

**Drug prescribing practices among Primary Healthcare providers in  
a Local Government Area of Northwestern Nigeria**

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## KEY WORDS

Primary Healthcare

Prescribing practices

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Local Government Area

Rational Drug use

Drug use indicators

Essential Drugs

Drug Utilization

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## ABSTRACT

**Background:** Drugs are essential components of the health system and their rational use is vital to delivering quality and efficient healthcare services. However, inappropriate prescribing is a common rational drug use problem globally, particularly in developing countries including Nigeria. Despite measures to address this problem, inappropriate drug use continues to be a major public health problem in Nigeria.

**Aim:** This study assessed rational drug use (RDU), with a focus on rational prescribing and factors affecting it, among primary healthcare providers working in primary healthcare facilities of a LGA in Northwestern Nigeria.

**Methods:** The study was a cross sectional descriptive study and it included retrospective review of patient encounters and interviews with prescribing healthcare providers in sampled health facilities. Stratified random sampling method was used to select 20 public primary healthcare facilities and 30 patient encounters were drawn by systematic random sampling from each facility. One hundred and sixty three prescribing healthcare providers in the health facilities were also included in the study. Adapted WHO's drug use study tools and a structured self administered questionnaire were used to collect data. Data were analysed using Statistical Package for Social Sciences (SPSS Version 17) software and presented as contingency table with chi square test used to test for relationship between variables with statistical significance taken at  $p < 0.05$ . Ethical approval was obtained from the University of the Western Cape Research Ethics Committee and Kaduna State Ministry of Health, and permission from local stakeholders. Confidentiality of individual patients, healthcare providers and health facilities data was maintained.

**Results:** The prescribing staff at the selected facilities were predominantly Nurses/Midwives and community health assistants with SCHEWs constituting the majority (60.8%). More than half (54.4%) of providers did not know about the concept of RDU. Similarly, the computed knowledge score of RDU revealed that the majority (74.4%) had poor knowledge of the concept. Knowledge was significantly associated with duration of service, providers' previous training in rational drug use and professional status ( $p < 0.05$ ), with the CHOs having better knowledge of RDU compared with other professional cadres. High antibiotic use (68.3% in retrospective review and 82.9% in survey) and injection use (9.5% in retrospective review and 12% in survey) were found in the study with significant proportions of providers admitting that all cases of URTI should receive antibiotics (72.3%) and that patients could be prescribed injections if they requested for it (35.3%). The Standing Order was the main source of information for the majority (50.6%) of providers and it served as the major influence affecting prescribing practices.

**Conclusion:** This study revealed a poor understanding and knowledge of RDU among healthcare providers. High antibiotic and injection use also reflected providers' poor attitude to rational prescribing of these commodities. To improve prescribing practices at the PHC level, adequate staff skill mix, including physicians should be established. Since RDU knowledge was associated with prior training, curriculum development towards RDU and opportunities for in-service training should be provided to build prescribers capacity, in addition to instituting a system of rational drug use monitoring. Further research into rational drug use among different cadres of PHC healthcare providers is also recommended.



## DECLARATION

I declare that *Drug prescribing practices of Primary Healthcare providers in a Local Government Area of Northwestern Nigeria* is my own work, that it has not been submitted for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged by complete references.

**Name: Oguntunde, Olugbenga Olalere**

Signed...



.....

**Date: 30<sup>th</sup> November, 2011**



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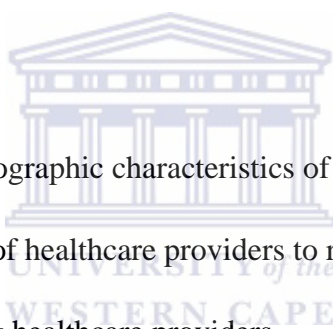
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# CONTENTS

<b>TITLE PAGE</b>	i
<b>KEYWORDS</b>	ii
<b>ABSTRACT</b>	iii
<b>DECLARATION</b>	v
<b>ACKNOWLEDGEMENTS</b>	vi
<b>CONTENTS</b>	vii
<b>LIST OF TABLES AND FIGURES</b>	x
<b>ACRONYMS</b>	xi
<b>DEFINITIONS</b>	xii
<b>CHAPTER 1 - INTRODUCTION</b>	
1.1 Introduction	1
1.2 Problem Statement	5
1.3 Rationale for the study	6
1.4 Aim and objectives of the study	7
<b>CHAPTER 2 - LITERATURE REVIEW</b>	
2.1 Introduction	8
2.2 Knowledge and Attitude of healthcare providers on rational use of drugs	9
2.3 Patterns of irrational use of drugs in health facilities	10
2.4 Factors influencing drug prescribing practices of healthcare providers	17
<b>CHAPTER 3 - METHODOLOGY</b>	
3.1 Study design	20
3.2 Study setting	20



3.3 Study population	21
3.4 Sample size determination	22
3.5 Sampling technique	22
3.6 Data collection	23
3.7 Data management and analysis	25
3.8 Validity and reliability	25
3.9 Limitations	26
3.10 Ethical considerations	27
<b>CHAPTER - 4 RESULTS</b>	
4.1 Introduction	28
4.2 Distribution and socio-demographic characteristics of healthcare providers	29
4.3 Knowledge of and attitude of healthcare providers to rational drug use	32
4.4 Prescribing practices among healthcare providers	38
4.5 Factors influencing rational drug use	40
<b>CHAPTER 5 - DISCUSSION</b>	
5.1 Introduction	42
5.2 Profile of healthcare providers	42
5.3 Practice of rational drug use by healthcare providers	45
5.4 Healthcare providers and knowledge of rational drug use	47
5.5 Healthcare providers attitude to rational use if drugs	50
5.6 Factors affecting rational use of drugs by healthcare providers	51



## **CHAPTER 6- CONCLUSION AND RECOMMENDATIONS**

6.1 Conclusion	52
6.2 Recommendations	52
<b>REFERENCES</b>	54
<b>APPENDICES</b>	62
Appendix I: Data collection tools	62
Appendix II: Participants' information sheet	67
Appendix III: Consent form	69



## **LIST OF TABLES AND FIGURES**

Table 1: Distribution of healthcare providers by facility

Table 2: Socio-demographic characteristics of healthcare providers

Table 3: Healthcare providers' knowledge of rational drug use

Table 4: Healthcare providers' level of computed knowledge of Rational Drug Use

Table 5: Healthcare providers' primary source of information and attendance at Rational Drug Use training

Table 6: Cross tabulation of healthcare providers' level of knowledge of Rational Drug Use and professional status, duration of service and having received training in the past year

Table 7: Healthcare providers' attitude to Rational Drug Use

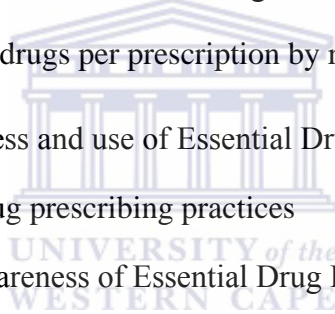
Table 8: Distribution of number of drugs per prescription by retrospective review and survey

Table 9: Healthcare providers' access and use of Essential Drugs List

Table 10: Factors that influence drug prescribing practices

Figure 1: Healthcare providers' awareness of Essential Drug List

Figure 2: Selected prescribing indicators by retrospective review and survey



## ACRONYMS

CHEW	Community Health Extension Worker
CHO	Community Health Officer
EDL	Essential Drug List
FMOH	Federal Ministry of Health
INRUD	International Network for the Rational Use of Medicine
JCHEW	Junior Community Health Extension Worker
LGA	Local Government Area
PHC	Primary Health Care
RDU	Rational Drug Use
SCHEW	Senior Community Health Extension Worker
WHO	World Health Organization



## DEFINITIONS

Drug use indicators	Indices used to measure performance in rational use of drugs. It comprises core indicators (measures prescribing practices of healthcare providers, patients' care, and health facility factors) and complementary indicators (additional measures of rational drug use) (WHO, 1993).
Essential drugs/medicines	Drugs that satisfy the priority health care needs of the population (WHO, 2000).
Generic prescribing	Drug prescribing using non-propriety titles for a pharmaceutical preparations (WHO, 2001).
Rational Drug Use	Drug prescribing resulting in patients receiving medications appropriate to their clinical needs, in doses that meet their individual requirements for an adequate period of time and at lowest cost to them and their community (WHO, 2001).
Standing Order	A set of specific guidelines arranged by symptoms which defines how clients with different conditions should be cared for and designed to be used by community health workers and other health workers at the PHC setting in Nigeria (FMOH, 1995).



# CHAPTER 1

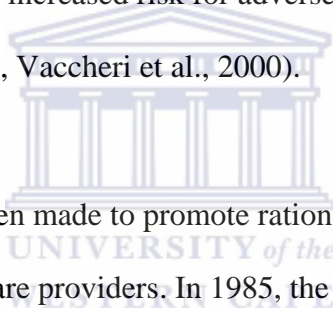
## INTRODUCTION

### 1.1 Introduction

Drugs are vital components of the health system and their availability in health facilities is one of the most visible symbols of quality of care to consumers (Uzochukwu et al., 2002). In addition to drugs being available, their rational use has also been identified to be an essential ingredient in enhancing provision of quality and efficient healthcare services (Chareonkul et al., 2002). The World Health Organization (WHO) defined rational drug use as “when patients receive medications appropriate to their clinical needs, in doses that meet their individual requirements for an adequate period of time and at lowest cost to them and their community” (WHO, 1985). However, inappropriate, ineffective and inefficient use of drugs in health facilities are common public health problems globally (Garjani et al., 2009). Even though it is a global problem, inappropriate drug use is particularly prevalent in developing countries (Chuckwuani et al., 2002). The use of inappropriate or ineffective drugs, misuse of effective drugs, use of combination products with no justifiable advantage over other single preparations, and other irrational prescribing practices such as polypharmacy, non generic prescribing practices, overuse of antimicrobials and injections were reported as common practices in several developing countries (Hafeez et al., 2004).

In many developing countries, including Nigeria, between 20-50% of the health budget is spent on pharmaceuticals (Govindaraj et al., 2000). Nevertheless, significant proportions of the

population in need of drugs still have limited access to them due to non-availability, high cost or inappropriate prescribing practices by healthcare providers. Even though ensuring a regular supply of essential affordable drugs may improve the quality of care and attendance at health facilities, it may still not translate into optimal improvement in health outcomes if irrational use of these drugs continues to plague the health systems. In fact, in many developing countries, irrational drug use remains a major concern at all levels of healthcare but with preponderance at the primary care levels such as the PHC centres, and especially in rural areas where supervision and controls on the activities of healthcare providers are usually less rigorous. These practices often result in serious consequences such as, reduction in the quality of drug therapy, wastage of resources, increased treatment cost, increased risk for adverse drug reactions, and emergence of drug resistance (Siddiqi et al., 2002, Vaccheri et al., 2000).



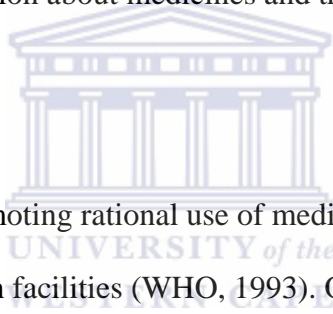
Worldwide, several efforts have been made to promote rational use of medicine including rational prescribing among healthcare providers. In 1985, the WHO Conference of Experts on the Rational Use of Drugs, held in Nairobi Kenya, served as an important landmark in the promotion of rational drug use around the world (WHO, 1985). The International Network for the Rational Use of Medicine (INRUD) was established in 1989 to conduct multidisciplinary intervention research to promote rational use of medicines. The first and second International Conferences on the Irrational Use of Medicine (ICIUM) were held in Chiang Mai, Thailand in 1997 and 2004 respectively (WHO, 2004b). The two conferences provided avenues for national and international policy makers, program managers, researchers, clinicians, and other stakeholders to create awareness on irrational use of medicines and interventions to improve medicines use, especially in non-industrialized countries where the problem is more prevalent.

Moreover, the 6<sup>th</sup> World Health Assembly in 2007 through its Resolution WHA60.16 provided recommendations to member countries, the secretary General of the United Nations and other stakeholders on measures needed to be adopted towards rational use of medicines (WHO, 2004b).

Similarly in the last two decades the WHO and other stakeholders have promoted rational use of medicines across the world, most especially in developing countries (WHO, 1994, WHO, 2006). Cardinal among its efforts was the Bamako Initiative which was launched in 1988 (Ebrahim, 1993). The aim of this initiative was to provide strategic support for local governments in developing countries to assist them in strengthening the provision of primary healthcare (PHC) through ensuring a steady supply of essential drugs, promotion of drug prescription by generic names, as well as improving prescribing practices of health providers. More recently, interventions such as establishment of national committees to coordinate policies on medicine use, use of clinical guidelines, development and use of national essential medicines list, establishment of drug and therapeutics committees in districts and hospitals among others have been advocated to promote more rational use of medicines (WHO, 2002).

In Nigeria, the essential drugs programme was first introduced in 1988 with financial and technical support from the WHO, United Nations' Children's Fund (UNICEF) and UK Department of International Development (DFID) (FMOH, 1994). At its inception this programme had the preparation of an essential drugs list and development of a system of rational use of drugs as part of its objectives (FMOH, 1994). Since then, several efforts at all levels of

government have been introduced to promote rational use of medicine among healthcare providers. Some of these efforts include establishment of a national committee on rational use of medicine, development of national essential medicine list and formulation of clinical treatment guidelines, whilst others include sensitization of healthcare providers and other stakeholders on rational use of medicine and training of healthcare providers about rational use of drugs (FMOH, 2005). Despite these efforts, irrational use of medicine still continues to be a major problem in health facilities, most especially at the primary care level where the majority of the work force are of the lower cadres of health care providers (Olayemi et al., 2006). At this level of healthcare, continuous medical education among health workers and adequate supervision are often poor resulting in minimal or no information about medicines and their rational use (Pakenham-Walsh and Bukachi, 2009).



As part of the global efforts at promoting rational use of medicine, INRUD generated indicators for assessment of drug use in health facilities (WHO, 1993). Over the years these indicators have been extensively field-tested and refined and have been used to assess rational use of medicines in health facilities in many parts of the world. The indicators were designed to assess clinical or economic aspects of inappropriate use of medicines. In addition to this, it was also intended to serve as a supervisory tool in health facilities or to measure the effect of an intervention towards rational use of medicines (WHO, 1993). Of these indicators, the core drug use indicators comprise prescribing indicators, patient care indicators and health facility indicators. The prescribing indicators assess prescribing practices of healthcare providers. Considering the important roles that prescribing practices play in rational use of medicines, this present study

therefore focused on prescribing practices of healthcare providers at the primary healthcare facilities in a local government area of Northwestern Nigeria.

## **1.2 Problem statement**

Inappropriate prescribing is a major public health problem in Nigeria. Polypharmacy, non generic prescribing practices, misuse of antibiotics and overuse of injections are various forms of irrational use of medicines that have been described at all levels of healthcare in Nigeria. (Enwere et al., 2007, Akande and Ologe, 2007, Olayemi et al., 2006). Despite the various measures put in place to address these problems, the situation has not changed significantly as recent studies still report similar findings (Olayemi et al., 2006, Akande and Ologe, 2007, Adebayo and Hussain, 2009). The direct implication of this is a reduction of quality of drug therapy. Besides the increased cost of treatment and wastage of resources, other problems associated with inappropriate prescribing include the increased risk of adverse drug reactions and emergence of drug resistance. Among the various types of inappropriate use of medicines, misuse of antibiotics and injections are particularly common in Nigeria. For example, a 2002 WHO survey documented that 60% of antibiotics in Nigeria, were prescribed unnecessarily (WHO, 2006). Apart from the economic waste and non-optimal patient care that might result from this, anti-microbial resistance could also develop necessitating the use of newer more expensive antibiotics (Vaccheri et al., 2000, Siddiqi et al., 2002) . Similarly, in many healthcare settings in developing countries including Nigeria, misuse of injections and poor adherence to universal precautions have been noted to be particularly prevalent (Kermode, 2004, Jacob et al., 2010). The misuse of injections coupled with practices such as re-use and use of non-sterilized

needles may increase the transmission of blood borne infections such as hepatitis and HIV, thus increasing the burden of morbidity and mortality resulting from these diseases.

### **1.3 Rationale for the study**

Nigeria's health system has adopted the primary health care (PHC) approach which includes as one of its components provision of essential drugs, and for this to be successful rational use of essential drugs is a critical factor (FMOH, 2004). Prescribing practices of healthcare providers is a crucial component of rational drug use, as rational use translates into significant health gains for patients and the health system generally (WHO, 2006). Studies focusing on rational drug use and especially prescribing practices of healthcare providers at the primary health care level are therefore important in contributing to the overall success of PHC in the country and ultimately to the smooth functioning of its health system. A number of studies on providers' prescribing practices have been conducted in the southern part of Nigeria but there are few drug use studies from the northern part and more especially at the primary care level. This study documents drug use among primary healthcare providers in a local government area of Northwestern Nigeria and it is hoped that the findings will serve as a baseline for future drug use studies. The study also documents factors that affect rational drug use at this level of care, and it is hoped that these findings will create both awareness among health providers and other stakeholders of rational drug use, and will assist policy makers in further reviewing and implementing policies related to rational drug use.

## **1.4 Aim and objectives of the study**

**Aim** To assess rational drug use among healthcare providers working in public primary health care facilities in Zaria Local Government Area (LGA), Northwestern Nigeria.

### **Specific objectives**

1. To assess the level of knowledge and attitude about rational drug use among healthcare providers in public primary healthcare facilities in Zaria LGA
2. To determine the prescribing practices of healthcare providers in public primary healthcare facilities in Zaria LGA
3. To determine factors that influence rational drug use by healthcare providers in public primary healthcare facilities in Zaria LGA.



## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Introduction

Many drug use studies have been conducted around the world to assess rational use of medicines (WHO, 2004a). The WHO's drug use indicators have been used in most of these studies (Hogerzeil et al., 1993). These indicators are classified into core indicators and complementary indicators. The core indicators were developed to be used as measures of performance in three general areas related to the rational drugs use: prescribing practices by health providers, key elements of patient care including consultation and pharmaceutical dispensing, and availability of facility-specific factors such as drug policies and regulations which support rational use (WHO, 1993). Complementary indicators measure providers' effectiveness in use of non-pharmaceutical therapies, cost considerations, adherence to treatment guidelines, quality of care received by patients and access to impartial drug information. These indicators are sometimes used in addition to core drug indicators, although they are often more difficult to obtain and are highly sensitive to the local context (WHO, 1993).

The pioneering studies on drug use in health facilities started in late 1989 and early 1990s. The majority of these studies were designed to evaluate the impact of essential drug programmes on rational drug use in various countries with many focusing on the core drug use indicators (Hogerzeil et al., 1989, Walker et al., 1990, Bannenberg et al., 1991, Hogerzeil et al., 1993). These studies were generally aimed at describing the current prescribing practices and



monitoring specific drug use behavior in the countries where they were conducted. More recently however, in addition to assessing current prescribing practices, studies have focused on elucidating factors that influence rational use of medicines in health facilities and the evaluation of effectiveness of specific interventions aimed at addressing these problems in different settings (WHO, 1993).

In Nigeria, most studies on rational drug use have focused on drug prescribing patterns among healthcare providers using the core drug use indicators and almost all of these studies have been carried out in the southern part of the country (Nwolisa et al., 2006 , Erah et al., 2003, Olayemi et al., 2006, Ibrahim, 2004, Ogunnowo and Asuzu, 2003, Odusanya, 2006, Enwere et al., 2007). Even though these studies documented the drug use profile in health facilities, many did not focus on the factors that were responsible for the pattern of drug use. The few studies that looked at factors influencing prescribing practices were conducted in secondary healthcare facilities (Erah et al., 2003, Adebayo and Hussain, 2009). For example, Erah et al. (2003), in addition to documenting prescribing practices, interviewed 40 prescribers about factors affecting prescribing practices. Similarly, the baseline study by Adebayo et al. (2009) in a military hospital in Lagos, Southern Nigeria, documented the factors that influenced drug use among health workers in the that setting.

## **2.2 Knowledge and attitude of healthcare providers on rational use of drugs**

Healthcare providers' knowledge of rational use of drugs is an important determinant of their prescribing behavior (Garjani et al., 2009 ). Despite this, studies that focused on providers'

knowledge as it relates to their prescribing behavior are still limited. In a study to assess the impact of an essential drug programme on availability and rational use of drugs in Yemen, Hogerzeil et al reported that healthcare workers that were trained on rational use of medicines scored slightly, but not significantly, better in a test on theoretical knowledge on rational drug use (Hogerzeil et al., 1989). However, the study noted considerable differences in the prescribing patterns in the study areas. Adebayo et al in a cross-sectional descriptive study of Nigerian army hospitals documented that only 12.1% of respondents, who were mainly physicians, could correctly detail the steps in rational prescribing practices (Adebayo and Hussain, 2010). In a similar study among medical assistants in Ghana, Ofori- Adjei et al reported that improving prescribers' knowledge of rational drug use through in-service training improved their knowledge but not their prescribing behavior (Ofori-Adjei and Arhin, 1996). In contrast, a study carried out in Zimbabwe found that improving nurses' knowledge of rational drug use through on the job training improved their prescribing practices (Masango, 1994). These findings show that the success of training as a means of improving prescribers' knowledge and practice on rational drug use may be dependent on their professional status.

### **2.3 Patterns of irrational drug use of drugs in health facilities**

Various patterns of irrational drug use have been described in several drug use studies. These include polypharmacy, irrational use of anti-microbial agents, and irrational use of injections (Olayemi et al., 2006, Otoom et al., 2010). Most of these studies were cross sectional descriptive studies that looked at current prescribing practices of health workers and adopted the WHO's drug use indicators and guidelines on how to investigate drug use in health facilities.

Polypharmacy is measured by average number of drugs per encounter, while the percentage of drugs prescribed by generic name measures the tendency of prescribers to prescribe using generic names, as opposed to brand (trade), names. The percentage of encounters with an antibiotic or injection measures the overall use of antibiotics or injections, which are two commonly overused and costly forms of drug therapy. The percentage of drugs prescribed from the essential drug list or drug formulary measures the degree to which prescribing practices conforms with national drug policy and treatment guidelines (WHO, 1993).

Even though there is no agreed reference values for the WHO core drug use indicators for all regions of the world due to differences in disease patterns, researchers have used different methods to arrive at reference values. In Nigeria, local reference values for the WHO core prescribing indicators were computed using survey-derived morbidity data and locally appropriate treatment guidelines developed by a panel of health care providers. They suggested the following: average number of drugs per encounter (1.6-1.8); percentage encounters with injections (10.1%-17.0%); and with antibiotics (20.0%-25.4%); percentages of drugs prescribed by generic name and those prescribed from the essential drug list were assigned 100.0% each (Isah et al., 2001).

### ***2.3.1 Polypharmacy***

Polypharmacy involves the use of too many medicines per patient. It is generally a common problem in medical practice but especially in geriatric and psychiatric care where prevalence may be as high as 39.5% (Bregnhøj et al., 2007, Junius-Walker et al., 2006). Some authors have

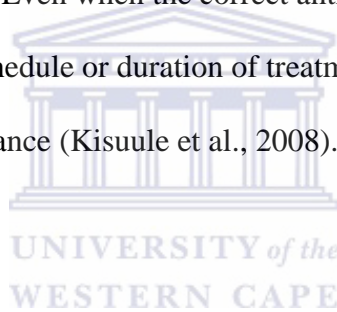
differentiated between appropriate polypharmacy and inappropriate polypharmacy noting that polypharmacy may be appropriate when patients correctly receive multiple drug therapy for their multiple co-existing medical problems (Milton and Jackson, 2007, Aronson, 2004). However, inappropriate polypharmacy may result in several serious consequences such as non-compliance with medications, drug interactions, adverse drug reactions and waste of resources. Several drug studies in Nigeria have reported the problem of polypharmacy. For example, studies done in a military hospital in Lagos (Adebayo and Hussain, 2009), public hospitals in Lagos (Chuckwuani et al., 2002 ) and Ilorin (Akande and Ologe, 2007) found an average number of drugs per prescription to be 3.0, 3.16 and 3.99 respectively. A comparative study of drug use patterns in PHC facilities on the basis of the operational Bamako Initiative (BI) drug revolving fund programme revealed an average of 5.3 drugs per prescription in facilities operating the drug revolving fund, in contrast to 2.1 in facilities not operating the programme. Studies in primary healthcare facilities from other parts of Africa (Nsimba et al., 2004, Desta et al., 1997) and Asia (Bhartiy et al., 2008, Guyon et al., 1994, Hafeez et al., 2004, De Costa et al., 2008) all reported average drug prescription per patient of more than 2.5. In a more comprehensive study involving twelve developing countries, an average number of drugs ranging from 1.3 to 2.2 was reported in ten out of twelve developing countries, but with Nigeria and Indonesia having values of 3.8 and 3.3 respectively (Hogerzeil et al., 1993).

### ***2.3.2 Irrational use of anti-microbial drugs***

Antimicrobials are a group of drugs that are often used irrationally. Among the various antimicrobial drugs, misuse of antibiotics is particularly prevalent and has been reported in

several studies. Inappropriate or overuse of antibiotics is especially common in developing countries where antibiotics may be prescribed by any clinician and purchased without prescription (Thamlikitkul et al., 1998). Ochoa et al (2009) observed that due to unregulated antibiotic use in Lima Peru, antimicrobial drug resistance in *E. coli* was associated with a high frequency of antibiotic use for diarrhea in a cohort study of infants (Ochoa et al., 2009).

Irrational use of antibiotics may take several forms: antibiotics may be given for illnesses for which they are not indicated, especially in many viral infections which may not warrant the use of antibiotics; broad-spectrum antibiotics may be overused in the empiric treatment of common infections; and intravenous antibiotics may be prescribed by healthcare providers when oral agents would have been sufficient. Even when the correct antibiotic choice is made, inappropriate antibiotic dosage, schedule or duration of treatment can threaten patient safety as well as increasing the risk of resistance (Kisuule et al., 2008).



The consequences of inappropriate use of antimicrobials are far more serious and severe compared with other groups of drugs. Like other drugs, overuse of antimicrobials may result in sub-optimal patient care, increased morbidity and mortality due to side effects, as well as wastage of financial resources, but more importantly, antimicrobial misuse may induce resistance of infectious organisms to these antimicrobials (Awad et al., 2006). In Ghana for example, 80% of patients attending government health facilities in Wassa district were prescribed an antibiotic (Bosu and Ofori-Adjei, 2000). Several studies have reported a consistent antibiotic use rate exceeding 50% in Nigeria. In a 2002 baseline survey carried out to assess the pharmaceutical sector in Nigeria, the report showed that 59% of patients were prescribed

antibiotics (FMOH, 2002). Similarly, a comparative study of prescribing practices between private and public health care facilities in Southern Nigeria revealed that 55% of prescriptions from private facilities included at least one antibiotic, while those from public facilities had 75% (Erah et al., 2003). Other studies in secondary health facilities in Nigeria have reported similar findings (Chuckwuani et al., 2002 , Nwolisa et al., 2006 , Olayemi et al., 2006). In addition, inadequate dose and duration of treatment have also been documented leading to the development of resistant strains of micro-organisms (Siddiqi et al., 2002). This is particularly important in diseases such as malaria and tuberculosis where inadequate or inappropriate use of antimicrobials have been reported to contribute greatly to evolution of resistant strains which have significant public health consequences (Wongsrichanalai et al., 2010).



### ***2.3.3 Irrational use of injections***

Irrational use of injections involves overuse of injections when oral formulations would be more appropriate. This practice has been identified as a serious public health problem in several drug studies from developing and transitional countries, with some documenting values as high as 39.3% (Hauri et al., 2004, Janjua et al., 2005, Awad and Himad, 2006, Yvan et al., 2003). In addition to its irrational use, injection use in these regions is usually accompanied with reuse of injection equipment without adequate sterilization (Yvan et al., 2003). Reuse of injection equipment has been documented to be associated with increased transmission of blood borne infections such as hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV) infections (Janjua et al., 2005, Simonsen et al., 1999).

In Nigeria, several studies have reported injection use in the 40-70% range (Odusanya, 2006). The baseline survey of the Nigerian pharmaceutical sector documented a mean injection prescription rate of 55%, while values between 10.8% and 40.6% were reported by other researchers (Ibrahim, 2004, Akande and Ologe, 2007). Studies from other parts of West and Central Africa reported a similarly high injection prescription rates (Massele and Mwaluko, 1994, Bosu and Ofori-Adjei, 2000, Nsimba, 2006). All these may result in increased transmission of blood borne infections such as HIV and hepatitis, in addition to adverse drug reactions.

#### ***2.3.4 Rational drug use and generic prescribing***

Generic prescribing is the practice of prescribing using the non-proprietary title for a pharmaceutical preparation. Drug prescribing using generic names has been identified to be an indicator of good prescribing practice. The practice allows for the flexibility of dispensing any suitable generic drug rather than a particular brand of the drug. Generic prescribing can minimize the cost of purchasing drugs because cheaper alternatives can be prescribed. Apart from saving cost, it also ensures the availability of a wider range of alternative preparations that may prevent delays in drug dispensing. Generic products are almost always cheaper and more available than branded products. The practice of generic prescribing also reduces confusion as only one name for a drug is used instead of several branded names. However in many developing countries, there is a low rate of generic prescribing among healthcare providers. Generic prescribing of 10.2% was documented among primary healthcare providers in Bahrain (Otoom et al., 2010). Bharti et al (2008) found that generic prescribing among primary healthcare providers in Madhya Pradesh India was 48.5%. Similarly, situations whereby the percentage of drugs

prescribed in generic is less than 50% have been documented in many parts of developing countries (De Costa et al., 2008, Pavin et al., 2003 Feb, Santos and Nitrini, 2004 May). In contrast, generic prescription rates of 99.8% and 87% were described among primary healthcare workers in Cambodia and Tanzania (Chareonkul et al., 2002, Nsimba, 2006 ). In Nigeria, most drug studies that looked at generic prescribing also documented low practices among healthcare providers. Adebayo and Hussain (2009) documented 43.8% of drugs prescribed in generic while Akande and Ologe (2007) Olayemi et al (2006) reported 43% and 50% respectively (Adebayo and Hussain, 2009, Akande and Ologe, 2007, Odusanya, 2006).

### ***2.3.5 Rational drug use and the Essential Drug (Medicine) List***

Essential Medicines are defined as those medicines that satisfy the priority health care needs of the population and which need to be available at all times in adequate amounts and in appropriate dosage forms at all levels of the health care delivery system of the country (Kar et al., 2010).

The adoption of an essential medicine list is a key strategy for achieving one of the goals of the national drug policy which is to increase availability of essential drugs in the country (FMOH, 2003). The use of an essential medicine list makes medicine management easier in many ways. Procurement, storage and distribution are easier if fewer items are involved. Furthermore, prescribing and dispensing also become simpler for professionals as they would need to be familiar with few items.



## **2.4 Factors influencing drug prescribing practices of healthcare providers**

Many factors have been identified as influencing drug use and prescribing practices of healthcare providers. Conventionally these factors have been divided into three broad groups: health system related factors, healthcare provider factors, and patient factors. Health system related factors include the organization and processes of healthcare delivery system, which may include drug policy initiatives that determine availability or restriction of prescription drugs in health facilities and regulation of professional practice. Aggressive promotion and marketing of drugs by the pharmaceutical industries and high prevalence of fake and adulterated drugs in the community are also system related factors that may influence providers prescribing practices (Spurling et al., 2010, Vancelik et al., 2007, Erah et al., 2003). Health provider factors include knowledge, training and skills of the provider, access to objective independent information about drugs, opportunities for continuing medical education, especially on drug use, incentives and remuneration of healthcare providers (WHO, 2002). Patient factors such as socio-economic factors, their perception of their illness and expectations from healthcare providers, educational level and cultural backgrounds have also been identified as factors that influence patterns of drug prescribing by health workers (Boonstra et al., 2002, Kotwani et al., 2010, Ljungberg et al., 2007, Tan et al., 2009). These factors may operate singly or in combination in influencing the patterns of drug use by healthcare providers in health facilities.

For example, a cross sectional exploratory study of factors influencing prescribing practices among general practitioners in primary health centres in Turkey found that the majority (73.7%) consulted pharmaceutical guides from pharmaceutical companies in cases of problems with drug

prescribing (Vancelik et al., 2007). In this study other self reported factors found to be statistically significant in influencing prescribing behavior included participation in training activities organized by drug companies, promotional activities by sales representatives, heavy daily patient load and years of practice. In a similar qualitative study among doctors at the secondary level of care in Sweden, it was reported that patient-specific factors and cost were important considerations for healthcare providers when prescribing (Ljungberg et al., 2007). Other factors that influenced the prescribing habits of these doctors included written information sources, advertisements, personal practice, information from colleagues and the drug use tradition in the health facility. Tan et al's qualitative study among family physicians in China using focus group discussions indicated that medical training and acquisition of asthma-related information and updates were important considerations that influenced their drug prescribing practices for their asthmatic patients. In addition, cost of drugs and treatment, uncertainty of disease diagnosis, concern about drug side effects as well as patients' beliefs and their perceptions of the disease and treatment were significant considerations for the family physicians (Tan et al., 2009). In Nigeria, Erah et al identified patient factors (demand, culture, attitude and socio-economic status), prescriber factors (pre-qualification training, in-service education, work load and feedback from patient responses), drug factors (availability and cost) and the influence of industry as important influences on healthcare prescribing practices (Erah et al., 2003).

A major limitation of most drug use studies in Nigeria is that they have focused on prescribing behavior of health workers working in secondary or tertiary health facilities. These studies, and the few that assessed prescribing practices at the PHC level, failed to explore the factors that may be responsible for the identified pattern of drug use. Thus, there is a need to conduct drug use

studies at PHC level that both measure the magnitude and pattern of irrational drug use, and also identify the reasons that may influence the observed patterns of drug use. Information from these studies would assist immensely in designing evidence-based strategies to address the problem of irrational drug use at the PHC level.



## CHAPTER 3

### METHODOLOGY

#### 3.1 Study design

The study was a descriptive cross sectional study which assessed the level of knowledge of rational drug use, drug prescribing practices and factors that influenced rational drug use among primary healthcare providers in Zaria LGA, Northwestern Nigeria. The WHO standardized methodology, tools and indicators were adapted for use in the study (WHO, 1993). A cross-sectional descriptive study design was chosen and considered the most appropriate design to use for this study because the study was a preliminary study into the problem of rational drug use in the North-western part of the country. The use of this design assisted in gathering preliminary information from which hypotheses could be generated about prescribing practices of health providers.



#### 3.2 Study setting

Zaria Local Government Area (LGA) is located in Kaduna state, Northwestern Nigeria. It is an urban LGA with an estimated population of 408,198 according to the 2006 census (NPC, 2006). The predominant ethnic group is Hausa/Fulani, and the majority of the inhabitants are Muslims working as civil servants or farmers. The health department of the LGA consists of the following units: Maternal and Child Health/Family Planning, Medical, Disease Control, National Program on Immunization, Essential Drug Supply, and Monitoring and Evaluation units. There are 33 public PHC facilities divided among the 13 wards that make up the local government. Of these, seven are primary health centres while the rest are basic health centres. Both types of health

centres provide curative services for simple and acute ailments in addition to preventive and promotive services. However, primary health centres have in addition a limited number of beds for admission of acute cases. Basic health centres usually have fewer staff compared to primary health centres. The health department of the LGA has a total of 354 healthcare providers at its public PHC facilities. This comprises 192 community health assistants (Community Health Officer (CHO) and Community Health Extension Workers (CHEWs)), 33 nurses/midwives, 106 environmental health officers, 13 pharmacy technicians and 10 laboratory technicians. In addition, medical officers, when available, work at the health facilities and provide both medical and supervisory functions. In facilities with no medical officers, the CHO has both supervisory and medical responsibilities. The CHEWS, on the other hand are responsible for preventive and promotive health activities in the LGA. In many primary healthcare facilities in most LGAs across the northern parts of Nigeria, there are no medical officers, hence the nurses/midwives, CHOs and CHEWs are responsible for prescribing drugs. Complicated cases that cannot be managed at this level are referred to secondary healthcare facilities.

### **3.3 Study population**

The study population included all 33 public PHC facilities in the LGA (seven primary health centres and 26 basic health centres) and patient encounters were drawn from these facilities. In addition, the 225 prescribing healthcare providers in these health facilities were included in the study. The PHC facilities were the primary sampling unit.

### **3.4 Sample size determination**

#### ***3.4.1 Health facilities and Patient encounters***

The sample size for this study was calculated using methods recommended by the WHO for drug use indicator studies. According to this method, the goal of a drug use study should be to estimate percentage indicators that summarize values for the sample as a whole with a 95% confidence interval and a precision level of  $\pm 7.5\%$  (WHO, 1993). Based on this, at least 600 patient encounters were included in the study, with 30 each selected from the 20 selected health facilities.

#### ***3.4.2 Health providers***

All 163 prescribing health providers at the 20 sampled health facilities were included in the study.



### **3.5 Sampling technique**

A multistage sampling technique involving two stages was used in this study. The first stage involved sampling the health facilities, which were the primary sampling unit. Twenty health facilities were sampled through systematic random sampling from a sampling frame of 33 public health facilities in the study area. The health facilities were stratified according to the two types and their capacity in service delivery i.e seven primary health centres and 26 basic health centres. Twenty facilities were selected proportional to size according to this classification resulting in four primary health centres and 16 basic health centres being selected. A sampling interval was calculated by dividing the total number of health facilities in each category by total number of required sample. Thereafter, a number was randomly chosen by ballot between 1 and the

sampling interval to pick the first health facility. Subsequently, the sampling interval was added to the previous number until 20 health facilities were selected.

The second stage involved sampling of 30 patient encounters (secondary sampling units). In each sampled health facility, patient encounters were selected retrospectively over a period of one year (January 2010- December 2010) using stratified random sampling. The total number of prescriptions were ascertained for the whole year and arranged chronologically. The sampling interval was computed by dividing the total number of prescription for the study period (January 2010 - December 2010) in each health facility by 30. A number was chosen at random between 1 and the sampling interval using balloting method to pick the first prescription. Other prescriptions were selected by adding the sampling interval to the previous figure.

### **3.6 Data collection**

Three data collection tools were used in this study: an adapted WHO's Detailed Indicator Encounter Form, Prescribing Indicator Form and a Structured Self administered Questionnaire designed by the researcher (Appendix I), each taking an average of 20, 15, and 10 minutes to be filled respectively.

***Tool 1: Detailed Indicator Encounter Form.*** This was administered at the record department of the selected health facility. From the selected prescriptions, information on patients' identification including age and sex, health problems as well as names and strength of the prescribed drugs were collected.

***Tool 2: Prescribing Indicator Form.*** This was used to collate the information from the 30 patient encounters entered in the Detailed Indicator Encounter Form from each health facility.

***Tool 3: Structured Self administered Questionnaire.*** This was administered to the prescribing healthcare providers in the selected health facilities. This was used to collect information on knowledge about rational drug use, and practices of rational prescribing practices among primary healthcare provider using the last prescription issued by the health provider prior to the interview.

The data were collected by the researcher with the assistance of three trained research assistants. The research assistants were recruited from the resident doctors at the Department of Community Medicine, Ahmadu Bello University Teaching Hospital, Zaria. They were considered to be suitable as research assistants for the study because they had background knowledge of pharmacology, and were familiar with pharmaceutical terms which were necessary to be able to reliably extract information from records and record them accurately. Before commencing the data collection a two day training session was conducted for the research assistants on the use of the study instruments as well as the methodology employed in the study. During the training, didactic presentations on the scope of the study, concepts of rational drug use with emphasis on the key indicators to be assessed, and practice sessions on sampling, data extraction and entry using the appropriate forms were conducted. All data collection tools were pretested in two of the health facilities (one primary health centre and one basic health centre) not selected for the study and appropriate revisions and corrections made before the commencement of data collection. For example, in the sections on attitude of healthcare providers to rational prescribing, some items were reworded to remove ambiguity in interpretation. Similarly, related questions were regrouped in the section on factors influencing rational prescribing to allow for easier flow of the questionnaire.



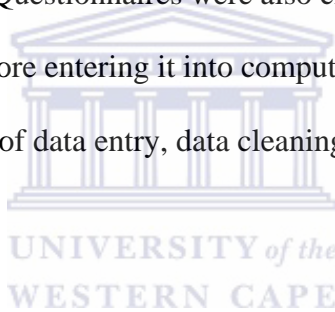
### **3.7 Data management and analysis**

The data collection took place between 4<sup>th</sup> January and 28<sup>th</sup> February 2011. All forms were checked for accuracy and completeness before leaving the health facility. Data were subsequently entered into the Statistical Package for Social Sciences (SPSS Version 17) software and summarized using means and standard deviations. Presentation of data was done using contingency tables and chi square test was used to test for relationship between variables with statistical significance taken at  $p < 0.05$ . Analysis of the drug use indicators was done based on selected WHO's standard indicators for assessing drug prescription patterns. This included the following: average number of drugs per prescription/encounter; percentage of encounters with antibiotic prescribed; percentage of encounters with injections prescribed; percentage of drugs prescribed by generic name; and percentage of drugs prescribed from essential drug list. In evaluating the levels of knowledge, a total of 15 items were scored (see Appendix 1 tool III section B, Questions 1-5 [Options in questions 3 and 4 were scored individually]) with every correctly answered question allocated 1 mark while incorrectly answered question attracted no mark. Aggregate scores were computed for each. The aggregate scores were further categorized into poor (0-6 correctly answered questions) and good knowledge (7-15 correctly answered questions). Bivariate analysis was conducted by cross tabulating practices with factors related to rational drug use.

### **3.8 Validity and Reliability**

Validity and reliability were achieved through standardization of all tools for data collection. Very importantly, the tools were adapted WHO drug use instruments which have been

standardized and used extensively in drug use studies across the world. The tools were pre-tested in similar settings prior to commencing the data collection for this study and several adjustments were made to improve clarity and flow of questions. The recruitment of research assistants was also carefully carried out as resident doctors with adequate knowledge of pharmaceutical terms were selected to ensure validity and reliability of collected data. In addition, the process of data collection was standardized by training the research assistants on the methodology of the study and use of the data collection tools before the commencement of the study. This ensured uniformity in the process of data collection. Spot checks of forms was carried out in the field by the researcher such that errors were promptly detected and corrections effected by the research assistants before leaving the field. Questionnaires were also checked for accuracy and completeness by the researcher before entering it into computer statistical software (SPSS Version 17). After the completion of data entry, data cleaning was carried out and accuracy ensured before final data analysis.



### **3.9 Limitations**

A major limitation of this type of study is availability of complete data on the patient records which may reduce the validity of the data collected (WHO, 1993). In this study, however, assessment of the availability and completeness of data in health facilities prior to commencement of study was found to be adequate. During the study, retrieving patients' cards was easy as they were kept in the medical record units of the health facilities and details of prescribed drugs was found to be adequate and easy to extract as prescribed medications were recorded on the patients' cards.

### **3.10 Ethical considerations**

Ethical clearance was obtained from the Research Ethics Committee of the University of the Western Cape and the ethical committee of Kaduna State Ministry of Health, Nigeria before embarking on the study. Permission was also sought from the local government chairman and management of the health facilities that were used for the study. The objectives and the scope of the study were duly explained to them (Appendix II). Prior to the administration of the questionnaires, written informed consent was obtained from sampled health providers and they were assured of the confidentiality of the information that was collected (Appendix III). All participants were assured of the voluntary nature of participating in the study and they were further informed that they might withdraw their participation at any period during the study without any consequences. Information collected from the study was kept in lockers in the custody of the researcher and the computer used for data entry was password protected to ensure its safety and confidentiality. At the end of the study, a meeting will be organized to disseminate the results of the study to healthcare providers, managers of the health facilities as well as officials from the health department of the local government.

## **CHAPTER 4**

### **RESULTS**

#### **4.1 Introduction**

This chapter is divided into four sections and it presents the findings in line with the study objectives. The distribution and socio-demographic characteristics of healthcare providers interviewed is presented first and followed by their knowledge and attitude to rational drug use. The findings on prescribing behavior of healthcare providers are presented thereafter, with factors affecting healthcare providers' rational prescribing following.

Twenty health facilities were included in the study, 600 patient prescriptions were reviewed and a total of 163 healthcare providers were interviewed. In each health facility, a list of all prescribing staff was obtained and each provider interviewed and those that were not present on the day of the survey were followed up and subsequently interviewed. Out of the 163 retrieved questionnaires, only 158 questionnaires were suitable for analysis as five were discarded because of incomplete entries, giving a response rate of 96.9%.

## 4.2 Distribution and socio-demographic characteristics of healthcare providers

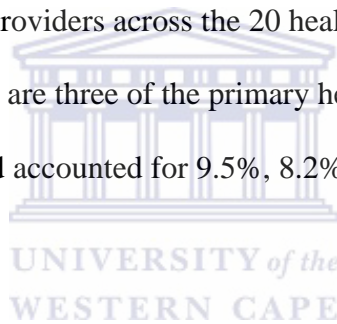
**Table 1: Distribution of healthcare providers by facility (N=158)**

Facility	Number (%) of healthcare providers	Facility	Number (%) of healthcare providers
A	8 (5.1)	K	7 (4.4)
B*	12 (7.6)	L	7 (4.4)
C*	15 (9.5)	M	6 (3.8)
D	9 (5.7)	N	5 (3.2)
E*	10 (6.3)	O	7 (4.4)
F	6 (3.8)	P	4 (2.5)
G*	13 (8.2)	Q	8 (5.1)
H	6 (3.8)	R	7 (4.4)
I	8 (5.1)	S	8 (5.1)
J	5 (3.2)	T	7 (4.4)

\*Primary health centre

The distribution of the healthcare providers across the 20 health facilities is as shown in table 1.

Health facilities C, G and B, which are three of the primary health centres, had the largest number of healthcare providers and accounted for 9.5%, 8.2% and 7.6% of all interviewed healthcare providers respectively.



**Table 2: Socio-demographic characteristics of healthcare providers (N=158)**

<b>Age group (yrs)</b>	<b>Frequency (n)</b>	<b>Percentage (%)</b>
20-24	4	2.5
25-29	32	20.3
30-34	14	8.9
35-39	40	25.3
40-44	35	22.2
45-49	18	11.4
50- 54	15	9.5
<b>Sex</b>		
Male	53	32.9
Female	105	67.1
<b>Marital status</b>		
Single	18	11.4
Married	137	86.7
Divorced/ Separated	3	1.9
<b>Tribe</b>		
Hausa	131	82.9
Fulani	17	10.8
Yoruba	4	2.5
Others	6	3.8
<b>Religion</b>		
Islam	150	94.9
Christianity	8	5.1
<b>Professional status</b>		
Nurse/Midwife	20	12.7
CHO	18	11.4
SCHEW	96	60.8
JCHEW	24	15.2
<b>Duration of service (yrs)</b>		
1-5	50	31.6
6-10	34	21.5
11-15	40	25.3
16-20	8	5.1
21-25	14	8.9
26-30	12	7.6

The frequency distribution of the socio-demographic characteristics of health providers is as shown in Table 2. Of the 158 healthcare providers, the age group with the highest frequency was 35-39 years, accounting for 25.3%. This was followed by those within the age group of 40-44

years with 22.2%. The mean age was  $37.2 \pm 8.1$  years. Females constituted the majority (67.1%) of all the health care providers and the majority (86.7%) were married. The predominant ethnic group among the healthcare providers was Hausa which constituted 82.9% while others (3.8%) included Kagoro, Ebira, Kataf, Jaba ethnic groups and the majority (94.9%) were Muslims. Most of the healthcare providers (60.8%) were SCHEWs, while JCHEWs and nurses accounted for 15.2% and 12.7% respectively. About a third of the healthcare providers had being in practice for 1-5 years while another quarter had practiced for 11-15 years. The mean duration of years of practice was  $10.7 \pm 8$  years.



### 4.3 Knowledge and attitude of healthcare providers to rational drug use

#### 4.3.1. Healthcare providers' knowledge about Rational Drug Use

**Table 3: Healthcare providers' knowledge of Rational Drug Use (N=158)**

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Understanding of Rational Drug Use</b>		
Judicious use of medicines in patient care	36	22.8
Drugs that are used in everyday practice	13	8.2
Drugs used in treating patients	18	11.4
Prescribing drug in a standard way	5	3.2
Don't know	86	54.4
<b>Ability to correctly detail Rational Drug Use sequence</b>		
Able to detail correct sequence	17	10.8
Unable to detail correct sequence	141	89.2
<b>Identified components of rational prescribing*</b>		
Choice of drugs	40	25.3
Dosage of drug	50	31.6
Route of administration	38	24.1
Duration	45	28.5
Generic prescription	42	26.5
Number of prescribed drugs	31	19.6
Information about drug	34	21.5
<b>Identified consequences of irrational drug use*</b>		
Sub-optimal care	78	49.4
Wastage of resources	30	19.0
Microbial resistance	22	13.9
Adverse drug reactions	26	16.5
Others	17	10.8

\*Responses with multiple options

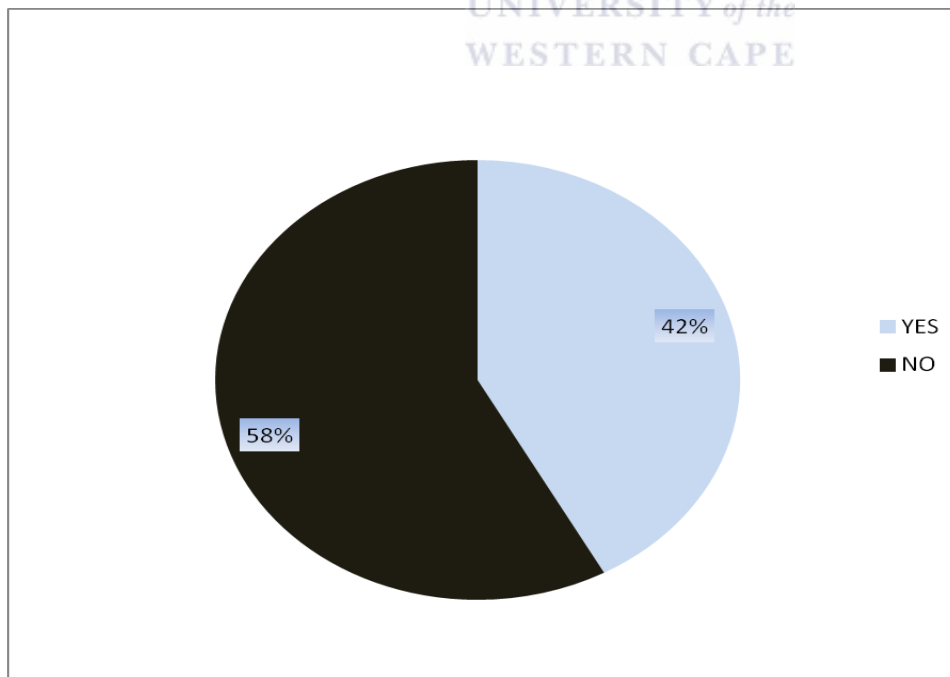
**Table 4: Healthcare providers' level of computed knowledge of Rational Drug Use (N=158)**

<b>Level of computed knowledge of Rational Drug Use</b>	<b>Frequency</b>	<b>Percentage</b>
Poor	116	73.4
Good	42	26.6

Knowledge of Rational Drug Use is an important determinant of prescribing practices of healthcare providers, however, as shown in table 3, more than half (54.4%) of the healthcare providers said they did not know what RDU was, with less than a quarter (22.8%) responding



correctly that it was ‘judicious use of medicine in patient care’. Only a few (10.8%) could detail the correct sequence of rational drug prescribing. Regarding identification of the components of rational prescribing, only about half of healthcare providers could correctly identify each of the components listed, with only 31.6% and 28.5% being able to identify dosage and duration of treatment as components respectively. Sub-optimal care, which accounted for 49.4%, was the highest identified consequence of irrational use of drugs, while less than a quarter identified other listed consequences. From the composite score {computed from 15 items with each correctly identified item awarded one mark and total score further categorized into good( $\geq 7$ ) and poor( $< 7$ )} of on knowledge of RDU, the majority (73.4%) of respondents had a poor level of knowledge of rational drug use (Table 4). Questions used in computing composite score included providers understanding of rational drug use, ability to detail sequence of rational drug use, identify components of rational prescribing and consequences of irrational prescribing.



**Figure 1: Healthcare providers’ awareness of Essential Drug List**

Figure 1 shows that just over half (58%) of healthcare providers were not aware of the Essential Drug List.

**Table 5: Health providers' primary source of information and attendance at Rational Drug Use training (N=158)**

<b>Source of information</b>	<b>Frequency</b>	<b>Percentage</b>
Advertisement by Drug companies	22	13.9
Standing order*	80	50.6
Drug formulary	4	2.5
Drug leaflet	50	31.6
Sales representative	2	1.3
<b>Awareness of National Drug Formulary</b>		
Aware	6	6.8
Not Aware	152	96.2
<b>Attendance at Rational Drug Use training in the last one year</b>		
Attended	17	10.8
Did not attend	148	89.2
<b>Total</b>	<b>158</b>	<b>100</b>

\*Treatment Guidelines for CHO and CHEWS

Table 5 shows that about half (50.6%) of healthcare providers indicated that they relied on Standing Order for information about prescription drugs while another 31.6% and 13.9% relied on drug leaflets and advertisement from drug companies respectively. On awareness of the National Drug Formulary, the majority (96.2%) indicated they were not aware. The majority of healthcare providers (89.2%) also indicated they had not received training in RDU in the previous year.

**Table 6: Cross tabulation of healthcare providers' level of knowledge of Rational Drug Use and professional status, duration of service and having received training in the past year (N=158)**

Variable	Level of knowledge	
	Poor	Good
<b>Professional status</b>		
Nurse /midwife	16	4
CHO	4	10
SCHEW	74	26
JCHEW	22	2
Total	116	42
Chi square=18.98	Df=3	P=0.00001
<b>Duration of service (years)</b>		
1-5	43	7
6-10	20	14
>10	53	21
Total	116	42
Chi square=7.88	Df=2	P=0.019
<b>Rational Drug Use training in the past year</b>		
Yes	5	12
No	111	30
Total	116	42
Chi square=18.9	Df=1	P=0.00001

Table 6 shows the relationship between healthcare providers' level of knowledge of RDU and professional status, duration of service and training. A statistically significant difference was found between the level of knowledge and professional status ( $p < 0.05$ ). In this study it was found that whilst the majority of nurse/midwives, SCHEWs and JSCHEWs interviewed were classified as having poor knowledge 16 (80%), 74 (74%) and 22 (91.7%) respectively, the majority of CHOs, 10 (71.4%) were classified as having good knowledge.

In the same table, while only a little more than half 20 (58.8%) of mid-career (6-10years) healthcare providers were classified as having poor knowledge of RDU the study found that the

majority 43(86%) and 53(71.6%) of providers in their mid and late career respectively were similarly classified as having poor knowledge.

Only a small proportion, 17(10.8%), of healthcare providers had received training in RDU in the past year. However of those who did, the majority 12 (70.6%) were classified as having good knowledge of RDU as compared to only 5 (21.3%) of those that did not. Duration of years of service and having received RDU training in the previous year also both show significant association ( $p<0.05$ ) with knowledge of RDU. This means there is an association between level of knowledge and professional status, duration of service and training in RDU in the previous year.

### 4.3.2 Healthcare providers' attitude to Rational Drug Use

**Table 7: Healthcare providers attitude to Rational Drug Use (N=158)**

<b>Response</b>	<b>SA (%)</b>	<b>A (%)</b>	<b>U (%)</b>	<b>D (%)</b>	<b>SD (%)</b>
Optimal patient care involves how drugs are prescribed for patient	83.5	8.9	6.3	0	1.3
A health worker may prescribe injection for patient if a patient demands for it	12.5	22.8	3.1	21.1	40.5
Antibiotics should be prescribed for all cases of URTI	60.8	15.5	8.9	3.8	11.0
It does not matter whether a health provider prescribe in generic or trade name	34.2	11.4	15.2	12.7	26.6
More drugs can be prescribed for patients to make him happy even if he does not need all the drugs	8.2	6.3	5.0	31.7	48.8
Drugs that are not in EDL may be prescribed for patients so far it is effective	15.3	10.1	52.3	6.1	16.2

\*SA= Strongly Agree; A=Agree; U=Undecided; D= Disagree; SD=Strongly Disagree

The attitude of healthcare providers to RDU is presented in table 7. The majority (83%) strongly agreed (SA) that optimal patient care involved how drugs were prescribed for patients with 6.3%

and 1.3% of respondents undecided (U) and strongly disagreeing (SD) respectively. Respondents who strongly agreed that a healthcare provider might prescribe injections on patients' demand accounted for 12.5% while 22.8% agreed (A). The majority (60.8% strongly agree and 15.5% agree) indicated that antibiotics should be prescribed for all cases of Upper Respiratory Tract Infection (URTI). Almost half felt that it did not matter whether a health provider prescribed in generic or trade name and this included 34.2% who Strongly Agreed, 11.4% who Agreed and 15.2% who were Undecided. On whether more drugs could be prescribed to meet patient demand even if the patient did not need all of the drugs, the majority of healthcare providers' strongly disagreed (48.8%) while 31.7% just disagreed (D). Almost half (52.3%) of the respondents were undecided whether an effective drug that is not in EDL should be prescribed for patients.



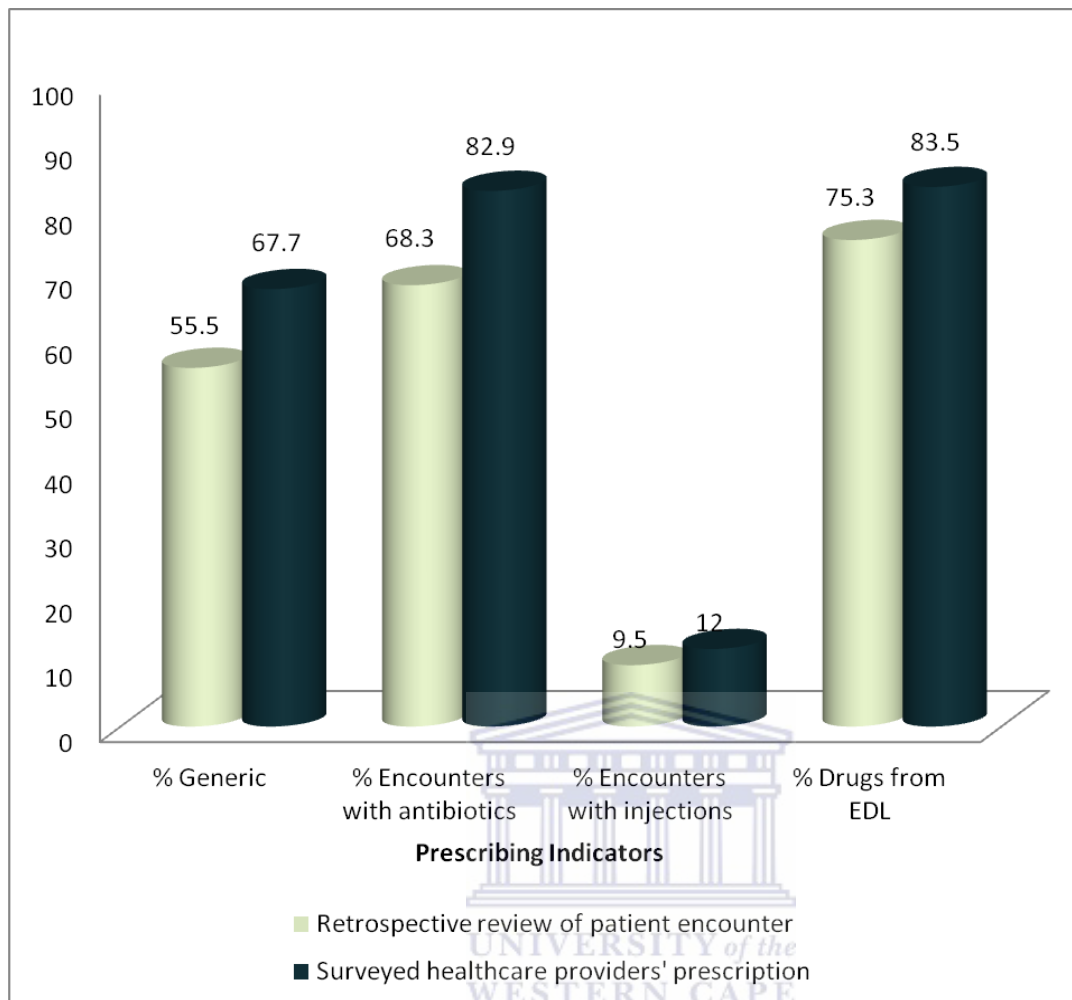
#### 4.4 Prescribing practices among healthcare providers

The prescribing practices of the healthcare providers were assessed using both retrospective audits of patient prescriptions as well as the last prescriptions by healthcare providers on the day of the survey. A total of 600 patient encounters, 30 from each of the 20 sampled health facilities were reviewed for the retrospective audit while 158 healthcare provider prescriptions (one prescription per healthcare provider included in the study) were also reviewed. The WHO's core rational drug use indicators were subsequently computed to assess prescribing practices.

**Table 8: Distribution of number of drugs per prescription by retrospective review and survey**

Number of drugs per prescription	Retrospective review of patient encounters (Jan-Dec 2010) N=600		Surveyed healthcare providers prescriptions (N=158)	
	Frequency	Percentage	Frequency	Percentage
None	2	0.3	0	0
1-2	50	8.3	10	6.3
3-4	480	80.0	118	74.7
5-6	61	10.2	27	17.1
7 and above	7	1.2	3	1.9
Mean	3.7±0.9		3.9±1.2	

Table 8 shows the majority of prescriptions were in 3-4 drugs/prescription category, accounting for 80.0% (mean=3.9±1.2) for retrospective review and 74.7% (mean=3.7±0.9) for surveyed prescriptions from healthcare providers respectively. The table also reflects that 0.3% and 0% of patient encounters did not receive any medications in the retrospective review and the survey, in contrast to 1.2% and 1.9% of patients' encounters who received 7 or more drugs respectively.



**Figure 2: Selected prescribing indicators by retrospective review and survey (N=158)**

Figure 2 shows that the percentage of prescriptions written in generic names was just above half and one thirds for the retrospective review and the survey respectively. In more than half of the patient encounters an antibiotic was prescribed, 63.3% and 82.9% of the retrospective review and surveyed healthcare providers' prescriptions respectively. The injection use, as reflected by percentage of patient encounters with an injection, was a little more in the surveyed healthcare providers than the retrospective review accounting for 12% and 9.5% respectively. Both the survey and the retrospective review of patient encounters found that more than two thirds of all drugs prescribed were on the EDL.

**Table 9: Health providers' access and use of Essential Drugs List (N=158)**

Essential drug list	Frequency	Percentage
Access to EDL	22	13.9
Routinely use EDL	9	5.7

Table 9 shows that only 13.9% of healthcare providers have access to the essential drug list and 5.7% use it routinely while prescribing.

#### 4.5 Factors influencing rational drug use

**Table 10: Factors that influence drug prescribing practices (N=158)**

Factor	Drug choice		Dose		Route		Duration	
	Freq	%	Freq	%	Freq	%	Freq	%
Personal experience	16	10.2	13	8.1	17	11.0	8	5.2
Routine practice in facility	8	5.1	12	7.6	4	2.3	4	2.3
Available drug in facility	24	15.3	0	0	0	0.0	0	0
Cost of drug	5	3.2	0	0	4	2.3	3	2.1
Patient/care giver expectation	7	4.3	0	0	32	20.4	0	0.0
Pharmaceutical guide	0	0.0	61	38.7	2	1.1	11	7.1
Promotion by sale representatives	0	0.0	0	0	0	0.0	0	0.0
EDL	2	1.1	8	5.1	6	3.8	2	1.1
Patient Load	0	0	0	0	0	0	0	0
Standing order	96	60.8	64	40.5	93	59.1	130	82.2
Total	158	100	158	100	158	100	158	100

Table 10 shows healthcare providers response on what influenced their decisions when prescribing. The majority (60.8%) indicated that the Standing Order influenced their decision on which drug to prescribe while 15.3% and 10.2% indicated drug availability and personal experience respectively. Forty percent of healthcare providers also indicated being influenced by the Standing Order and another third (38.7%) pharmaceutical guide as a major consideration for dosage of prescribed drugs. Almost one third of healthcare providers said they would consider patient/care givers' expectations in deciding the route of administration of drugs, while the



majority indicated they would be influenced by the Standing Order (59.1%). The majority of healthcare providers (82.2%) indicated the Standing Order as the main consideration for deciding the duration of treatment. The study found that the Standing Order was a major influence in decisions on choice of drug, route of administration, and duration of treatment for the health providers.



## **CHAPTER FIVE**

### **DISCUSSION**

#### **5.1 Introduction**

Irrational drug use poses an important public health problem globally, especially in developing countries, and rational prescribing among healthcare providers constitutes an important component of rational drug use. This study aimed at assessing rational drug use, with a focus on rational prescribing, among public primary health care providers in Zaria Local Government Area (LGA), Nigeria. It is hoped that the findings will provide an understanding of the prescribing practices of healthcare providers and the factors influencing them, and that these will be used to make evidence-based recommendations towards improving rational use of drugs among healthcare providers. Overall the results from this study were comparable to published literature from developing countries in areas like polypharmacy, use of antibiotics and injections and generic prescribing practices, but differed in other areas such as source of drug information and factors affecting rational use of drugs. This chapter commences with the profile of the healthcare providers studied and is followed by discussing healthcare providers' practice of rational drug use, their knowledge and attitude, and concludes with the factors affecting rational prescribing.

#### **5.2 Profile of healthcare providers**

A good understanding of healthcare providers' characteristics are likely to give insights into their prescribing practices, as it has been reported in the literature that prescribing practices are influenced by professional status, years of experience, age and sex (Ljungberg et al., 2007, Kotwani et al., 2010). In this study, prescribing staff at the health facilities comprised

nurses/midwives and community health assistants only and no physicians were identified at any of the selected facilities (Table 2). Both Bolarinwa et al (2011) and an assessment of the Nigerian pharmaceutical sector conducted several years ago reported a similar findings with community health assistants (CHO and CHEWS) and nurses as the health professionals comprising the majority of prescribing staff at PHC facilities in Nigeria (Bolarinwa et al., 2011, FMOH, 2002). However, other studies at the primary level of care reported that trained physicians formed a significant proportion of prescribing staff at primary health care facilities (al-Nasser, 1991, Bregnhøj et al., 2007).

Prescribing behavior has been linked to the status and level of training of prescribing staff (Ofori-Adjei and Arhin, 1996), which is understandable as the training of the various cadres of healthcare providers differs in content, depth and duration. At one end, the training of general physicians usually lasts a minimum of six years at a university and is broader in scope and depth than the other cadres of healthcare providers, usually incorporating basic principles of pharmacology and dispensing. At the other extreme, the community health extension workers, who constitute the lowest in the hierarchy of prescribing health staff, spend two (JCHEW) or four (SCHEW) years at a School of Health Technology with curricula mainly focusing on preventive and promotive services. However, with the dearth of trained providers at the primary health care level, the lower cadre healthcare providers such as the CHEWS have taken up clinical responsibilities including drug prescribing at this level. The lower cadre health professionals also often times have less access to opportunities for more training and continuous medical education that may improve their practice. It is also worthy of note that even though the majority of these health professionals had practiced for more than five years in the service of the health

department of the LGA, regular training in rational drug use was not a routine practice as only 10.8% indicated they had attended training on rational drug use in the past year (Table 5). This further implies that healthcare providers have limited or no access to training on rational prescribing and therefore lack the opportunity to update and improve their skills about rational prescribing.

The age distribution of healthcare providers' in this study revealed that the majority were in the 35-39 years and 40-44 years age groups. The mean age of  $37 \pm 8.1$  years is comparable to  $39 \pm 8$  years in a similar study which assessed knowledge and attitude of primary healthcare workers on safe injections in the North-central states of Nigeria (Bolarinwa et al., 2011). Other studies from Nigeria also documented a relatively older population of healthcare providers (Musa, 2005). The predominance of a relatively older workforce may be as the result of upward migration of younger lower cadre healthcare providers along the professional ladder. Healthcare providers were also found to be predominantly females, and again this finding correlates with other studies in Nigeria which found a preponderance of female providers among healthcare providers at the primary level of healthcare (Uzochukwu et al., 2011, Bolarinwa et al., 2011). In Nigeria and many developing countries, the female gender is associated with nursing and many other nursing related professions. Hausa ethnic group, who are predominantly of the Islam faith, constituted the majority. This is expected because the Northwestern region of Nigeria where the study was conducted is mainly populated by the Hausa Muslims.

### **5.3 Practice of rational drug use by healthcare providers**

The WHO drug use indicators were used to assess prescribing practices of healthcare providers in this study. Unlike many drug use studies that were limited to retrospective audit of patient encounters/prescriptions, this study combined both retrospective audit and evaluation of prescribers' last prescription to increase the validity of the study findings. The drug use indicators examined included average number of drugs per prescription, percentage of drugs prescribed by generic, percentage of prescriptions with antibiotic and injections, percentage of drugs prescribed from EDL. This study revealed that the practice of irrational use of drugs was prevalent in the health facilities. Poly-pharmacy was prevalent and the average number of drugs per prescription of 3.9 and 3.7 for retrospective review and surveyed health professionals was similar to findings from other researchers in Nigeria and many other developing countries (Nsimba et al., 2004, Nasseb and Nasser, 2005 Sep, Odusanya and Oyediran, 2004). Hogerzeil et al (1993) also found an average drug per prescription of 3.8 drugs per prescription in Nigeria, while findings from Zimbabwe and Sudan recorded a lower value of 1.3 and 1.4 drugs per prescription respectively (Hogerzeil et al., 1993).

The practice of prescribing using generic names has been documented as a means of improving accessibility and availability of drugs, including making them more affordable to patients, as well as making drug management easier. Whilst the WHO recommends that generic prescribing should be 100%, unfortunately in this study, only 60% of reviewed prescriptions and 65% of surveyed health providers' prescriptions were written generically (Figure 2). This finding was comparable to many other studies at the primary care level in developing countries where drugs

are usually not prescribed generically (Akande and Ologe, 2007, Bhartiy et al., 2008, Chareonkul et al., 2002). Similar findings have also been documented among healthcare providers at both secondary and tertiary level of care in many developing countries (Akande and Ologe, 2007, Biswas et al., 2000, Chuckwuani et al., 2002 ).

Worldwide, almost 50% of antibiotics are reportedly prescribed unnecessarily (WHO, 2006). The baseline assessment of the pharmaceutical sector in Nigeria and the survey by the WHO about drug use in Nigeria documented that 59% (FMOH, 2002). and 60% (WHO, 2006) of patients received antibiotics respectively. In this present study, the percentage of prescriptions containing antibiotics was even much higher amounting to 68.8% and 82.9% of retrospective audit and surveyed health care providers respectively (Figure 2). These findings were comparable to studies in developing countries where the proportion of prescriptions containing antibiotics was found to be as high as 60% (Bhartiy et al., 2008, Otoom et al., 2010, Cheraghali and Idries, 2009). Nsimba et al (2006) in a study among children under five years of age attending PHC facilities in Tanzania reported that antibiotics were prescribed for conditions such as malaria, diarrhoeal diseases, and upper respiratory tract infections (Nsimba, 2006 ). This finding was similar to the attitude of healthcare providers in this study as the majority indicated that antibiotics should be prescribed for all cases of upper respiratory infections (Table 6). This unnecessary use of antibiotics could result in antibiotic resistance, in addition to sub-optimal patient care additional treatment costs for patients.

Inappropriate use of injections is a major problem in Nigeria and in many other developing countries. In this study, injection use was high, with prescriptions containing injections

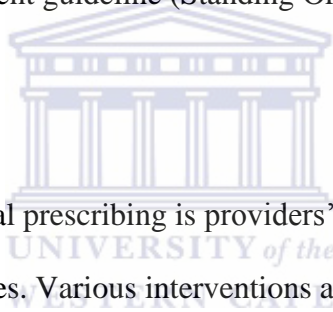
accounting for 9.5% and 12% of retrospective audit of patient encounters and surveyed healthcare professionals respectively (Figure 5). This figure was comparable with several other studies in Nigeria where injection use has been consistently above 10% (Akande and Ologe, 2007, Olayemi et al., 2006, Adebayo and Hussain, 2009, Ibrahim, 2004). The overuse of injections has important and significant consequences such as increased treatment cost and the likelihood of increased transmission of blood borne infections, especially HIV and hepatitis. Non adherence to universal precautions guidelines and reuse of needles which are common in these settings could further aggravate these problems.

#### **5.4 Healthcare providers and knowledge of Rational Drug Use**

The general understanding of prescribers about rational drug use in this study was poor as more than half of all respondents did not know the meaning of rational drug use (Table 2). This correlates with the fact that majority of the prescribers could also not correctly detail the sequence of rational drug prescribing, correctly identify the components of rational prescribing or consequences of irrational prescribing. This was in keeping with findings from similar studies which identified poor knowledge of rational drug use among prescribers in health providers in primary, secondary and tertiary levels of care (Adebayo and Hussain, 2009, Akande and Ologe, 2007, Alam et al., 2006). This implies that the problem of irrational prescribing is prevalent at all the levels of healthcare.

It was expected that an association would exist between knowledge of rational drug use and particularly rational prescribing and professional status of healthcare providers. This would probably be as a result of the differences in depth and scope of training of the various cadres of

healthcare providers as well as opportunities for continuous medical education. In this study, level of knowledge of rational drug use was found to be statistically significantly associated with professional status (Table 6). This is in consonance with findings from a similar study which noted a significant association between level of knowledge and practice of rational drug prescribing and the cadre of the prescriber (Bosu and Ofori-Adjei, 2000). In this present study Community Health Officers had better knowledge of rational drug use than the nurse/midwives and the CHEWS. This is contrary to what might ordinarily be expected as Nurses/Midwives are of higher professional status. However, this is expected in this setting when one considers that the training of CHO's in Nigeria is specifically tailored towards medical consultation and prescribing using a standard treatment guideline (Standing Order) compared to that of nurses and CHEWS.



Of paramount importance to rational prescribing is providers' awareness of the essential drug list and its availability in health facilities. Various interventions aimed at promoting rational drug use and improving prescribing practices of healthcare providers have focused on the availability of the essential drug list in health facilities. In this study, the majority of prescribers were not aware of an essential drug list (Figure 1). This was in contrast to another study in the country which documented awareness of EDL as 90.5% in a military hospital (Adebayo and Hussain, 2010). However, it would be expected that trained physicians, who were the subject of the latter study, should be more aware of EDL than other cadres because of the wider scope of their training. Healthcare providers' awareness of the National Drug formulary was even poorer. This is not surprising as the majority of the healthcare providers in this study depended almost exclusively on Standing Orders for drug prescribing. The use of Standing Orders and its influence on rational



drug prescribing among healthcare providers at the PHC level was quite encouraging as the Standing Order is a form of standard treatment guideline within which healthcare providers operate. Despite this however, the percentage of drugs prescribed from the Essential Drug List was 75.3% and 83.5% for retrospective audit and surveyed healthcare providers prescriptions respectively. This means that providers still prescribed some drugs outside the EDL. This was consistent with providers' attitude in which a significant proportion agreed or was undecided about prescribing an effective drug that was not on EDL (Table 7).

Healthcare providers' access to accurate information about drugs is vital to rational prescribing. Several drug information reference documents were used by healthcare providers, including the National Drug Formulary, Essential Drug List and Standing Order. The National Drug Formulary is a compendium of drugs in the country with comprehensive information about dosage, forms and preparations, contraindications, side effects and interactions. The Essential Drug List gives information about dosage, forms and strength of essential drugs. The Standing Order is a form of standard treatment guideline for CHO and CHEWS detailing flow charts for common conditions at the PHC level. It is an algorithm which guides the PHC providers to reach a diagnosis and provide treatment. In this study, healthcare providers' source of information about drugs was mainly from the Standing Order, although the Standing Order does not provide detailed information about drugs or their side effects (Table 5). This finding was in contrast to other studies which indicated seeking information from colleague, the media and leaflets as the important sources of information about drugs (Ohlsson et al., 2005). Other sources of drug information listed in this study included drug leaflets and advertisements from drug companies. These sources of information may not however provide adequate, accurate and unbiased

information about drugs. However, since the Standing Order is put to good use by healthcare providers in diagnosis, same could be utilized in promoting rational prescribing by incorporating explicit drug information.

### **5.5 Healthcare providers' attitude to rational use of drugs**

In this study, the majority of healthcare providers admitted that optimal patient care involved how drugs were prescribed for the patients. Having said this however, many went on to describe irrational drug use practices. A significant proportion of the health workers (35.3%) also felt injections can be prescribed for patient on request (Table 7), a practice documented in a similar study (Yvan et al., 2003). Patients' demands and expectations have been documented as important factors influencing rational prescribing among healthcare providers. Similarly, the use of antibiotics for conditions that may not require antibiotic use has been documented to be very prevalent among healthcare providers. In this study, 76.3% of surveyed healthcare providers agreed that antibiotics could be prescribed for all cases of Upper Respiratory Tract Infection (URTI). Whilst many healthcare providers agreed that only minimum amount of drugs needed should be prescribed for patients, almost half were undecided about the rationality of picking a drug they perceived to be effective but not in essential drug list (Table 7). In many healthcare settings in developing countries, providers may prescribe drugs more than the need of the patient so that the patient may feel happy and satisfied about the consultation (Sachs and Tomson, 1992).

## **5.6 Factors affecting rational use of drug by healthcare providers**

In this study it was found that the Standing Order was the major factor (60.8%) reported as influencing the choice of drug, dosage, and duration of drug treatment (Table10). This was in contrast to findings from another study which identified factors such as perceived demand and patient expectation and the influence of medical representatives as the main factors affecting prescribing practices of healthcare providers (Oshikoya et al., 2011). Nevertheless, a significant proportion (20.4%) of healthcare providers assessed in this study still admitted they would be influenced by the patients' demands and expectations in deciding the route of administration of prescribed drugs. This is consistent with the attitude of healthcare providers to rational use of drugs in this study as a significant proportion (12.5% and 22.8% strongly agreed and agreed respectively) indicated that injections could be prescribed for a patient if he demands for it. In many settings in developing countries including Nigeria, injections are believed to work better than other drug preparations thereby making patients demand this route of drug administration. This results in an overuse of injections by the healthcare providers with all the negative connotations.

## CHAPTER 6

### CONCLUSION AND RECOMMENDATIONS

#### 6.1 Conclusion

This study revealed that the level of understanding and knowledge of rational drug use among the majority of healthcare providers was poor and many had little understanding of the concept of rational drug use. Knowledge of rational drug use was significantly associated with healthcare providers' professional status, duration of practice and previous training on rational drug use. Surprisingly, CHOs were found to have better knowledge about rational drug use than other cadres of PHC healthcare providers, a finding that is likely to be because CHOs training is tailored towards prescribing using a standard treatment guideline (Standing Order). While the Standing Order, which does not contain detailed information about drugs, was found to be the main influence on prescribing and source of information to healthcare providers, drug leaflets from pharmaceutical companies also served as important source to a significant proportion.

The attitude of the providers to certain aspects of rational prescribing such as antibiotic and injection use was poor, which was reflected in an overuse of antibiotic and injections. Similarly, the study showed that generic prescribing and prescribing from the essential drug list by healthcare providers was considerably below 100% target. Furthermore, the study revealed that the majority of healthcare providers had not received recent training on rational use of drugs.

#### 6.2 Recommendations

Rational drug use, and especially rational prescribing by healthcare providers, would go a long way in improving the quality of healthcare services. It would minimize wastage of resources and

prevent hazards associated with unwanted drug interactions and side effects. For significant improvements in rational prescribing and drug use among healthcare providers at the PHC level, the following recommendations are made based on the findings from this study:

1. Staff skill-mix at primary healthcare facilities should be improved, so that doctors and other higher cadres of healthcare providers should take greater responsibility for drug prescribing.
2. The capacities of all prescribing healthcare providers' on rational drug use should be improved through in-service training such as group- based outreach programmes and a system of continuous medical education instituted to promote lifelong learning.
3. The concept of rational drug use should be incorporated into the curricula of all healthcare providers prescribing at the primary care level.
4. Drug and therapeutic committees should be instituted in every facility at the PHC level to improve awareness about rational drug use.
5. Continuous monitoring and supervision of health providers on rational use of drugs should be instituted in health facilities to ensure rational drug use.
6. Further research into rational use of drugs should be conducted across various professional cadres prescribing drugs at PHC level.

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## APPENDICES

### APPENDIX I: DATA COLLECTION TOOLS

#### TOOL I: DETAILED INDICATOR ENCOUNTER FORM

Name of Health facility:.....

Investigator:.....

Date:.....

Identification no	Date	Name	Age	Sex	Prescriber
Health problem	Health problem description		Code		
	1.				
	2.				
	3.				
Drugs	Name and strength		Code		Quantity
	1.				
	2.				
	3.				
	4.				
	5.				
	6.				
7.					

## Tool II: PRESCRIBING INDICATOR FORM

Health facility:.....

Investigator.....

Date:.....

S/N	Type(R/P)	Date of treatment	Age(yrs)	No Drugs	No of generics	Antib (0/1)	Injec (0/1)	No on EDL	Diagnosis
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
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28									
29									
30									

# TOOL III: QUESTIONNAIRE FOR HEALTH PROVIDERS

## SECTION A: SOCIODEMOGRAPHIC CHARACTERISTICS

1. Sex Male  Female
2. How old are you.....
3. What is your professional status
  - a. Doctor
  - b. Nurse
  - c. CHO
  - d. CHEW
4. How long have you been working in this capacity?.....
5. What is your marital status
  - a. Single
  - b. Married
  - c. Divorced
  - d. Widowed
6. What is your religion
  - a. Islam
  - b. Christianity
  - c. Others
7. What is your ethnic group
  - a. Hausa
  - b. Fulani
  - c. Yoruba
  - d. Igbo
  - e. others



## SECTION B: KNOWLEDGE OF RATIONAL DRUG USE

1. What do you understand by rational use of drugs?  
.....  
.....
2. The following are the steps taken in rational drug prescription practices (1 is the first step and five the last step)
  - a. Appropriate indication
  - b. Appropriate drug choice
  - c. Appropriate patient
  - d. Appropriate information
  - e. Appropriate monitoring



3. Rational drug use include the following
  - a. Choice of drug                      Yes [ ]        No [ ]    Don't Know [ ]
  - b. Dosage of drug                      Yes [ ]        No [ ]    Don't Know [ ]
  - c. Route through which drug is given    Yes [ ]        No [ ]    Don't Know [ ]
  - d. Duration of treatment              Yes [ ]        No [ ]    Don't Know [ ]
  - e. Information about drug to patient    Yes [ ]        No [ ]    Don't Know [ ]
  - f. Number of drugs given              Yes [ ]        No [ ]    Don't Know [ ]
  - g. Generic/trade name prescribing      Yes [ ]        No [ ]    Don't Know [ ]
  - h. Others .....
4. Consequences of irrational prescribing include
  - a. Sub-optimal patient care              Yes [ ]        No [ ]    Don't Know [ ]
  - b. Wastage of resources                Yes [ ]        No [ ]    Don't Know [ ]
  - c. Microbial resistance to antimicrobial    Yes [ ]        No [ ]    Don't Know [ ]
  - d. Adverse drug reactions              Yes [ ]        No [ ]    Don't Know [ ]
  - e. Others specify.....
5. Are you aware of the existence of National Essential Drug list or National Drug Formulary?
6. Have you attended Rational Drug Related training within the last year? Yes[] No []

SECTION C: ATTITUDE TOWARDS RATIONAL DRUG USE

Please indicate by ticking how you feel about the statements below on rational drug use (SA= Strongly Agree, A= agree, U= Undecided, D= disagree and SA= Strongly Disagree).

	Item	SA	A	U	D	SD
A	Optimum patient care involves how drugs are prescribed to patients					
B	A health worker may prescribe injection for patient if a patient demands for it					
C	Antibiotics should be prescribed for all cases of Upper Respiratory Tract Infection(URTI)					
D	It does not matter whether a health worker prescribe in generic or trade name					
E	More drugs can be prescribed for patients to make him happy even if he does not need all the drugs					
F	Drug that are not in EDL may be prescribed for a patients so far it is effective					

SECTION D: PRACTICE OF RATIONAL DRUG USE

(For questions 1-5, check last prescription by healthcare provider)

1. How many drugs did you prescribe for your last patient? .....
2. Does your last prescription contain an antibiotic? .....
3. Does your last prescription contain an injection? ).....
4. How many of the drugs in your last prescription were prescribed in generic? .....
5. How many of the drugs in your last prescription are listed in Essential Drug List.....
6. Do you routinely use EDL/NDF routinely in your prescription Yes [] NO[]
7. What mainly guides the choice of drug(s) you prescribe for your patient? (Indicate by ticking the factor with the main influence)

Factor	Drug choice	Dose	Route	Duration
Personal experience				
Routine practice in health facility				
Available drug in the health facility				
Cost of drug				
Patient/care giver expectation				
Promotion by sale representative				
Essential drug list				
Patient load				
Standing order				
Others				

8. Do you have access to Essential Drug List/National Drug Formulary in this facility Yes[] No[]
9. What is your primary source of information on prescription drug use?
  - a. . Promotion by sales representative of drug companies
  - b. Advertisement by drug companies
  - c. Drug formularies
  - d. Others (Specify).....
10. When was the last time you received any training on rational drug use.....
11. Do you desire more training on rational drug use? Yes [] No[]



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## APPENDIX II: PARTICIPANT INFORMATION SHEET

Drug Prescribing practices among Primary Healthcare providers in a Local Government Area of Northwestern Nigeria.

Date:

Interviewer:

UWC Student no: 2826923

Tel: \_\_\_\_\_ Fax: \_\_\_\_\_

E-mail:oguntundedoc@gmail.com

Institution: University of the Western Cape

Place at which the interview was conducted:

Thank you for agreeing to allow me to interview you. What follows is an explanation of the purpose and process of this interview.

### 1. Information about the interviewer

I am Oguntunde Olugbenga, a student at the School of Public Health, University of the Western Cape. As part of my Masters in Public Health, I am required to carry out a research on prescribing practices of primary healthcare providers in Zaria LGA. I am accountable to Ms Hazel Bradley who is contactable at c/o SOPH Fax: 021 959 2872 or by e-mail at hbradley@uwc.ac.za

Here is some information to explain the purpose and usage of my interview.

**2. Purpose and contents of interview:** The purpose of the interview is to assess the level of knowledge of rational drug use, drug prescribing practices and factors that influence rational drug use among primary healthcare providers in Zaria LGA, Northwestern Nigeria.

**3. The interview process:** You shall be given a questionnaire and you will be required to respond to questions about your knowledge, attitude and practice of rational use of drugs after which the questionnaire will be collected back from you. This may take you about ten minutes to complete.

**4. Anonymity of contributors:** At all times, I will keep the source of the information confidential I shall keep any other records of your participation locked away at all times, and destroy them after the data has been collected. The results of questionnaire will be presented in an aggregated form and not traceable to any individual healthcare provider or health facility. No risk will accrue to you for participating in this study but your responses may go a long way in understanding drug use by primary healthcare providers in this LGA of Northwestern Nigeria.

### 5. Things that may affect your willingness to participate

If at any time during the interview you would like not to participate in the study, please feel free to do so. I will not be offended and there will be no negative consequences if you would prefer to withdraw your participation.

**6. Interviewer's agreement:** The contents will be used for the purposes referred to above, but may be used for published or unpublished research at a later stage without further consent. Any change from this agreement will be renegotiated with you.

### Study Coordinator's Name:

Dr Olugbenga Oguntunde

Department of Community Medicine

Faculty of Medicine

Ahmadu Bello University, Zaria

Telephone: 08068107367

Email: [oguntunedoc@gmail.com](mailto:oguntundedoc@gmail.com)



**Supervisor:** Hazel Bradley ([hbradley@uwc.ac.za](mailto:hbradley@uwc.ac.za))

School of Public Health

University of the Western Cape

Private Bag X17, Belville 7535

South Africa

Should you have any question regarding the study or rights as a participant or wish to report any problems please contact:

**Director of School of Public Health:** Prof Uta Lehmann ([ulehmann@uwc.ac.za](mailto:ulehmann@uwc.ac.za))

Dean of Community & Health Sciences Faculty: Prof Ratie Mpofu ([rmpofu@uwc.ac.za](mailto:rmpofu@uwc.ac.za))

This research has been approved by the University of the Western Cape Senate Research Committee and Ethics Committee.



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## APPENDIX III: CONSENT FORM

### CONSENT FORM

**Title of Research Project:** Prescribing practices among Primary Health Care providers in a Local Government Area of Northwestern Nigeria.

The study has been described to me in language that I understand and I freely and voluntarily agree to participate. My questions about the study have been answered. I understand that my identity will not be disclosed and that I may withdraw from the study without giving a reason at any time and this will not negatively affect me in any way.

*Participant's name*.....

*Participant's signature*.....

*Witness*.....

*Date*.....



Should you have any questions regarding this study or wish to report any problems you have experienced related to the study, please contact the study coordinator:

**Study Coordinator's Name:**

Dr Olugbenga Oguntunde  
Department of Community Medicine  
Faculty of Medicine  
Ahmadu Bello University, Zaria  
Telephone: 08068107367  
Email: oguntunedoc@gmail.com