.2.3 Inadequate monitoring

The act of monitoring drug use involves;

- Documenting the indication for a new drug
- Keeping a current list of drugs used by the patient in medical records
- Monitoring for achievement of therapeutic goals and other responses to new drugs
- Monitoring necessary laboratory tests for efficacy or adverse effects
- Periodically reviewing drugs for continued need

Such measures are especially important for elderly patients. Lack of close monitoring, especially, after new drugs are prescribed, increases risk of adverse effects and ineffectiveness.

2.2.4 Inappropriate drug selection

A drug is inappropriate if its potential for harm is greater than its potential for benefit. Inappropriate use of a drug may involve;

- Choice of an unsuitable drug, dose, frequency of dosing, or duration of therapy
- Duplication of therapy
- Failure to consider drug interactions and correct indications for a drug
- Appropriate drugs that are mistakenly continued once an acute condition resolves (as may happen when patients move from one health care setting to another)

Adverse effects of inappropriate drugs account for about 7% of emergency hospitalizations for patients ≥ 65 years, and 67% of these hospitalizations are due to four(4) drugs or drug classes—warfarin, insulin, oral antiplatelet drugs, and oral hypoglycaemic drugs (Oparah, 2010). Some classes of drugs are of special concern in the elderly. Some drugs are so problematic that they should be avoided altogether in the elderly, some should be avoided only in certain situations, and others can be used but with increased caution. Clinicians must weigh benefits and risks of therapy in each patient.

In practice, inappropriate drugs are still being prescribed for the elderly; typically, about 20% of community-dwelling elderly received at least one inappropriate drug. In

such patients, risk of adverse effects is increased. In nursing home patients, inappropriate use also increases risk of hospitalization and death. In one study of hospitalized patients, 27.5% received an inappropriate drug. Some inappropriate drugs are available OTC; thus, clinicians should specifically question patients about use of OTC drugs and tell patients about the potential problems such drugs can cause. The elderly are often given drugs (typically, analgesics, H_2 blockers, hypnotics, or laxatives) for minor symptoms (including adverse effects of other drugs) that may be better treated non-pharmacologically or by lowering the dose of the drug causing adverse effects. Initiating additional drugs is often inappropriate; benefit may be low, costs are increased, and the new drug may lead to additional toxicity (Oparah, 2010).

2.2.5 Lack of patient adherence

Drug effectiveness is often compromised by lack of patient adherence especially among the ambulatory elderly. Adherence is affected by many factors but not by age alone. Up to half of elderly patients do not take drugs as directed, usually taking less than prescribed (under adherence). Causes are similar to those for younger adults. In addition, the following contribute:

- Financial and physical constraints, which may make purchasing drugs difficult
- Cognitive problems, which may make taking drugs as instructed difficult
- Use of multiple drugs
- Use of drugs that must be taken several times a day or in a specific manner
- Lack of understanding about what a drug is intended to do (benefits) or how to recognize and manage adverse effects (Oparah, 2010).

A regimen using too frequent or too infrequent dosing, multiple drugs, or both may be too complicated for patients to follow. Clinicians should assess patients' health literacy and abilities to adhere to a drug regimen (e.g., dexterity, hand strength, cognitionand vision) and try to accommodate their limitations by arranging for or recommending easy-access containers, drug labels and instructions in large type, containers equipped with reminder alarms, containers filled based on daily drug needs, reminder telephone calls, or medication assistance. Pharmacists and nurses can help by providing education and reviewing prescription instructions with elderly patients at each encounter. Pharmacists may be able to identify a problem by noting whether patients obtain refills on schedule or whether a prescription seems illogical or incorrect (Cipolle *et al*., 2013).

2.2.6 Overdosage

An excessive dose of an appropriate drug may be prescribed for elderly patients if the prescriber does not consider age-related changes that affect pharmacokinetics and pharmacodynamics. For example, doses of renally cleared drugs should be adjusted in patients with renal impairment.

Generally, although dose requirements vary considerably from person to person, drugs should be started at the lowest dose in the elderly. Typically, starting doses of about one third to one half the usual adult dose are indicated when a drug has a narrow therapeutic index or when another condition may be exacerbated by a drug. The dose is then titrated upward as tolerated to the desired effect. When the dose is increased, patients should be evaluated for adverse effects, and drug levels should be monitored when possible. Over dosage can also occur when drug interactions increase the

amount of drug available or when different practitioners prescribe a drug and are unaware that another practitioner prescribed the same or a similar drug (therapeutic duplication).

2.2.7 Poor communication

Poor communication of medical information at transition points (from one health care setting to another) causes up to 50% of all drug errors and up to 20% of adverse drug effects in the hospital (Cipolle *et al*., 1998). When patients are discharged from the hospital, drug regimens that were started and needed only in the hospital (such as sedative hypnotics, laxatives, proton pump inhibitors and so on) may be unnecessarily continued by another prescriber, who is reluctant to communicate with the previous prescriber. Conversely, at admission to a health care facility, lack of communication may result in unintentional omission of a necessary maintenance drug.

2.2.8 Underprescribing

Appropriate drugs may be under prescribed, that is, not used for maximum effectiveness. Under prescribing may increase morbidity and mortality and reduce quality of life. Drugs that are often under prescribed in the elderly include those used to treat depression, Alzheimer disease, pain (e.g., opioids), heart failure, post-myocardiac infarction (β-blockers), atrial fibrillation (warfarin), hypertension, glaucoma and incontinence. Also, immunizations are not always given as recommended (Cipolle *et al*., 1998).

In elderly patients with a chronic disorder, acute or unrelated disorders may be undertreated (e.g., hypercholesterolemia may be undertreated in patients with

emphysema). Clinicians may withhold these treatments because they are concerned about increasing the risk of adverse effects or the time required to benefit from treatment. Clinicians may think that treatment of the primary problem is all patients can afford or want to handle or that patients cannot afford the additional drugs. Patients should participate in decision making about drug treatment so that clinicians can understand patients' priorities and concerns.

These drug therapy problems can be prevented through therapeutic interventions by pharmacists. The role of pharmacists in health care delivery continues to evolve from dispensing functions to greater involvement in pharmaceutical care. Pharmaceutical care is a concept that deals with the way patients should receive instructions for the use of drugs, responsibilities of patients and medical professionals, medication surveillance, counselling and outcomes of care (Onifade *et al*., 2013).

2.3 Causes of DTPs

The causes of DTPs are multi-factorial and their assessment has been based on factors such as: inappropriate prescribing, inappropriate delivery, inappropriate patient behaviour, Patient idiosyncrasy, and inappropriate monitoring

It has also been pointed out that five drug related need of patients that has resulted in drug therapy problems are; appropriate indication, effectiveness, safety, adherence/ compliance and undertreated indication (Cipolle *et al*., 1998).

2.4 Epidemiology

Epidemiology is the study of the distribution and determinants of health-related states or events (including diseases), in specified populations, and the application of this

study to the control of diseases and other health problems. Various methods can be used to carry out epidemiological investigations. Surveillance and descriptive studies can be used to study distribution while analytical studies are used to study determinants (WHO, 2008).

In Nigeria, Benin City a study was conducted to identify DTPs in Diabetic patients and the results showed prevalence in male patients than in female patients. There were varying diagnosis and several co-morbidities and/or complications. All the diabetic patients experienced DTPs (potential or actual) which could have been easily identified by a clinically trained pharmacist. The findings of this study suggest a high incidence of DTP in the health facility and this makes a case for the presence of a pharmacist who is trained in the pharmaceutical care of diabetes in our healthcare system to help identify, prevent and resolve DTPs (Odili *et al*., 2011).

According to another study conducted in Ambo Hospital, West Shoa, Ethiopia, (2014), most hypertensive patients had DTP. There were 200 numbers of DTPs. The number of DTP per patient was 1.32 + 0.47 associated with serious indication problem (Gobezie *et al*., 2015).

2.5 ASSESSMENT OF DRUG THERAPY PROBLEM

Pharmacists should acquire the skills to identify potential and actual drug therapy problems better than anyone else (Oparah, 2010). Relevant patient data must be acquired and critical thinking skills are applied. Compare all medications with the medical conditions or complaints to ascertain that every medication is treating a condition and that every condition is being treated with or without a medication. The pertinent questions that should be addressed by the pharmacist are:

- Is there a need for a medication? i.e. indication if No, Unnecessary Drug therapy (A)
- If yes, is the medication safe and efficacious for the condition? If No, wrong drug (B)
- If yes, are the dose, frequency and duration appropriate? If no, dosage too low (C) or Dosage too high (D)
- If yes, is the patient likely to experience adverse drug reaction? If yes, adverse drug reaction(E)
- Is there a likelihood of drug interaction? If yes, drug interaction(F)
- Is patient adherence appropriate? If no, inappropriate adherence (G)
- Is there any condition/complaint that requires a medication but receiving none? If yes, untreated indication/additional drug therapy (H) (Oparah, 2010).

2.6 Primary Healthcare

2.6.1 History of Primary Health Care in Nigeria

In 1988, the Military Administration of President Babangida launched the National PHC scheme; which was to be a collaborative effort of the three tiers of government. It should be people-oriented in that it strives to develop local capabilities, initiatives and to promote self-reliance. This was for the realization of sustainable improvement in the health of the people. Health services delivery in Nigeria had its historical antecedents. It had evolved through a series of developments including a succession of policies and plan, which had been introduced by previous administrations (Oyewo, 1991).

The historical epoch of Nigerian health sector was traced beyond the organized colonial period and asserted that maternal and child care of pre-colonial period though

primitive, compared to the orthodox medical care, served the people with precise efficiency which was proportional to their level of development. It is evident that public health services in Nigeria, mostly originated from the British army medical services. The integration of the army with the colonial government, leads to the extension of the medical care to the general population (Oyewo, 1991).

Four successive National health policy development plans were enacted; beginning with the first ten year National health policy development plan (1946 – 1956), which had a number of deficiencies and mainly controlled by expatriates; followed by the second National health policy development plan (1970–1974) which focused on addressing some of the deficiencies in the healthcare delivery services. The Third National Development Plan of 1975 – 1980 was aimed at expanding the proportion of the population receiving health care up to 60% from 25% of the population. The fourth National development plan too, made the basic health service scheme the core of its orientation in the health sector (Oyewo, 1991).

The main objectives of the Basic Health service scheme policy was to (a) initiate the provision of adequate and effective health facilities and care for the entire population; (b) correct the imbalance between preventive and curative care; (c) provide the infrastructures for all preventive health programmes such as control of communicable diseases, family health, environmental health, nutrition and others;(d) establish a health care system best adapted to the local conditions and to the level of health technology in the country (Oyewo, 1991).

Subsequently, during General Babangida's administration and Professor Olukoye Ransome- Kuti as Minister of health, they brought about the encouragement of PHC Directorate in the Federal Ministry of Health, which was charged with the

responsibility for formulating, developing and implementing the National PHC System in line with the recommendation of the 1988 International Conference on PHC (NPHCDA, 2012).

2.6.2 Features of PHC

In Nigeria, there are three (3) basic types of PHC;

i. Dispensary and health post: here minor treatments are giving to patients. It provide easy access to residents.
ii. Maternal and child health centres: This health institution provides service in gynaecology, family planning and nutrition.
iii. Health clinic and comprehensive health centres: This is the type of institution that provides in-patient services and is focussed on common diseases and antenatal care services (Kibon and Ahmed, 2013).

2.6.3 Components of Primary Health Care

There are 10 components of PHC. They includes: i. Education concerning prevailing health problems and the methods of preventing and controlling them. ii. Promotion of food supply and proper nutrition. iii. Adequate supply of safe water and basic sanitation. iv. Material and child health care including family planning. v. Immunization against the major infectious diseases. vi. Prevention and control of locally endemic diseases. vii. Appropriate treatment of common diseases and inquiries viii. Provision of essential drugs. ix. Community mental health care. x. Dental Health Being that health is more than just delivery of medical services; it is to be enjoyed by the people as a fundamental human right. This is the principle upon which PHC was founded (Adeyemo, 2005).

Primary Health Care system attempts to address peoples, "health needs" by integrating sectors such as agriculture, education, housing, social and medical services. PHC also acknowledges that the major killer diseases in children under five are preventable, as such, a shift to rural from the urban centres is the focus of PHC, through the utilisation of Community health workers as key personnel, then the traditional healers, traditional birth attendants or midwives in the village to render services.

As a compliment, the concept of village health committee was employed, composing of residents to aid the PHC system. These committees partake in the management of the PHC systems (Adeyemo, 2005).

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study Area and Setting

Kano state located in the North-western political zone of Nigeria ($11^0$30'N,8^o30'E), has a total area of 20,131km^2 and is the most populous state in Nigeria. The state has a population of about 10,000,000 persons (NPC 2006), out of which about 40% are children under the age of 12 years. Kano state, boarders Katsina state to the northwest, Jigawa state to the northeast, Bauchi state to the southeast, and Kaduna state to the southwest. The state located at 481 meters above sea-level, features savannah vegetation and a hot, semi-arid climate. Kano is typically very hot throughout the year, though from December through February, the city is noticeably cooler. Night time temperatures are cool during the month of December, January and February, with average low temperatures ranging from 11^0-14^0C. Being the largest commercial centre in the northern part of the country, Kano is cosmopolitan in nature with Hausa and Fulani as the dominant tribe.

The healthcare system in the state is divided into a Public (governmental), private and faith based sectors. The public system is classified as primary, secondary, and tertiary. The healthcare personnel in Kano have different educational backgrounds, with training from different parts of Nigeria and other countries.

Dala Local Government is one out of 44 Local Government areas (LGA) of Kano State in Northern Nigeria with a Land mass area of 19km². It has 9 facilities out of a total of 69 PHC facilities in Kano State Dala LG has a population of 418,777.The primary health care centres in Kano, also known as comprehensive healthcare

facilities are owned and operated by the Kano State Government, managed by Kano State Primary Healthcare Management Board (KSPHCMB).

3.1.1 Study population and Sample size

The study population comprised of all the Out-patient Department (OPD) healthcare practitioners in the two facilities and all the clients that were seen at the facilities selected within the study period and for whom drugs were prescribed. Around Forty (40) prescriptions were assessed daily until the calculated sample size of 400 was reached in each facility for assessment, for the pre-intervention studies while 200 prescriptions were collated and studied for the post-intervention studies, making a total sample size of 600 in each facility.

The number of patients consulted within the study period of 3 month is 4500 (population size)

For a population greater than 10,000

$n = Z^2P (1-P) / w^2$

n = required sample size

Z = standard deviation, 1.96

P = Proportion of population with similar characteristics, 0.5 (50%)

w = margin of error, 0.05 (5%)

$n = 1.96^2 \times 0.5 (1-0.5) / (0.05)^2$

n = 384

For a population of 4500;

Nf = n/(1+(n/N)

Nf = 384/(1 +(384/4500)

Nf = 353

(Degu and Yigzaw, 2006)

Adding 10% of this, to take care of attrition

353+35=388

The sample size used for this study was 400

3.1.2 Inclusion criteria

All out-patients prescriptions within the study period (April 2016 to June 2016) were included for the study prospectively. Out-patients visiting the facility were administered questionnaire. Only patients that have consented were involved.

3.1.3 Exclusion criteria

Patients who did not give consent were excluded in this study, prescription with incomplete data were also excluded. Patients who withdrew consent were also not included in this study.

3.1.4 Ethical consideration

Ethical approval was obtained from KSPHCMB Ethics Committee (Appendix II) while informed consent (Appendix III) was obtained from the patients in the prospective study.

3.2 Study Design

Two PHC facilities namely Dala Maternal and Child Health (Dala MCH) clinic, (Appendix VIII) and Kurna Primary Healthcare Clinic (Kurna PHC),(Appendix IX) were selected. The study was conducted prospectively in two phases.

Phase 1: The pre-intervention studies were carried out using outpatient prescriptions card (Appendix XII and XIII) mainly for women and children, issued during the

period of April 2016 to June 2016. The prescriptions were selected using purposeful sampling and simple random sampling and compared with the standard DTP-Registration Form V5.01 (PCNE Classification, 2006) (Appendix 1). The DTPs were identified with the aid of The Standard Treatment guidelines for CHEW/CHO (Appendix V).

Four hundred (400) outpatients that visited the clinics were issued 10 item assessment questionnaire developed by Levy *et al.,* 2003, to assess risk to drug therapy problems (Appendix IV). The questionnaire was administered to the patients and the corresponding answer ticked.

Phase 2: An intervention was designed based on the outcomes of the drug therapy problems observed in Phase 1. Information, education and communication (I.E.C) materials (Appendix VI) were employed for the intervention (Appendix X) and (Appendix XI). The impact of the intervention was assessed on the Prescribers via: administering a Pre-test and Post-test and Post Intervention DTPS prescriptions were examined to assess the impact of intervention on the prescribers. (Appendix VII)

3.3 Data Collection Tools

A standardized, DTP-Registration Form V5.01 (PCNE Classification, 2006) (See appendix I for PCNE Classification form).

A questionnaire was used to assess patient's risk factors to drug therapy problems as developed by Levy (2003).

3.4 Data Analysis

The data collected were entered into Microsoft Excel for easy sorting and were double checked to ensure accurate data entry. DTPs were classified based on the categories

given by PCNE classification and analysed using SPSS version 20.0. Results were presented in form of charts and tables where necessary.

Student t-test was used to compare the two facilities, where difference of $p \leq 0.05$ was considered significant statistically

CHAPTER FOUR

4.0 RESULT

4.1 Categories of Drug Therapy Problems that occurred in Maternal and Child Health Dala before and after intervention

The most frequently occurring drug therapy problems base on ‘problems’ at MCH Dala before intervention is potential drug interactions 92 (31.4%), followed by contra indication for drug 50 (17.1%) and then inappropriate duplication of therapeutic group or active ingredients of 35 (11.9%). After intervention, the potential drug interactions dropped to 4 (7.1%), contra indication for drug 2 (3.6%) and inappropriate duplication of therapeutic group or active ingredients of 4 (7.1%), (Table 4.1).

While the most frequently occurring DTPs based on ‘causes’ before intervention is in-appropriate drug selection 151 (57.4%), followed by pharmacokinetic problems including ageing/deterioration in organ function and interaction 51 (19.4%) , then Drug overused/ over administered 27 (10.3%). After intervention, the Inappropriate drug selection dropped to 32 (47.1%), pharmacokinetic problems including ageing/deterioration in organ function and interaction dropped to 18 (26.5%) and drug overused/over administered dropped to 0 (0%), (Table 4.2).

On the other hand, the most frequently occurring DTPs based on ‘interventions’ at MCH Dala is prescriber informed only at 165 (42.5%), followed by ‘drug changed to’ 110 (28.4%) and then ‘drug stopped’ 29 (20.4%) before intervention. After intervention, ‘prescriber informed only’ dropped to 48 (53.3%), ‘drug changed to’dropped to 16 (17.8%) and ‘drug stopped’ changed to 4 (4.4%), (Table 4.3).

Table 4.1: Drug Therapy Problems Classified Based On Problems Pre And Post Intervention In MCH Dala

CODES	PROBLEMS	PI F (%)	POI F (%)
P1.1	Side effects suffered (non- allergic)	9(3.1)	0(0)
P1.3	Toxic effects suffered	3(1.0)	0(0)
P2.1	Inappropriate drug (not most appropriate for indication)	32(10.9)	20(36)
P2.2	Inappropriate drug form (not most appropriate for indication)	1(0.3)	0(0)
P2.3	Inappropriate duplication of therapeutic group or active ingredients	35(11.9)	4(7.1)
P2.4	Contraindication for drug (Pregnancy/Breast Feeding)	50(17.1)	2(3.6)
P2.5	No clear indication for drug use	17(5.8)	0(0)
P2.6	No drug prescribed but clear indication	21(7.2)	16(28.6)
P3.1	Drug dose too low or dosage regimen not frequent enough	7(2.4)	0(0)
P3.2	Drug dose too high or dosage regimen too frequent	13(4.4)	10(17.9)
P3.3	Duration of treatment too short	6(2.0)	0(0)
P3.4	Duration of treatment too long	2(0.7)	0(0)
P5.1	Potential Interaction	92(31.4)	4(7.1)
P6.2	Insufficient awareness of health and diseases	5(1.7)	0(0)

Data presented as frequencies(F) and percentages (%), comparison between pre-intervention (PI) and post-intervention(POI) of Drug therapy problems (DTP) using paired sample t-test. There is statistical significant reduction in ‘’problems’’ of DTPs, p=0.013, CF= 0.251, n = 400 in each case. MCH = Maternal and Child health.

Table 4.2: Drug Therapy Problems Classified Based On 'Causes' Pre And Post Intervention In MCH Dala

CODES	CAUSES	PI F (%)	POI F (%)
C1.1	Inappropriate drug selection	151(57.4)	32(47.1)
C1.2	Inappropriate dosage selection	3(1.1)	4(5.9)
C1.4	Pharmacokinetic problems including ageing/deterioration in organ function& interaction	51(19.4)	18(26.5)
C1.5	Synergistic/Preventive drug required and not given	2(0.8)	0(0)
C1.6	Deterioration/ improvement of disease state	6(2.3)	2(2.9)
C1.8	Manifest side effect , no other cause	2(0.8)	0(0)
C2.1	Inappropriate timing of administration &/or dosing intervals	1(0.4)	0(0)
C2.2	Drug under used/ under administration	6(2.3)	2(2.9)
C2.3	Drug overused/ over administered	27(10.3)	0(0)
C3.2	patient unaware of reason for drug treatment	1(0.4)	0(0)
C5.1	Prescribed drug not available anymore	1(0.4)	0(0)
C5.2	Prescribing error	0(0)	0(0)
C6.1	other cause/specify	1(0.4)	0(0)
C6.2	No obvious cause	11(4.2)	10(14.7)

Data presented as frequencies(F) and percentages (%), comparison between pre-intervention (PI) and post-intervention(POI) of Drug therapy problems (DTP) using paired sample t-test. There is statistical significant reduction in ''causes'' of DTPs, p=0.000, CF= 0.934, n = 400 in each case.MCH = Maternal and Child health.

Table 4.3: Drug Therapy Problems Classified Based On 'Interventions' Pre And Post Intervention In MCH Dala

CODES	INTERVENTION	P I F (%)	POI F (%)
I1.1	Prescriber informed only	165(42.5)	48(53.3)
I1.2	Prescriber asked for information	1(0.3)	0(0)
I3.1	Drug changed to…	110(28.4)	16(17.8)
I3.2	Dosage changed to…	15(3.9)	16(17.8)
I3.4	Instructions for use changed to…	0(0)	0(0)
I3.5	Drug stopped	79(20.4)	4(4.4)
I3.6	New drug started	18(4.6)	6(6.7)

Data presented as frequencies(F) and percentages (%), comparison between pre-intervention (PI) and post-intervention(POI) of Drug therapy problems (DTP) using paired sample t-test. There is statistical significant reduction of'' intervention'' of DTPs, p=0.022, CF= 0.825, n = 400 in each case.MCH = Maternal and Child health.

4.2 Comparison between pre and post interventions of Drug therapy problems at MCH Dala

Comparison between pre and post intervention on overall drug therapy problems comprising of problems, causes and interventions as observed in MCH Dala. There was statistical significant difference of ($p \leq 0.001$) indicating the impact of intervention on the occurrence of DTP using paired sample t test (Table 4.4).

TABLE 4.4: Comparison Between Pre And Post Interventions Of Drug Therapy Problems At MCH Dala

Assessments	Mean number of DTPs±SEM	Level of significance	Correlation
Pre-intervention	26.97± 7.178		
		0.001	0.796
Post –intervention	3.06± 0.896		

Data are presented as mean ± SEM, and analysed using paired sample t-test. $p<0.001$
DTPs = Drug therapy problems, MCH = Maternal and Child health. n=400

4.3 Categories of Drug Therapy Problems that occurred in PHC Kurna before and after intervention

The most frequently occurring drug therapy problems base on ‘problems’ at PHC Kurna before intervention is potential drug interactions 138 (30.7%), followed by insufficient awareness of health and diseases 63 (14.0%) and then contraindication for drug (Pregnancy/Breast Feeding) 57 (12.7%). After intervention, the potential drug interactions dropped to 10 (35.7%), insufficient awareness of health and diseases to 0 (0%) and then contraindication for drug (Pregnancy/Breast Feeding) to 0 (0%) (Table 4.5).

While the most frequently occurring DTPs based on ‘causes’ at PHC Kurna before intervention is in-appropriate drug selection 196 (45.9%), followed by pharmacokinetic problems including ageing/deterioration in organ function and interaction 146 (34.2%) and then drug underused/ under administered 11 (2.6%). The Inappropriate drug selection dropped to 22 (100%) after intervention, pharmacokinetic problems including ageing/deterioration in organ function & interaction dropped to 0 (0%) and drug underused/under administered reduced to 0% (Table 4.6).

The most frequently occurring DTPs based on ‘interventions’ at PHC Kurna is prescriber informed only at 268 (41.6%), followed by ‘drug changed to’ 161 (25%) and then ‘drug stopped’ 104 (16%) before intervention. After intervention, ‘prescriber informed only’ dropped to 26 (52%), ‘drug changed to’ dropped to 14 (28%) and ‘drug stopped’ changed to 0 (0%), (Table 4.7).

Table 4.5: Drug Therapy Problems Classified Based On Problems Pre And Post Intervention In PHC Kurna

CODES	PROBLEMS	P I F (%)	POI F (%)
P1.1	Side effects suffered (non- allergic)	4(0.9)	2(7.1)
P1.3	Toxic effects suffered	0(0)	0(0)
P2.1	Inappropriate drug (not most appropriate for indication)	44(9.8)	14(50)
P2.2	Inappropriate drug form (not most appropriate for indication)	0(0)	0(0)
P2.3	Inappropriate duplication of therapeutic group or active ingredients	39(8.9)	0(0)
P2.4	Contraindication for drug (Pregnancy/Breast Feeding)	57(12.7)	0(0)
P2.5	No clear indication for drug use	26(5.8)	0(0)
P2.6	No drug prescribed but clear indication	27(6.0)	2(7.1)
P3.1	Drug dose too low or dosage regimen not frequent enough	27(6.0)	0(0)
P3.2	Drug dose too high or dosage regimen too frequent	16(3.6)	0(0)
P3.3	Duration of treatment too short	6(1.3)	0(0)
P3.4	Duration of treatment too long	2(0.4)	0(0)
P5.1	Potential Interaction	138(30.7)	10(35.7)
P6.2	Insufficient awareness of health and diseases	63(14.0)	0(0)

Data presented as frequencies(F) and percentages (%), comparison between pre-intervention (PI) and post-intervention(POI) of Drug therapy problems (DTP) using paired sample t-test, there is statistical significant reduction in ‘’problems’’ of DTPs, p=0.006, CF= 0.553, n = 400 in each case.PHC = Primary healthcare

Table 4.6: Drug Therapy Problems Classified Based On 'Causes' Pre And Post Intervention In PHC Kurna

CODES	CAUSES	PI F (%)	POI F (%)
C1.1	Inappropriate drug selection	196(45.9)	22(100)
C1.2	Inappropriate dosage selection	29(6.8)	0(0)
C1.4	Pharmacokinetic problems including ageing/deterioration in organ function& interaction	146(34.2)	0(0)
C1.5	Synergistic/Preventive drug required and not given	9(2.1)	0(0)
C1.6	Deterioration/ improvement of disease state	7(1.6)	0(0)
C1.8	Manifest side effect , no other cause	1(0.2)	0(0)
C2.1	Inappropriate timing of administration &/or dosing intervals	8(1.9)	0(0)
C2.2	Drug under used/ under administration	11(2.6)	0(0)
C2.3	Drug overused/ over administered	10(2.3)	0(0)
C3.2	patient unaware of reason for drug treatment	0(0)	0(0)
C5.1	Prescribed drug not available anymore	0(0)	0(0)
C5.2	Prescribing error	6(1.4)	0(0)
C6.1	other cause/specify	1(0.2)	0(0)
C6.2	No obvious cause	3(0.7)	0(0)

Data presented as frequencies(F) and percentages (%), comparison between pre-intervention (PI) and post-intervention(POI) of Drug therapy problems (DTP) using paired sample t-test, there is statistical significant reduction in ''causes'' of DTPs, p=0.001, CF= 0.784, n = 400 in each case.PHC = Primary healthcare

Table 4.7: Drug Therapy Problems Classified Based On 'Interventions' Pre And Post Intervention In PHC Kurna

CODES	INTERVENTION	P I F (%)	POI F (%)
I1.1	Prescriber informed only	268(41.6)	26(52)
I1.2	Prescriber asked for information	0(0)	0(0)
I3.1	Drug changed to…	161(25)	14(28)
I3.2	Dosage changed to…	67(10.4)	8(16)
I3.4	Instructions for use changed to…	2(0.3)	0(0)
I3.5	Drug stopped	104(16)	0(0)
I3.6	New drug started	43(6.7)	2(4)

Data presented as frequencies(F) and percentages (%), comparison between pre-intervention (PI) and post-intervention(POI) of Drug therapy problems (DTP) using paired sample t-test,There is statistical significant reduction in ''intervention''of DTPs,p=0.043, CF= 0.921, n = 400 in each case. PHC = Primary healthcare

4.4 Comparison between Pre And Post Interventions of Drug therapy Problems at PHC Kurna

Comparison between pre and post intervention on overall drug therapy problems comprising of Problems, causes and interventions as observed in PHC Kurna, It showed significant statistical difference of ($p \leq 0.000$) indicating the impact of intervention on the occurrence of DTP using paired sample t test (Table 4.8).

TABLE 4.8: Comparison Between Pre And Post Interventions of Drug therapy Problems at PHC Kurna

Assessments	Mean number of DTPs± SEM	Level of significance	Correlation
Pre-intervention	43.46± 10.924		
		0.000	0.829
Post –intervention	1.43± 0.896		

Data are presented as mean ± SEM, and analysed using paired sample t-test. $p<0.000$
DTPs = Drug therapy problems, PHC = Primary healthcare n=400

4.5 Demographic information of respondents in MCH Dala and PHC Kurna

The most occurring respondent age in MCH Dala and PHC Kurna was 0-4 years with frequency of 150 and 120 respectively. The most occurring Gender group in MCH Dala and PHC Kurna were females with frequency of 204 and 274 respectively. The most occurring marital Status of married and single in MCH Dal is 159 and 241 while at PHC Kurna is 154 and 220 respectively. The most occurring educational status in MCH Dala and PHC Kurna were clients with no formal education standing at a frequency of 206 and 285 respectively. The range of diseases suffered by respondents at MCH Dala and PHC Kurna are as follows Diabetes: 0 and 1, Hypertension: 15 and 6, Peptic ulcer disease: 30 and 50, Enteric fever: 41 and 174, Malaria: 203 and 174, other diseases: 111 and 150 respectively. The major occupational status are housewives at MCH Dala 155, while at PHC Kurna is 147 (Table 4.9)

Table 4.9 Demographic information of respondents in MCH Dala and PHC Kurna

NO.	CHARACTERISTICS	VARIABLE	MCH DALA	PHC KURNA
			FREQUENCIES	n= 400
1	AGE	0-4	150	120
		5-9	45	35
		10-14	47	40
		15-19	40	39
		20-24	35	65
		25-29	39	55
		Above 30	44	46
2.	SEX	Male	196	126
		Female	204	274
3.	MARITAL STATUS	Married	159	154
		Single	241	220
		Widow	0	0
		Divorced	0	0
4.	EDUCATIONAL STATUS	Primary	66	66
		Secondary	119	43
		Tertiary	9	6
		NFE	206	285
5	OCCUPATIONAL STATUS	Housewife	155	147
		Student	60	68
		Bussiness	4	3
		C/servants	0	3
		Others	181	179
6	DISEASE SUFFERED	Diabetic	0	1
		Hypertension	15	6
		PUD	30	19
		Typhoid	41	50
		Malaria	203	174
		Others	111	150

KEY:MCH= Maternal and child health, PHC= Primary healthcare ,PUD= Peptic ulcer diseases, NFE= No formal education, C/servants= Civil servants,

4.6 Outpatients' Response to Self-Assessment Questionnaires to Identify Risk Factors for Drug Therapy Problems at MCH Dala

Four hundred (400) self-assessment questionnaires were administered and analysed. Prescriptions from more than one physician at regular basis depicted the highest risk factor 53.3%, followed by patients' difficulty to follow a medication regimen 52.5% and then prescriptions filled at more than one pharmacy 50.0% (Table 4.10).

Table 4.10 Outpatients' response to self-assessment questionnaires to identify risk factors for medication- related problems at MCH Dala

Questions	MCH DALA	
	YES(%)	NO(%)
2. Do you currently take 1 or more medication?	209 (52.3)	191 (47.7)
3. Are you currently taking medications for more than one medical problem?	150 (37.5)	250 (62.5)
4. Have your medications been changed frequently?	300 (75.0)	100 (25.0)
5.Have your instructions relating to regimen been changed frequently?	169 (42.3)	231 (57.7)
6. Do you also visit other Healthcare facilities?	158 (39.5)	242 (60.5)
7. Do more than one physician prescribe medications for you at regular basis?	207 (51.8)	193 (48.2)
8. Do you get your prescription filled at more than one pharmacy?	301 (75.3)	99 (24.7)
9. Does someone else bring any of your medications to your home for you?	214 (54.0)	186 (60.0)
10. Is it difficult for you to follow your medication regimen or do you sometimes choose not to follow?	149 (37.3)	251 (62.7)

4.7 Outpatients' Response to Self-Assessment Questionnaires to Identify Risk Factors for Drug Therapy Problems at PHC Kurna

Four hundred (400) self-assessment questionnaires were administered and analysed from each facility. Prescriptions from more than one physician at regular basis depicted the highest risk factor 53.3%, followed by patients' difficulty to follow a medication regimen 52.5% and then prescriptions filled at more than one pharmacy 50.0% (Table 4.11).

Table 4.11 Outpatients' Response to Self-assessment Questionnaires to Identify Risk Factors For Medication- Related Problems At PHC Kurna

Questions	PHC KURNA	
	YES (%)	NO (%)
2. Do you currently take 1 or more medication?	102 (25.5)	298 (74.5)
3. Are you currently taking medications for more than one medical problem?	106 (26.5)	294 (73.5)
4. Have your medications been changed?	150 (37.5)	250 (62.5)
5.Have your instructions relating to regimen been changed frequently?	77 (19.3)	323 (80.7)
6. Do you also visit other Healthcare facilities?	90 (22.5)	310 (77.5)
7. Do more than one physician prescribe medications for you at regular basis?	204 (51.0)	196 (49.0)
8. Do you get your prescription filled at more than one pharmacy?	322 (80.5)	78 (19.5)
9. Does someone else bring any of your medications to your home for you?	280 (70.0)	120 (30.0)
10. Is it difficult for you to follow your medication regimen or do you sometimes choose not to?	90 (22.5)	310 (77.5)

4.8 Demographic Information and Test Scores of Health Workers at MCH Dala

Out of the 12 health workers that participated in the study, 6 were males and also 6 females, the eldest aged 48 years and the youngest 25 years with 29 years and 1 year being the longest and shortest years of experience respectively. Majority of the health workers are community health extension workers (CHEW) with only two pharmacy technicians while the rest were environmental health personnel. The post-test scores were in all cases higher than the pre-test scores (Table 4.12).

Table 4.12 Demographic Information and Test Scores of Health Workers at MCH Dala

S/NO	SEX	AGE	YOE	EDUCATIONAL STATUS	PT	POT
1	M	45	9	PEHO	9	19
2	M	35	2	JCHEW	11	18
3	M	28	1	PHARM TECH	9	16
4	M	25	1	JCHEW	11	12
5	F	28	9	SCHEW	10	14
6	F	28	9	SCHEW	8	13
7	F	28	9	EHA	3	9
8	F	43	20	ACHEW	11	15
9	F	32	9	FHD	5	9
10	F	27	3	HIT	8	16
11	M	47	21	PHARM TECH	8	17
12	M	48	29	CCHEW	10	13

KEY;PT = pre-test; POT =post-test, YOE = years of experience, F= Female, M= Male, FHD= Food and hygiene diploma; HIT= Health information technician; ACHEW= Assistant community health extension worker; PHARM TECH= Pharmacy technician, SCHEW= Senior community health extension worker; CCHEW=; PEHO= Principal environmental health officer; EHA= Environmental health assistant.

4.9 Comparison Between Pre-Test and Post Test to Detect Impact Of Intervention on Prescribers at MCH Dala

Comparison between pre and post test to assess pharmacist's intervention on prescribers in MCH Dala. The comparison showed significant statistical difference ($p \leq 0.001$) indicating the impact of intervention at the healthcare centre (Table 4.13).

Table 4.13 Comparison Between Pre and Post Test to Detect Impact of Intervention on Prescribers at MCH Dala

Assessments	Mean number of questions answered ± SEM	Level of significance	Correlation
Pre test	5.25 ± 0.77		
		0.001	0.285
Post test	8.60 ± 0.60		

Data presented as mean ± SEM, analysed using paired sample t test

4.10 Comparison Between Pre and Post Test to Detect Impact of Intervention on Prescription at MCH Dala

Comparison between pre and post-test to assesses pharmacist's intervention on prescription in MCH Dala. The comparison showed significant statistical difference ($P \leq 0.05$) indicating the impact of intervention at the healthcare centre (Table 4.14).

Table 4.14 Comparison Between Pre and Post Test to Detect Impact of Intervention on Prescription at MCH Dala

	Number of Prescriptions with DTP	**Number of Prescriptions without DTP**	**Correlation**
Pre-intervention	315	85	
Post-intervention	30	370	0.756
Level of Significance	0.003	0.042	

Data analysed using paired sample t test.

4.11 Demographic Information and Test Scores of Health Workers at PHC Kurna

Out of the 10 health workers that participated in the study, 3 were males and 7 were females, the eldest aged 45 years and the youngest 20 years with 15 years and 1 year being the longest and shortest years of experience respectively. Majority of the health workers are community health extension workers (CHEW) with only two pharmacy technicians. The post-test scores were in all cases higher than the pre-test scores (Table 4.15).

Table 4.15 Demographic Information and Test Scores of Health Workers at PHC Kurna

S/NO	SEX	AGE	YOE	EDUCATION STATUS	PRET	POST T
1	M	23	2	PHARM TECH	8	18
2	F	38	8	PHARM TECH	6	16
3	F	38	10	CHEW	11	15
4	F	24	1	JCHEW	5	14
5	F	20	2	JCHEW	9	15
6	F	20	1	CHEW	8	14
7	F	45	15	CHEW	8	14
8	M	24	1	CHEW	8	12
9	F	20	2	JCHEW	12	17
10	M	35	10	CHEW	10	14

KEY: PT = pre-test; POT = post-test; YOE = years of experience; F= Female, M= Male, JCHEW= Junior community health extension worker; PHARM TECH= Pharmacy technician

4.12 Comparison Between Pre and Post Test to Detect Impact of Intervention on Prescribers at PHC kurna

Comparison between pre and post-test to assesses pharmacist's intervention on prescribers in PHC Kurna. The comparison showed significant statistical difference ($p \leq 0.05$) indicating the impact of intervention at the healthcare centre (Table 4.16).

Table 4.16: Comparison Between the Pre and Post Test to Detect Impact of Intervention on Prescribers at PHC Kurna

Assessments	Mean number of questions answered ± SEM	Level of significance	Correlation
Pre-test	4.30±0.52		
		0.000	0.729
Post-test	7.35±0.55		

Data presented as mean±SEM, analysed using paired sample t test.

4.13 Comparison Between Pre and Post Test to Detect Impact of Intervention on Prescriptions at PHC Kurna

Comparison between pre and post-test to assess pharmacist's intervention on prescription in PHC Kurna. The comparison showed significant statistical difference ($p \leq 0.05$) indicating the impact of intervention at the healthcare centre (Table 4.17).

Table 4.17 Comparison Between Pre and Post Test to Detect Impact of Intervention on Prescription at PHC Kurna

	Number of Prescriptions with DTP	**Number of Prescriptions without DTP**	**Correlation**
Pre-intervention	350	50	
Post-intervention	70	330	
			1.00
Level of Significance	0.005	0.009	

Data analysed using paired sample t test.

CHAPTER FIVE

5.0 DISCUSSION

All practitioners who provide pharmaceutical care must be able to identify, prevent, and resolve any and all of the types of drug therapy problems for a given patient. When the practitioner concludes that a patient has a drug therapy problem, he or she is obligated to work with the patient and other health care practitioners, if necessary, to resolve that problem.

The objectives of this study were to identify the types and frequency of drug therapy problems, assess patient's risk factors to the DTPs, as well as to examine pharmacist's intervention outcomes on the prescribers in facilities in Dala L.G.A, Kano state.

The results from the prospective study revealed that DTPs occurred in the two facilities. This is in agreement with other studies which showed that DTPs are common in PHC facilities (Shehu *et al*., 2015) and other tiers of the healthcare delivery system (Victor *et al*., 2015). Identification and categorization of drug therapy problems can be an empowering process for a number of reasons. Firstly, it can serve as a focus for developing a systematic process of problem solving whereby the practitioner contributes significantly to the overall positive health outcomes of patients. This systematic process will not only aid the practitioner in achieving successful outcomes on an individual patient basis but could also aid pharmacoepidemiologists in the development of a national or even international database concerning DTPs (Victor *et al*., 2015). Secondly, categorizing help to clarify and demarcate the professional responsibilities and accountability of the pharmaceutical care practitioner. This is most helpful in a team-oriented health care

delivery system. Few practicing physicians, nurses, health care administrators, or payers need to be convinced that drug therapy problems are important, their prevention is necessary, and their resolution is in need of an expert. Furthermore, in today's health care system, DTPs are recognized as important patient problems to be solved. Within the national guidelines for patient-centered medical home services, drug therapy problem identification and resolution are recognized as the primary function of comprehensive medication management services. Thirdly, the process illustrates how adverse drug reactions are but one category of DTP, and it also puts adherence and noncompliance into an appropriate clinical perspective.

It becomes clear that practitioners must proactively identify, resolve, and prevent drug therapy problems of all types in order to ensure that each patient experiences effective and safe pharmacotherapy (Gordon *et al.*, 2007). Another function of this categorization is to provide the clinical work of the pharmaceutical care practitioner with a vocabulary consistent with that used by other healthcare professionals. It helps define the practitioner's function in terms of identification, resolution, and prevention of a patient's DTPs, this function is placed in a patient care context consistent with the responsibilities of other health care practitioners.

In addition to all mentioned above, pharmaceutical care practice, the patient and not the drug product is the major focus of the practitioner's energies, skills, knowledge, decisions, and actions (Roughead *et al*., 2004). The high rate of DTPs observed in this study following the categorization might be a reflection of the problems associated with PHC services in the facilities in terms of inadequacy of skilled personnel, training and retraining of health workers, infrastructural decay as well as a good working environment; among others (Emeka *etal*., 2011). It was reported that only

two out of the total number of twelve and ten staff of MCH Dala and PHC Kurna respectively, were ever invited once for a re-training by their employer. Thus, indicating a possibility of information gap. The on-site presentation by researchers, companies' medical representatives and NGO's might be biased as they are tilted towards an expected objective, might not suffice or even address the information need of the health workers, thus inadequate.

The educational status of these health workers in the two facilities clearly indicates that none of them is a Doctor, Pharmacists or even Nurse, with majority are bearing Community Health Extension workers (CHEW) but were seen to attend to all disease conditions including Diabetic and Hypertensive clients (despite the forbiddance to treat such diseases in the standing order by the CHEW). Obviously, pharmaceutical care practitioners hold a great deal of the responsibility for identifying DTPs. Much of this responsibility stems from their special knowledge and experience in the fields of pharmacology, pharmacotherapy, pathophysiology and toxicology. However, failure to possess special knowledge and experience in these fields confer a lot of problems (Emeka *etal*., 2011) as observed in this study where more than 75% of the prescriptions of each facility had DTPs.

In order to resolve or prevent a DTP, practitioners such as pharmacists intervene with, or on behalf of, the patient to make changes in the patient's drug regimen. In general, these interventions involve starting new drug therapies, increasing dosages, decreasing dosages, discontinuing drug therapies, providing patient-specific drug information/explanations, or referring the patient to another health care practitioner who has the expertise to resolve a complex problem. Identification and resolution of either potential or actual DTP are critical responsibility of pharmacists in order to

improve therapy outcomes and reduce harm associated with medicine use. Pharmacists' intervention reduced DTPs with the potential to alter therapeutic outcomes in the patients. So also, pharmacists' intervention led to modification of prescriptions for improved therapeutic effectiveness, improved adherence monitoring and decreased risk to DTPs. An appreciable number of recommendations were made by the pharmacist in order to resolve DTP, which were accepted by the health workers in both facilities such as the need for an additional drug, removal of unwanted/duplicated drug, changing a contraindicated drug in pregnant women or children, changing a drug with great potentiality for interaction with others, among others.

The aim of pharmacy practice is to provide pharmaceutical care to all patients through the responsible provision of drug therapy and non-drug therapy for the purpose of achieving definite outcomes that improve patients' quality of life (Ogbonna *et al*., 2015). This is accomplished through the integration of clinical practice and coordination of the effective provision of medication therapy. Therefore, systematic therapy strategies have to be developed in order to prevent or reduce the excessive DTP by identifying cause of failure as well as ensuring the eradication of that particular cause in our PHCs.

Out of the total number of prescriptions sampled from the two PHCs, about two third had DTPs (in more than 75% of the prescriptions), before pharmacists' intervention, which consequently reduced to less than one quarter (corresponding to only about 7% of the prescriptions). Potential drug interaction was found to be the most prevalent DTP, followed by contraindication for drugs and then inappropriate duplication of therapeutic group. Other DTPs found present were insufficient awareness of health

and diseases and contra indication for drug. This could be attributed to inadequate knowledge on drugs, diseases and drug interaction (Abah *et al.,* 2013).

The implication of this profound DTP could be seen in the much client re-visit to the facilities, high morbidity rate, presentation of always sickness by the clients, economic derailment, loss of man hour to address other socio economic needs, loss of confidence in the health facility and on the health workers, multiple actual/potential side effects and adverse effects, toxicities and potential / actual congenital anomaly. Drastic reduction in the DTPs after intervention shows that the health workers can do better if well informed or well-trained despite the low level qualification.

Intervention processes were developed based on type of DTP observed at each PHC. This approach was also adopted in enlightening health workers in appreciating the role of pharmacist in preventing DTPs (Onifade. *et al.,* 2013) which resulted in a positive outcome.

Wrong drug prescriptions were also reported in this study which was similar to previous research (Agu, *et al.,* 2014). Prescriptions of wrong drugs are major errors with potential to cause medical harm if not corrected. The frequency of this type of errors is a course for serious concern. There is an urgent need to strengthen the prescription process through standardization of the prescription process, creation of independent checks for crucial steps in the process and learning from mistakes when they occur. Feedback control systems, immediate and regular review of prescription will help in reducing medical mishaps resulting from prescribing wrong drugs. In addition, training and re-training of prescribers and peer group discussions should be employed as strategies to promote rational prescribing (Bradley *et al.,* 1997)

The research study design permits the complete identification of the types and frequency of DTPs in the two primary healthcare facilities in Dala L.G.A, Kano state. It also shows a remarkable similarity in the observed DTPs, health worker and client attitude to work and disease presentation respectively.

Numerous factors were observed to greatly contribute in enhancing the DTPs in both facilities such that a whopping 75% of the respondents at MCH Dala said they receive their medication at more than one pharmacy while 80.5% report same at PHC Kurna which coincidentally is the highest risk factor to DTP in both facilities. While 37.3% of the clients at MCH Dala report that it is difficult to follow medication regimen, this stands at 22.5% at PHC Kurna which also coincides in the two facilities as the lowest factor risking DTPs.

Considering the educational status of the clients, it will not be surprising to record such exceedingly high DTP of more than 75% before intervention, many of them lack training and re training, poor staff motivation, 3 out of the 12 staff at MCH Dala are on temporary schedule (not on salary) while 2 out of 10 staff at PHC Kurna are also temporary. A staff not on salary, how do you expect performance? All these will go a long way in contributing to causing DTPs in primary health care facilities.

The DTPs before intervention was identified at more than 75% in each of the two facilities which drastically was reduced to less than 10% upon pharmacist's intervention in each facility. This pro-active measure shows that there is serious need of pharmacists' expertise, the staffs can be re oriented with re-training and that the outcome of therapy can be better as reported in a similar study (Ogbonna *et al*., 2015).

The health workers are all expected to comply with the National Standing Orders for Community Health Extension Workers / Community health officers as revised by NPHCDA, March, 2010 but unfortunately there are serious contravention to the

provision of the order in terms of when to refer and medication selection among others. It was observed that these contraventions to the stated orders are majorly responsible for the DTPs observed

More so, age 0-4years was more frequently reported which has been so in previous findings (Otoom *et. al*., 2007). This could be in agreement with reports that children below the age of 5 years being more prominent with certain disease conditions. DTP may also be more in this category probably because of high risk to polypharmacy.

Females were more than men in the facilities. This could be due to the fact that women have more health seeking behaviour than men and also tend to have more reasons to be in hospitals than men (Victor *et al*., 2015). This finding of high number of women is consistent with the healthcare facilities target of women and children and also consistent with a similar research work conducted as to patronage of health centres (Otoom *et. al*., 2007).

The most occurring client's demographic information on marital status between married and unmarried in MCH Dala and PHC Kurna indicates that majority are not married, and there are anecdotal believe that marriage has psychosocial component towards stabilising the mental wellbeing of an individual which could have tremendous impact on therapy outcome.

Majority of the two facility clients had no formal education. However, trading has been the most common occupational activity of the residents, thus, majority of the clients are not formally educated and this has been reported in previous research (Usman and Ahmed, 2013).

The most occurring disease condition in MCH Dala and PHC Kurna was malaria. This is not a surprise because the area is one of the most densely populated zones in Kano associated with poor housing and sanitary measures thus enabling the breed of mosquitoes, with relatively poor environmental hygiene supporting the propagation of malaria parasite. Kano state has been mentioned as one of the endemic zones for malarial diseases.

Moreover, majorly, in both facilities the women are house wives and hardly engage in business activities

In the comparison between pre-test and post-test to assess pharmacist's intervention on DTPs observed in MCH Dala, a positive intervention impact was achieved at the healthcare centres. Only two staff out of a total of twelve staff (83.3%)scored less than 50% at the post test intervention raising from seven (7) out of the same total (41.66%) at the pre-test. It was also evidenced that those with pharmacy background (pharmacy technicians) performed excellently at both the pre-test and post-test followed by those with longer years of experience.

In the case of PHC Kurna, all the staff scored more than 50% at the post test. Similarly, staff with pharmacy background (pharmacy technicians) performed better expectedly in both pre-test and post-test followed by those with longer years of experience.

Majority of the interventions and recommendations made by the pharmacist to resolve DTP were accepted in both facilities which is in keeping with similar research work (Victor *et. al., 2015*).

It was ascertained that the two facilities are comparable in terms of staff strength, staff qualifications, resemblances in staff measures of experience, output to input of knowledge as well as the relevance of having a pharmacy background (pharmacy technicians) all play a role in terms of understanding the DTPs and understanding the proposed resolutions to DTPs in the two facilities. In both facilities, the designed interventions helped to achieve an increase in knowledge towards minimising the occurrence of DTPs by the prescribers on prescriptions.

Majority of the prescriptions in both facilities studied confirmed the anecdotal belief that there is widespread DTPs in PHCs, as they were found to grossly have DTPs. But, after the intervention, the DTPs drastically reduce to a negligible proportion indicating the impact of the intervention and that the health workers have capacity to improve, in the two PHC facilities. A finding consistent with a recent finding that majority of the DTPs were resolved after intervention as performed by (Victor *et .al., 2015*).

CHAPTER SIX

6.0 SUMMARY AND CONCLUSION

6.1 Summary

Drug therapy is considered a major component of patient management at all levels of healthcare settings. The benefits acquired by patients from therapeutic interventions are valuable but the risks of drug administration and the consequences of inappropriate use cannot be overlooked. The accessibility, affordability, availability as well as rational use of drugs and appropriate management are critical to the successful reduction of morbidity and mortality caused by diseases. However, in Kano state Nigeria, drugs are prescribed and dispensed by personnel with low level of training, in addition to being widely available in the open-drug markets, often taken without diagnosis and not necessarily in complete dosage regimen. The lack of the much needed pharmaceutical care components in our healthcare facilities leading to a substantial number of DTPs were identified, analysed and intervened by the aid of DTP-PCNE classification tool and the Standing Order to CHEW / CHO by KSPHCMB in two (2) PHC facilities in Kano state, Nigeria. It was determined prospectively, educational intervention designed, administered and assessed.

In phase 1, two (2) facilities were selected based on their focal site relevance; four hundred (400) prescriptions were collected from each facility prospectively while questionnaires were concurrently administered to each client totalling to four hundred (400). The prescriptions collected in each facility were analysed and classified based on the frequency and type of DTP found on each prescription from both facilities. The questionnaires were also analysed.

In Phase 2, an intervention was designed based on the identified DTP pattern observed on the prescriptions and administered to the prescribers with the aid of audio-visual and a projecting set while the staffs were comfortably seated in each facility. A pre-test was administered before the intervention presentation while a post-test was administered after the intervention to assess their percentage gain in knowledge. During the intervention all the staff participated in both facilities, 12 staff from MCH Dala while 10 staff participated at PHC Kurna.

In phase 3, after about 8 weeks, two hundred prescriptions were collected in each facility, which was analysed, identified and DTP classified based on the standard PCNE classification form tool (PCNE2006). The frequency of the prescriptions DTPs result was then compared with the frequency of the DTPs prescriptions in phase 1.
The demographic information of the prescribers in each facility was documented. The Pre-test and Post-test scores of the participants in each facility was analysed via sampled paired t test SPSS package.

The DTPs observed in both facilities was in more than 75% of the prescriptions collected before interventions which drastically reduced to less than 10% after interventions. The qualifications of the prescribers, years of experience and having a pharmacy background all plays a significant role in comprehension and resolution of DTPs by the prescribers. The risk assessment questionnaire indicates that the clients' vulnerability to DTPs might be due to the clients filling their prescriptions at more than one pharmacy, a finding which coincidentally is the most frequent risk factor in both facilities

6.2 Conclusion

This study established the existence of DTPs and their various classes in two PHC facilities of Dala Local Government in Kano state. It was evident that more than 75% of DTP were identified before intervention from the collected prescriptions in both facilities which significantly reduced to about 10% after interventions. Risk factors to DTPs in these facilities were also assessed. Pharmacist intervention played a great role in reducing DTPs in these facilities. The intervention proposed strict adherence to the standing order of the Kano state Primary Healthcare Management Board prepared for CHEW and CHO treatment guidelines. The study revealed that pharmaceutical care concept has great role to play in drug therapy management of clients in our PHC facilities to reduce or overcome the occurrence of DTPs.

6.3 Limitation of the Study

The clients used in this study were outpatients, who came from far and wide, who in most cases could not read, write or even express themselves very well, in filling the questionnaires, it had to be interpreted to them and the corresponding answer filled.

The process being a prospective approach and an error detecting approach, though the prescribers do not know the complete motive of the researcher, which might make the prescribers to change their prescription pattern, thus; a retrospective approach might be better. However, retrospective approach might be marred by lack / insufficiency of data.

Five (5) research assistants were employed to support in the interpretation of the questionnaire, which might affect the meaning of the intended question as different individuals might have different interpretations.

6.4 Recommendations

Evidence presented in this study made it clear that availability and proper utilisation of the standard treatment guideline will significantly reduce DTPs and improve the outcomes of therapy. Writing and distributing adequate educational texts in form of bulletins, newsletters, continuing education and making the standard treatment guidelines online will provide easy accessibility.

There is need to study the drug therapy problems based on the pharmacological classes of drugs most frequently encountered and also to classify the disease conditions most frequently mismanaged in order to design an intervention that best address the DTPs.

The healthcare providers in the Primary healthcare facilities need training and retraining as well as an urgent need for including pharmacists in the PHC facilities healthcare provision in order to achieve an optimum pharmaceutical care.

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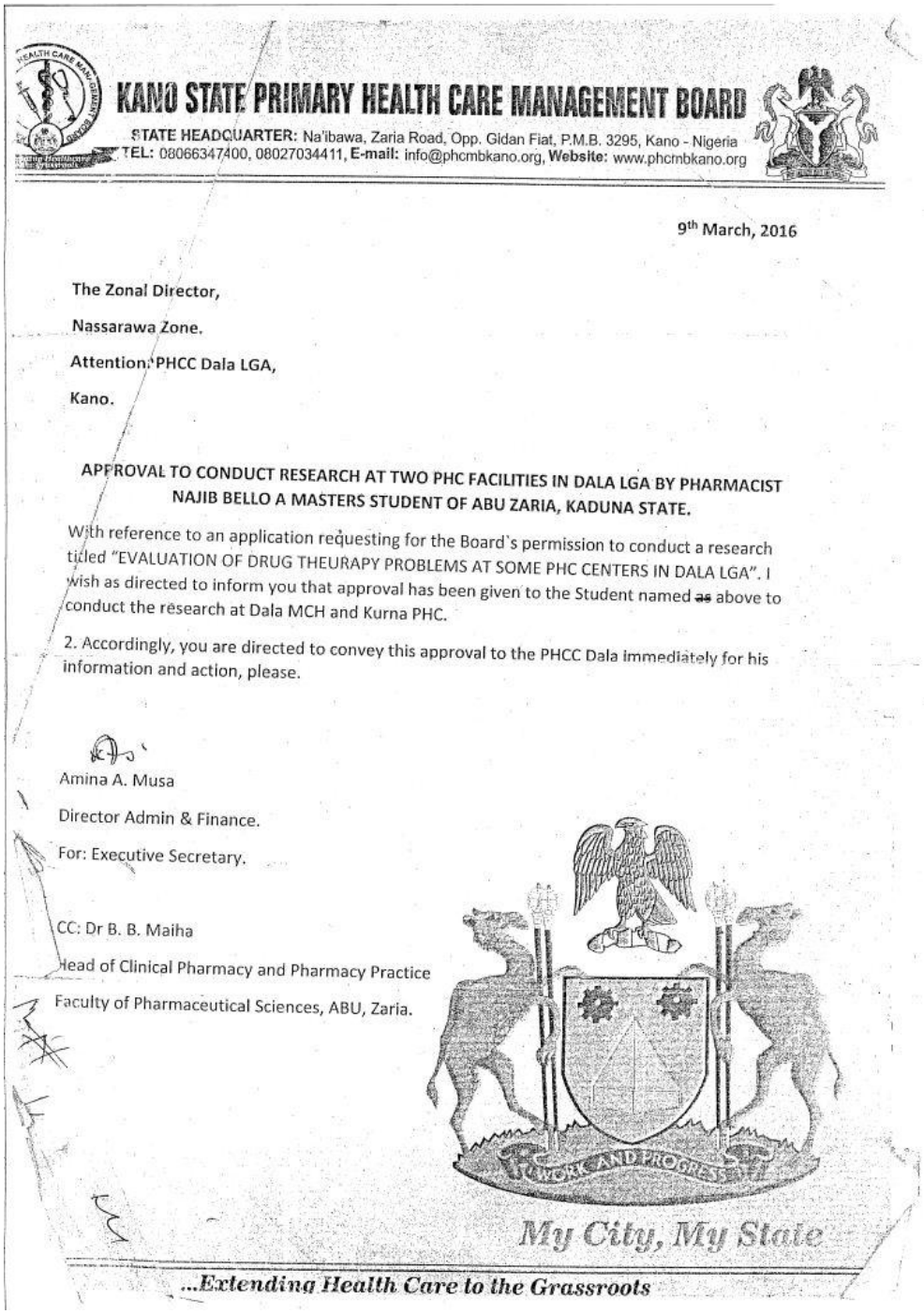
APPENDIX I

Standardized DTP registration form (PCNE Classification, 2006)

CODES	PROBLEMS
P1.1	Side effects suffered (non- allergic)
P1.3	Toxic effects suffered
P2.1	Inappropriate drug (not most appropriate for indication)
P2.2	Inappropriate drug form (not most appropriate for indication)
P2.3	Inappropriate duplications of therapeutic group or active ingredient
P2.4	Contraindication for drug (including Pregnancy/Breast Feeding)
P2.5	No clear indication for drug use
P2.6	No drug prescribed but clear indication
P3.1	Drug dose too low or dosage regimen not frequent enough
P3.2	Drug dose too high or dosage regimen too frequent
P3.3	Duration of treatment too short
P3.4	Duration of treatment too long
P5.1	Potential Interaction
P6.2	Insufficient awareness of health and diseases
	CAUSE
C1.1	Inappropriate drug selection
C1.2	Inappropriate dosage selection
C1.4	Pharmacokinetics problems including ageing/deterioration in organ functions and interaction
C1.5	Synergistic/Preventive drug required and not given
C1.6	Deterioration/ improvement of disease state
C1.8	Manifest side effect, no other cause
C2.1	Inappropriate timing of administration and/or dosing intervals
C2.2	Drug under used/ under administration
C2.3	Drug overused/ over administered
C3.2	patient unaware of reason for drug treatment
C5.1	Prescribed drug not available anymore
C5.2	Prescribing error
C6.1	other cause/specify
C6.2	No obvious cause
	INTERVENTION
I1.1	Prescriber informed only
I1.2	Prescriber asked for information
I3.1	Drug changed to…
I3.2	Dosage changed to…
I3.4	Instructions for use changed to…
I3.5	Drug stopped
I3.6	New drug started

APPENDIX II

Ethical approval



KANO STATE PRIMARY HEALTH CARE MANAGEMENT BOARD

STATE HEADQUARTER: Na'ibawa, Zaria Road, Opp. Gidan Fiat, P.M.B. 3295, Kano - Nigeria
TEL: 08066347400, 08027034411, E-mail: info@phcmbkano.org, Website: www.phcmbkano.org

9th March, 2016

The Zonal Director,

Nassarawa Zone.

Attention: PHCC Dala LGA,

Kano.

APPROVAL TO CONDUCT RESEARCH AT TWO PHC FACILITIES IN DALA LGA BY PHARMACIST NAJIB BELLO A MASTERS STUDENT OF ABU ZARIA, KADUNA STATE.

With reference to an application requesting for the Board's permission to conduct a research titled "EVALUATION OF DRUG THEURAPY PROBLEMS AT SOME PHC CENTERS IN DALA LGA". I wish as directed to inform you that approval has been given to the Student named ~~as~~ above to conduct the research at Dala MCH and Kurna PHC.

2. Accordingly, you are directed to convey this approval to the PHCC Dala immediately for his information and action, please.

Amina A. Musa

Director Admin & Finance.

For: Executive Secretary.

CC: Dr B. B. Maiha

Head of Clinical Pharmacy and Pharmacy Practice

Faculty of Pharmaceutical Sciences, ABU, Zaria.

WORK AND PROGRESS

My City, My State

...Extending Health Care to the Grassroots

APPENDIX III

Client Informed consent

FACULTY OF PHARMACEUTICAL SCIENCES, DEPARTMENT OF CLINICAL PHARMACY, AHMADU BELLO UNIVERSITY, ZARIA

Dear respondent,

This is to seek your consent in participating in my master's program as a student of student of Ahmadu Bello University, Faculty of Pharmaceutical Sciences, Department of Clinical Pharmacy who is conducting a research on Drug Therapy Problems. This exercise is solemnly for academic purpose and your contributions will be treated with utmost confidentiality and anonymity.

APPENDIX IV

QUESTIONNAIRE ON ASSESSMENT OF PATIENTS' RISK FACTORS TO DRUG THERAPY PROBLEMS,

FACULTY OF PHARMACEUTICAL SCIENCES, DEPARTMENT OF CLINICAL PHARMACY, AHMADU BELLO UNIVERSITY, ZARIA

Dear respondent,

This questionnaire is from **Najib Bello,** a Master's student of Ahmadu Bello University, Faculty of Pharmaceutical Sciences, Department of Clinical Pharmacy who is conducting a research on Drug Therapy Problems. This exercise is solemnly for academic purpose and your contributions will be treated with utmost confidentiality and anonymity.

Please answer all questions as honest as possible. It's strictly voluntary and all information is confidential. Thank you for your time and cooperation:

Section 1: Demographic information

1. Age: 0-5 [ ] 6-10[ ] 11-15 [ ] 16-20 [ ] 21-30 [ ] 31and above [ ]
2. Sex: Female [ ] Male [ ]
3. Occupation of patients: Housewife [ ] Student [ ] Business [ ] Civil service [ ] others [
4. Marital status: Married [ ] Single [ ] Widow [ ] Divorced [ ]
5. Educational background: Primary [ ] Secondary [ ] Tertiary [ ] No formal education [ ]

Section 2: Self-assessment questions to identify risk factors to drug related problems:

1. Do you suffer from what disease conditions? [D] [H] [U] [T] [M] [O]

2. Do you currently take 1 or more medication? Yes [ ] No [ ]

3. Are you currently taking medications for more than one medical problem? Yes [ ] No [ ]

4. Have your medications been changed? Yes [ ] No [ ]

5. Have your instructions relating to regimen been changed frequently? Yes [ ] No [ ]

6. Do you also visit other Healthcare facilities? Yes [ ] No [ ]

7. Do more than one physician prescribe medications for you at regular basis? Yes [ ] No [ ]

8. Do you get your prescription filled at more than one pharmacy? Yes [ ] No [ ]

9. Does someone else bring any of your medications to your home for you? Yes [ ] No [ ]

10. Is it difficult for you to follow your medication regimen or do you sometimes choose not to? Yes [ ] No [ ]

APPENDIX V

Pre-test/post test

DEPARTMENT OF CLINICAL PHARMACY AND PHARMACY PRACTICE,

AHMADU BELLO UNIVERSITY, ZARIA

DRUG THERAPY PROBLEMS : PHARMACISTS INTERVENTION AT MCH DALA SUPERVISORS: Dr B. B. Maiha, Dr S. Mohammed

Dated: 28th, April, 16 Time:10:00am

INSTRUCTIONS: ANSWER ALL QUESTIONS, CIRCLE THE CORRECT OPTION

Pre-test / Post—test

1. Which of the following is not a component of Primary Healthcare Services?

   a. Dental care
   b. Immunisation
   c. Diabetic care
   d. Health education

2. Which of the following is not a type of drug therapy problem?

   a. Adverse drug reaction

   b. Wrong drug

   c. Wrong diet

   d. Dosage too low

3. When a client condition is critical, the health worker should…

   a. work harder

   b. discuss with attendant

   c. Refer

   d. Set Drip

4. The most appropriate drug for a child suffering from Cough and catarrh is

   a. Nise Syrup

   b. Procold

   c. Emzolyn Child

   d. both a and c

5. A child will suffer from severe side effect of malaise and drowsiness when Nise is combine with one of the following…

a. coartem

b. Paracetamol

c. Tutolin

d. Ibuprofen

6. In a child suffering from cough, Panda cold cannot be combine with

a. jawaclox drop

b. ampiclox drop

c. nocof drop

d. vamiceedrop

7. A child less than 2yrs cannot take

a. paracetamol

b. multivitamin

c. ibuprofen

d. Antacid

8. A client suffering from Malaria, all can be use to treat except

a. Arthemeter- Lumefantrine
b. Atesunate- Amodiaquine
c. fansidar
d. Quinine

9. It is contraindicated in an ulcer patient to take all except

a. Blood tonic
b. Gestid
c. Ciproxin
d. loratidine

10. Could a Primary Health centre manage Hyprtension?

a. May be

b. Yes

c. No

d. Sometimes

11. The right dose of Augmentin for a client of 19yrs is

    a. 625mgbd

    b. 375mgbd

    c. 125mgbd

    d. all of the above

12. In an adult, Quinine can be taking

    a. 600mgtds

    b. 300mgtds

    c. 600mgbd

    d, 300mgbd

13. Can a child of 2yrs take 5mg of loratidine?

    a. No

    b. yes

    c. may be

    d. confirm

14. In treating typhoid fever of 160 x 2 and 80 x 4 titre…

    a. 15 days is okay

    b. 10 days is okay

    c. 5 days is okay

    d. 3 days can cure it

15. One of the following combination is wrong

    a. Act and Vitaminc
    b. Act and Brustan N
    c. Act and Paracetamol
    d. Act and EmzorPcm

16. Which one of the following is the odd one

    a. Vitamin C

    b. Brustan N

    c. Emzolyn

    d. P alaxin

17. The following can be taking together except

    a. Chemiron and Magsil

    b .Lonart and Paracetamol

    c. Brustan N and magsil

d. Lonart and Brustan n

18. A client presenting Fever, cough and Catarrh, should wisely be treated for

a. Malaria and cough

b. Fever and catarrh

c. only cough

e. Only catarrh

19. The Standing order is not always good to follow

a. No

b. Yes

c. May be

d. Sometimes

20. The most important being in the hospital is the

a. Client

b. HOD

c. Matron

d. Nurse

Thank you for your cooperation, Good luck.

APPENDIX VI

Sample prescriptions with DTP

DTPS : SOME EXAMPLES

CODES	PROBLEM	OCCURENCE
P1.1	Side effects suffered (non- allergic)	9
P1.3	Toxic effects suffered	3
P2.1	Inappropriate drug (not most appropriate for indication)	32
P2.2	Inappropriate drug form (not most appropriate for indication)	1

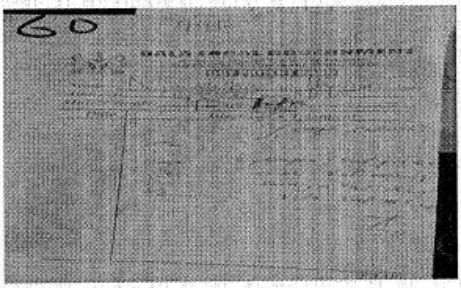
DTPS : SOME EXAMPLES

P2.3	Inappropriate duplication of therapeutic group or active ingredient	35
P2.4	Contra indication for drug (including Pregnancy / Breast Feeding)	50
P2.5	No clear indication for drug use	17
P2.6	No drug prescribed but clear indication	21
P3.1	Drug dose too low or dosage regimen not frequent enough	7

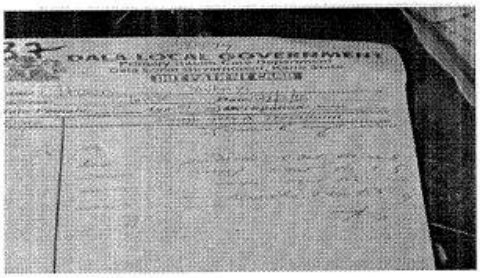
DTPS : SOME EXAMPLES

P3.2	Drug dose too high or dosage regimen too frequent	13
P3.3	Duration of treatment too short	6
P3.4	Duration of treatment too long	2
P5.1	Potential Interaction	92
P6.2	Insufficient awareness of health and diseases (possibly leading to future problems)	5

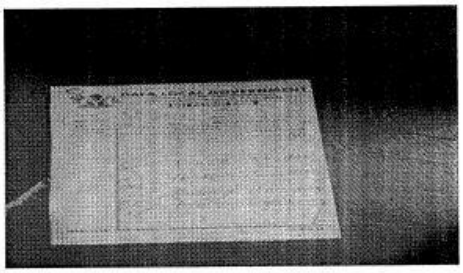
P1.1 : SIDE EFFECTS SUFFERED



P1.3 : TOXIC EFFECTS SUFFERED



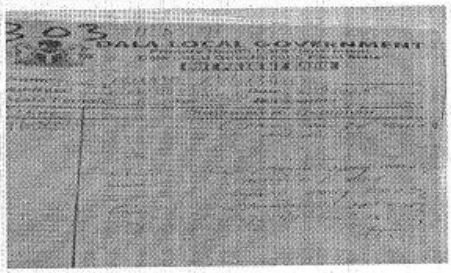
P2,1 : INAPPROPRIATE DRUG



P2.3 : INAPPROPRIATE DUPLICATION



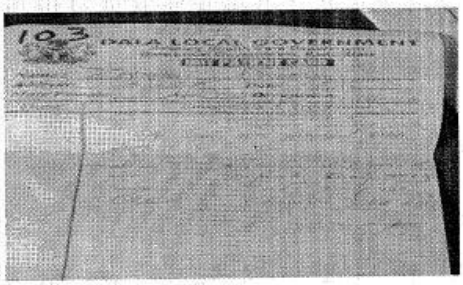
P2.4 : CONTRAINDICATION FOR DRUG



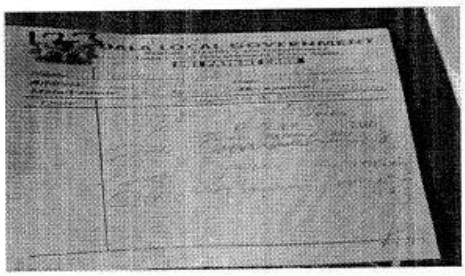
P2.5: NO CLEAR INDICATION FOR DRUG



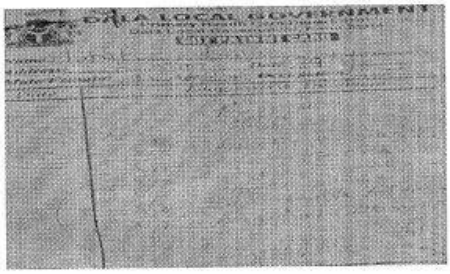
P2.6: NO DRUG PRESCRIBED BUT CLEAR INDICATION



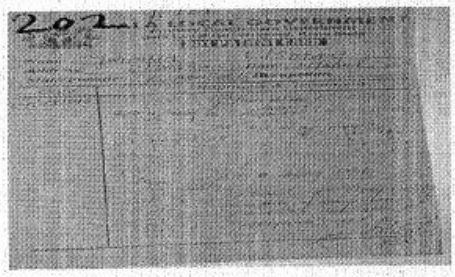
P3.1 : DRUG DOSE TOO LOW



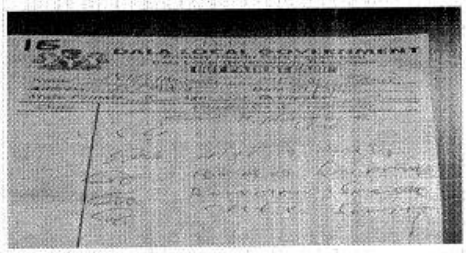
P3.2: DRUG DOSE TOO HIGH



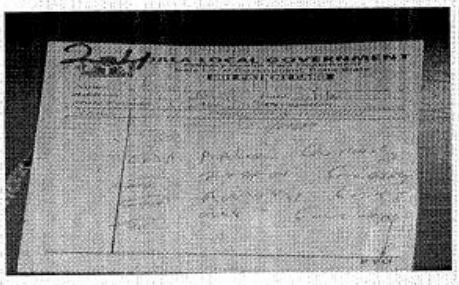
P3.2: DURATION OF TREATMENT TOO SHORT



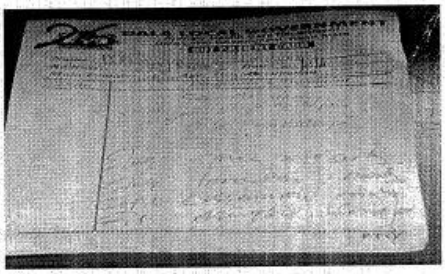
P5.1: POTENTIAL INTERACTION (1)



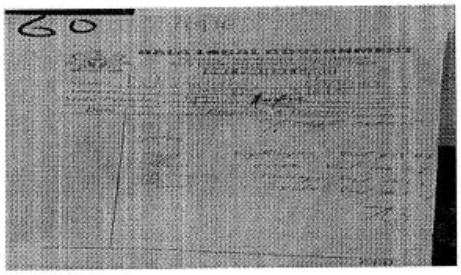
P5.1: POTENTIAL INTERACTION (2)



P5.1: POTENTIAL INTERACTION (3)



P3.2: INSUFFICIENT AWARENESS..



P3.2: NEED FOR REFERRAL



APPENDIX VII

DALA MCH, ATTENDANCE SHEET

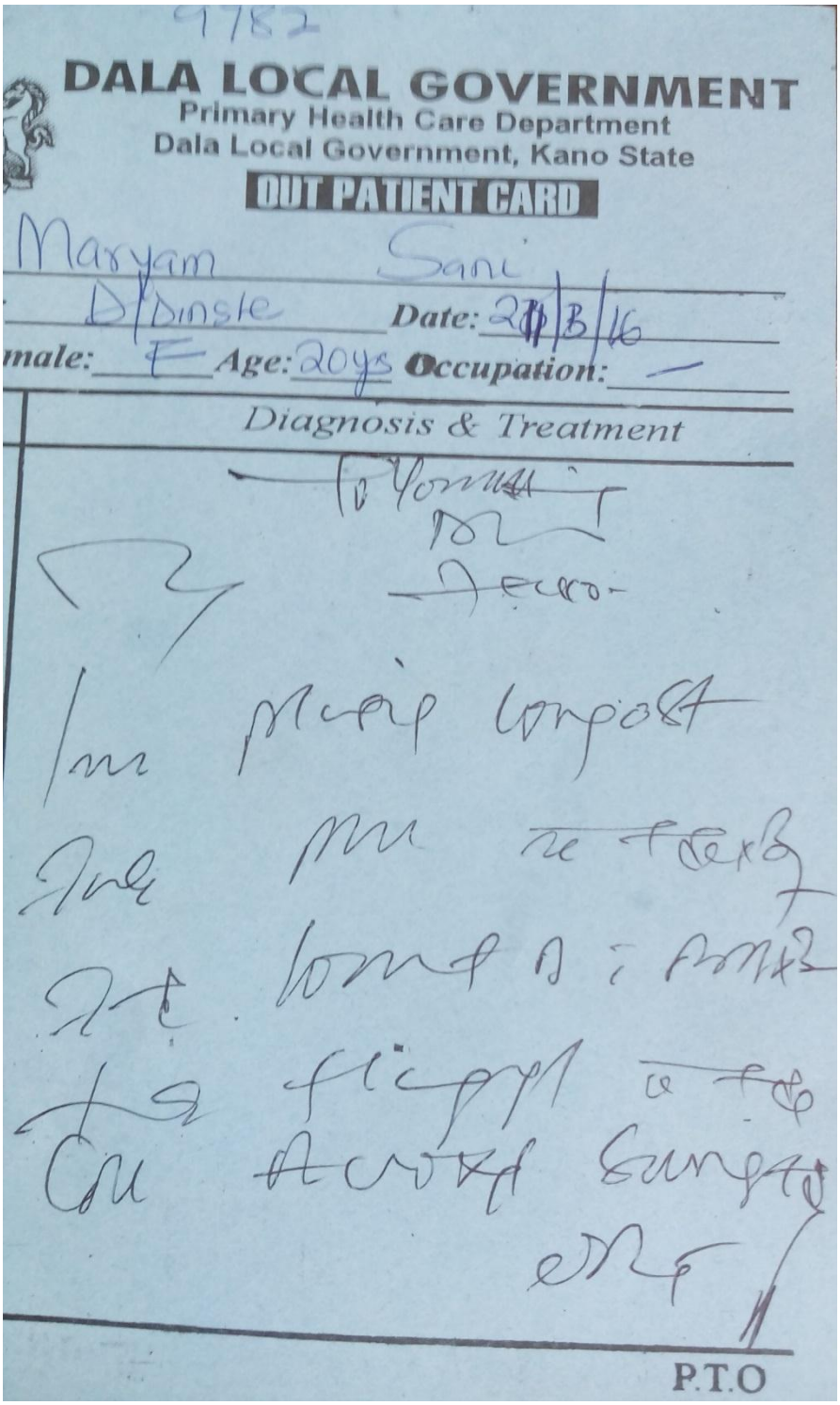
S/ NO	NAME/SURNAME	DESIGNATION	PHONE CONTACT	PRE TEST	POST TEST	REMARK
1	NUHUSULAIMAN	PEHOWFP	08057660618 08160053581	9	19	
2	SANI DANLAMI	JCHEW	07051214766	11	18	
3	YUSUF MOHD SANI	PHARM TECH	08131660111	9	16	
4	NAZIRUADAMU	JCHEW	08030849074	11	12	
5	ZAINABSALISUSHUAIBU	SCHEW	08134694321	10	14	
6	HAFSATADAMU BELLO	SCHEW	08036229024	8	13	
7	NAFISAUBA MUSA	EHA	07069168619	3	9	
8	ZANNIRAABDULLAHI	ACHEW	08035995949	11	15	
9	HADIZAABDULLAHI	FHD	08069802378	5	9	
10	SAFIYAUBAABDULLAHI	HIT	07059005334	8	16	
11	KABIRUSALISU	PHARMACY TECH	08132307323	8	17	
12	ALI MUSA	CCHEW (HOD)	08051230587	10	13	

APPENDIX VIII

ATTENDANCE SHEET, PHC KURNA

S/ NO	NAME/SURNAME	DESIGNATION	PHONE CONTACT	PRE TEST	POST TEST	REMARK
1	MUNTAQAABDULRAHMAN	PHARM TECH	07063845318	8	18	
2	AISHA MOHAMMAD	PHARM TECH	08160677243	6	16	
3	HADIZANALELE	CHEW	08085530850	11	15	
4	AMINA BELLO USMAN	JCHEW	08142590383	5	14	
5	NAFISAABDULLAHI	JCHEW	08101299315	9	15	
6	MAIMUNASHEHUMHD	CHEW	08145054828	8	14	
7	MAIROADAMUSIYASIYA	CHEW(HOD)	08065993906	8	14	
8	SUNUSI T USMAN	CHEW	08066967549	8	12	
9	AISHA SHEHU	JCHEW	07038959815	12	17	
10	HASSAN T SALIHU	CHEW	08180576275	10	14	

APPENDIX IX



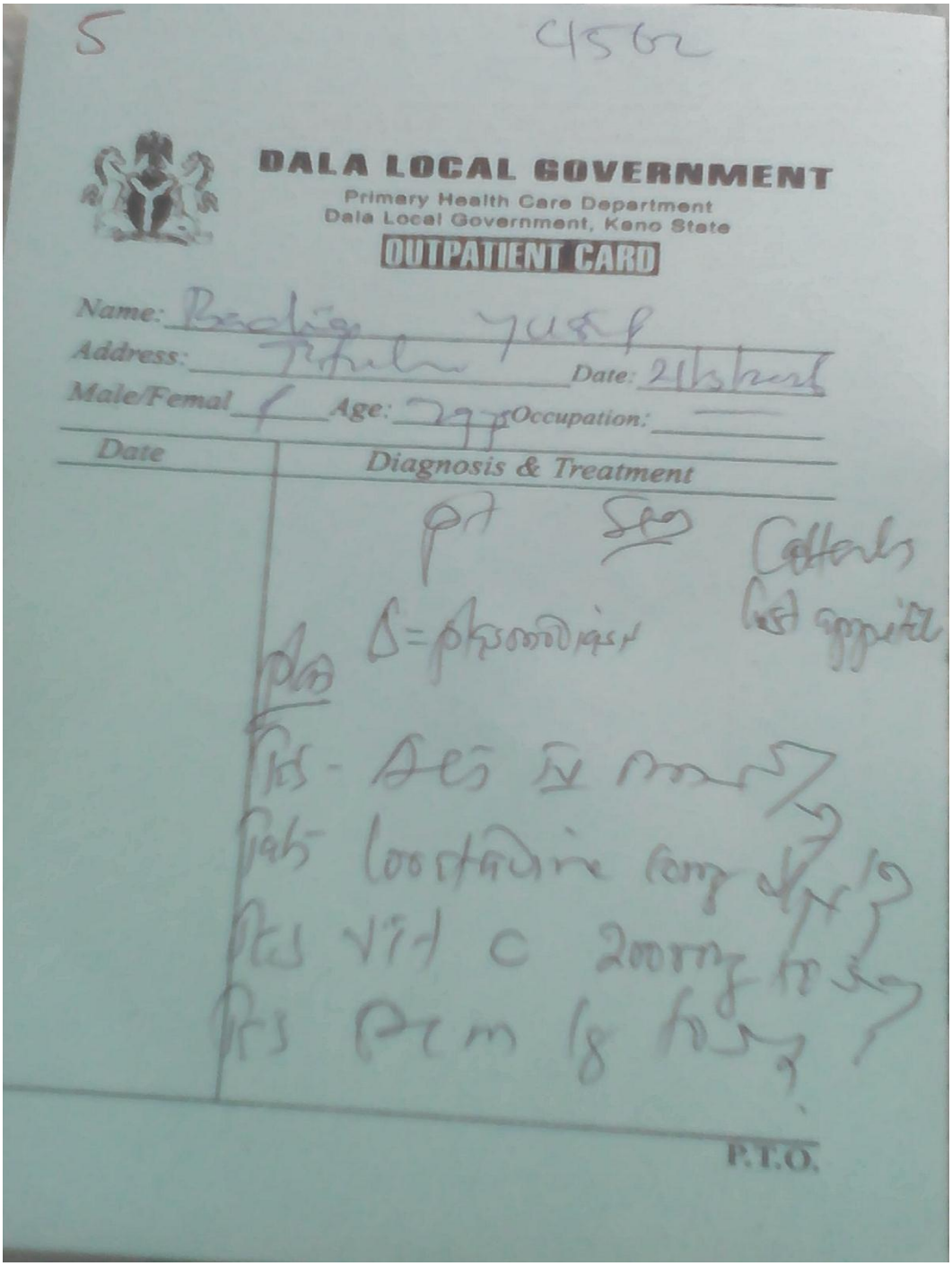
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DALA LOCAL GOVERNMENT
Primary Health Care Department
Dala Local Government, Kano State
OUT PATIENT CARD

Maryam Sani
D/Dinsle Date: 27/3/16
Male: F Age: 20ys Occupation: —

Diagnosis & Treatment

P.T.O



5 4562

DALA LOCAL GOVERNMENT

Primary Health Care Department
Dala Local Government, Kano State

OUTPATIENT CARD

Name: Bashir Yusuf

Address: Tofa Date: 21/5/2021

Male/Femal F Age: 27y Occupation: —

Date	Diagnosis & Treatment
	PT SOB Cellulitis Lt upper limb
	Δ = pneumonia
	Rx - Inj IV ...
	Tab Levofloxacin ...
	Rx Vit C 200mg ...
	Rx Prn 1g ...

P.T.O.