

**EFFECTIVENESS OF HEALTH EDUCATION ON PREVENTION OF
ANTIBIOTIC MISUSE AND SELF-MEDICATION AMONG HIV-POSITIVE
ADULTS IN BAUCHI STATE NIGERIA**

YUSUF ABDU MISAU

**A THESIS SUBMITTED IN PARTIAL FULFLMENT OF THE
REQUIREMENT FOR THE AWARD OF DOCTOR OF PHILOSOPHY
DEGREE IN PUBLIC HEALTH OF
MOUNT KENYA UNIVERSITY**

JANUARY, 2023

DECLARATION AND APPROVAL

I, Yusuf Abdu Misau, declare that this thesis is my original work and has not been submitted to any institution for the award of any degree.

Yusuf Abdu Misau

PHD/PH/2017/77145

Student's Signature:

Date: 02/01/2023

Approval by Supervisors

We the underlisted, being the university assigned supervisors of this work, hereby declare that this thesis has been submitted to the university with our approval.

Professor Suleiman A Mbaruk

Sign

Date: 03/01/2023

Dr Dominic Mogere

Sign

Date: 03/01/2023

DEDICATIONS

I dedicate this thesis to the memories of Hajiya Aishath Ibrahim and Alhaji Abdu Misau, my late parents.



ACKNOWLEDGEMENTS

My gratitude goes to my Dean, SPH, Dr. John Kariuki who provided huge moral support and encouragement during this work, The then head of department and my second Supervisor Dr. Dominic Mogere, my first supervisor, Prof. Mbaruk A. Suleiman for their support and facilitation that made this research fruitful. My postgraduate studies coordinator Dr. Alfred Owino and PG desk officer Mr Peterson Kimani both of whom always responded to email correspondences promptly.

I appreciate my family, so also my colleague Dr Usman Sunusi Usman for proof reading the draft manuscript, and my colleagues at Abubakar Tafawa Balewa University Bauchi, Dr. Abdullahi Ibrahim Bichi, Dr. Lamara Dattijo, Dr. Bashir Faruk who offered suggestions for improving this work. I am thankful to the Abubakar Tafawa Balewa University for awarding me a PhD study support and to the Mount Kenya University for granting me the chance to pursue the program in their university.

ABSTRACT

Misusing antibiotics and self-medications constitute one of the major public health challenges across the globe. Resistance to common antibiotics often necessitates shift towards more expensive and scarcely available higher generations antibiotics. People living with HIV/AIDS are likely to experience multiple health challenges irrespective of their use of antiretroviral drugs. The objective of this study was to determine the prevalence of antibiotics misuse and self-medication and the effect of Health Education (HE) on the prevention of antibiotics misuse and the behavior of self-antibiotics prescribed treatments for common bacterial infections among HIV positive adults residing in Bauchi State Nigeria. The study was quasi-experimental design. A total of 85 participants were selected in the intervention and control groups respectively. Health education intervention was conducted among experimental group. Data was collected using structured questionnaire at baseline and three months post-intervention and analyzed using SPSS and R software. The magnitude of antibiotics misuse and self-medication among intervention and control groups at baseline were 67.1% and 64.7% respectively. However, following health education, the magnitude in the intervention and control groups was 24.3% and 67.5% ($P < 0.005$) respectively. Occupation was significantly associated with having good knowledge of antibiotics misuse and self-medication, while years spent on ARVs were significantly associated with having good attitude towards antibiotics misuse and self-medication, so also tribe and the CD4 count status on perceived control beliefs. On adjusting for confounding effect using logistic regression analysis, the predictors of knowledge were marital status of married (AOR=2.01, 95%CI=1.67–3.99), occupational status of employed (AOR =4.00, 95%CI = 1.17–10.27), education (AOR=1.95, 95%CI=1.45–4.18) and duration of ARV therapy (AOR=2.12, 95%CI=1.77–7.88). Also, marital status of married (AOR=3.11, 95% CI=1.23–4.56), educational status of secondary school and beyond (AOR=3.99, 95%CI=2.76–9.54), and duration of ARV therapy (AOR=3.00, 95%CI=2.11–6.44) were significant predictors of poor attitude towards antibiotics misuse and self-medication among intervention group who received health education. Health education was found to have significant effect in reducing prevalence of antibiotics misuse and self-medication among HIV positive adults. Integration of health education into routine HIV care will be useful in reducing antibiotics misuse and self-medication. Further research is required on the long-term effects of health education on reducing antibiotics misuse and self-medication among HIV positive adult.

Key Words: Self-Medication, Antibiotics, HIV, Health Education

TABLE OF CONTENTS

DECLARATION AND APPROVAL	ii
DEDICATIONS	iii
ACKNOWLEDGEMENTS	iv
ABSTRACT	v
TABLE OF CONTENTS	vi
LIST OF TABLES	x
LIST OF FIGURES	xiv
LIST OF ABBREVIATIONS	xv
CHAPTER ONE: INTRODUCTION	1
1.1: Background	1
1.2 Problem statement.....	3
1.3: Study Rationale	5
1.4: Justification of the study	7
1.5: Study Objectives	9
1.5.1: General objective.....	9
1.5.2: Specific objectives	9
1.6: Research Questions	9
1.7: Hypothesis	10
1.8 Limitations and Delimitations.....	10
1.9 Operational Definitions of Terms	12
CHAPTER TWO: LITERATURE REVIEW	14
2.1: Antibiotics Misuse and Self-Medication among People living with HIV	14
2.2: Antibiotics Misuse and Self-Medication in General Population	22
2.3: Antibiotics Misuse and Self-Medication in Nigeria	48

2.4: Factors responsible for self-antibiotics medication	68
2.5: Consequences and Effects of Antibiotics Misuse and Self-Medications.....	75
2.6: Intervention Strategies for Antibiotics Misuse and self-medication.....	76
2.7: Theoretical framework.....	80
2.8: Conceptual Framework	84
2.9: Criticism against TPB	85
2.10: The gap expected to be filled by this study.....	86
CHAPTER THREE RESEARCH METHODOLOGY.....	87
3.1: Study design.....	87
3.2: Study Area	89
3.3: Vegetation.....	89
3.4: Administrative, political and economic structure.....	89
3.5: Bauchi State Health Systems	90
3.6: Study Site	90
3.7: Study Participants	91
3.8: Sample Size Determination.....	91
3.9: Sampling Method.....	93
3.10: Inclusions Criteria.....	94
3.11: Data Tool and Collection Method.....	94
3.11.1: Study Tool Development	94
3.11.2: Study Tool Validation	95
3.12: Statistical Analysis Plan	97
3.13: Intervention Plan.....	98
3.14: Ethical Considerations	103
CHAPTER FOUR: RESEARCH RESULTS AND DISCUSSION.....	105

4.1: Introduction.....	105
4.2: Baseline Findings (Univariate Analysis)	106
4.3 Post Intervention Univariate Analysis	116
4.4 Post Intervention Bivariate Analysis.....	119
4.5 Multiple Logistic Regression	133
4.6: Discussion.....	138
CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	153
5.1 Introduction.....	153
5.2 Recommendations	154
5.2.1 Recommendations for health care providers:.....	154
5.2.2 Recommendations for community advocacy	155
5.2.3 Recommendations for The Policy Makers.....	155
5.2.4 Recommendations for Researchers	155
REFERENCES	156
APPENDICES	182
Appendix A: Study Consent Form.....	182
Appendix B: Study Questionnaire	186
Appendix C: Ethical Approval.....	190
Appendix D: Introduction Letter.....	191
Appendix E: Bauchi State Govt Ethical Permit	192
Appendix F: Study Location Map.....	193
Appendix G: IEC Material-I	194
Appendix H: IEC Material-Ii	195
Appendix I: IEC Material-III	196



LIST OF TABLES

Table 3.1: Intervention Domain I: Awareness (Need for Behavior Change)	98
Table 3.2: Intervention Domain II: Information (Gather facts about behavior change)	99
Table 3.3: Intervention Domain III: Knowledge (Learn about facts)	100
Table 3.4: Intervention Domain IV: Skill (Psychomotor-physical movement and coordination)	101
Table 3.5: Intervention Domain V: Attitude (Constants feelings and predisposition) .	102
Table 3.6: Intervention Domain VI: Value	103
Table 4.1: Socio-demographic profiles of the study respondents	106
Table 4.2: Baseline Magnitude of antibiotics misuse and self-antibiotics medication among respondents.....	109
Table 4.3: Aggregate knowledge scores for antibiotics misuse and self-antibiotics medication among the respondents at baseline	110
Table 4.4: Aggregate attitude scores for antibiotics misuse and self-antibiotics medication among the respondents at baseline	110
Table 4.5: Perceived control of antibiotics misuse and self-antibiotics medication among the respondents at baseline	111
Table 4.6: Aggregate perceived control scores for antibiotics misuse and self-antibiotics medication among the respondents at baseline.....	112
Table 4.7: Comparison between socio-demographic profiles of participants in the intervention and control group at pre intervention.....	112

Table 4.8: Comparison of magnitude of self-antibiotics medication among the study respondents at baseline.....	114
Table 4.9: Comparison of aggregate knowledge score between intervention and control group at baseline	114
Table 4.10: Comparison of aggregate attitude score between intervention and control group at baseline.....	115
Table 4.11: Comparison of aggregate perceived control score between Intervention and control group at baseline	115
Table 4.12: Post-intervention Magnitude of antibiotics misuse and self-antibiotics treatment among participants in both intervention and control groups	116
Table 4.13: Cumulative knowledge scores for self-antibiotics medication among the participants at post-intervention	116
Table 4.14: Aggregate attitude scores for self-antibiotics medication among the study participants in both intervention and control at post-intervention.....	117
Table 4.15: Perceived Control of Self-antibiotics Medication among study participants at post-intervention.....	118
Table 4.16: Aggregate perceived control scores for self-antibiotics medication among the participants at post-intervention	119
Table 4.17: Comparison of magnitude of self-antibiotics medication among the study respondents at post-intervention	119
Table 4.18: Evaluation of aggregate knowledge score between intervention and control group at post-intervention	120

Table 4.19: Comparison of aggregate attitude score between intervention and control group at post-intervention	121
Table 4.20: Comparison of aggregate perceived control score between intervention and control group at post-intervention	121
Table 4.21: Comparison of magnitude of self-antibiotics treatment among the Intervention group of participants at baseline and post-intervention	122
Table 4.22: Comparison of cumulative knowledge scores for self-antibiotics medication among the intervention group of respondents at baseline and post-intervention	123
Table 4.23: Comparison of cumulative attitude scores for self-antibiotics medication among the Intervention group of respondents at baseline and post-intervention	123
Table 4.24: Comparison of aggregate perceived scores for self-antibiotics medication among the Intervention group of participants at baseline and after-intervention	124
Table 4.25: Comparison of the magnitude of self-antibiotics medication among the control group of respondents at baseline and post-intervention	125
Table 4.26: Comparison of cumulative knowledge scores for self-antibiotics medication among the control group of respondents at baseline and post-intervention	125
Table 4.27: Comparison of aggregate attitude scores for self-antibiotics medication among the control group of participants at baseline and post-intervention	126
Table 4.28: Comparison of aggregate perceived control scores for self-antibiotics medication among the control group of participants at baseline and post-intervention	126
Table 4.29: Relationship between socio-demographic factors of participants and Prevalence of antibiotic misuse among the study participants in the intervention group	127

Table 4.30: Association between individual factors of participants and knowledge of antibiotics misuse and self-medication among respondents.....	128
Table 4.31: Relationship between individual factors of respondents and attitude score on antibiotics misuse and self-medication among the intervention group respondents	130
Table 4.32: Relationship between socio-demographics characteristics of respondents and perceived control score on antibiotics misuse among the intervention group	132
Table 4.33: Logistic Regression analysis of predictors of knowledge of antibiotics misuse and self-medication among the intervention group respondents	134
Table 4.34: Logistic Regression analysis of predictors of poor attitude scores on antibiotics misuse among the intervention group	135
Table 4.35: Multivariate (Logistic Regression) analysis of predictors of good perceived control scores on antibiotics misuse among the intervention group.....	136

LIST OF FIGURES

Figure 1: Study Conceptual Framework	85
--	----



LIST OF ABBREVIATIONS

ADEs	Adverse Drugs Events
ADR	Adverse Drugs Reactions
AIDS	Acquired Immune Deficiency Syndrome
AOR	Adjusted Odds Ratio
ARVs	Anti Retro Viral Drugs
ART	Anti Retro Viral Treatment
ATBU	Abubakar Tafawa Balewa University Bauchi
BASG	Bauchi State Government
CD4	Clusters of Differentiation 4 positive cells
CDC	Centers for Diseases Control
CSW	Commercial Sex Workers
EU	European Union
GDP	Gross Domestic Product
HAART	Highly Active Anti Retro Viral Therapy
HE	Health Education
HIV	Human Immunodeficiency Virus
HRQL	Health Related Quality of Life
MA	Meta Analysis
MKU	Mount Kenya University

NACA	National Action Committee on AIDS
NHIS	National Health Insurance Scheme
OOP	Out of Pocket Payment
OR	Odds Ratio
OTCs	Over the Counter Medications
PLHA	People Living with HIV/AIDS
PCB	Perceived Control Behavior
SMP	Self-Medication Practice
SR	Systematic Reviews
STDs	Sexually Transmitted Diseases
TRA	Theory of Reasoned Action
TPB	Theory of planned behavior
UNAIDS	United Nations Program on HIV/AIDS
URTI	Upper Respiratory Tract Infection
WHO	World Health Organization
ZDV	Zidovudine

CHAPTER ONE: INTRODUCTION

This section entails a general outline on this thesis. This section comprises a background section within which attempts were made to provide broad definition of antibiotics misuse and self-medication, the global and local scope of the problem and why this study is important. The chapter also briefly summarizes current knowledge and understanding on key constructs of antibiotics misuse and self-medication, including causes, effects, and challenges in addressing the behavior and current strategies to overcome the problem within the statement of problem section. The concluding part of the chapter focuses on the study rationale, justification for the study and the study objectives. The research questions and the study hypothesis were discussed in the last part of the chapter.

1.1: Background

Antibiotics, also commonly called antimicrobial agents, are often chemical substances microorganisms produced as a natural defense to either harm, kill or inhibits the growth of other microorganisms (Byrne et al., 2019). Since their introduction in 1937, antibiotics are the best-known human weapons against infections, which have been used appropriately and have often been misused as well. In a broad sense of the word, Antibiotics misuse refers to any unjustified use of antibiotics in the absence of clinical condition that is deemed necessary for such drugs to be used. The Centers for Disease Control (CDC) defines antibiotics misuse as inability to take the complete course of antibiotics, skipping doses, reuse of previously prescribed or engaging in self-medication with antibiotics (Nawafleh et al., 2017). Antibiotics misuse has been interchangeably used with antibiotics self-treatment which denotes to the action of self-diagnosis and self-prescription of antibiotics for illnesses which were self-diagnosed. Antibiotics misuse is regarded as a public health concern globally (Okide et al., 2020).

Antibiotics are the most excessively consumed drugs globally (Lin et al., 2020) and their misuse is reported to be the most single major contributor to drug resistance (Owusu-Ofori et al., 2021), but the spectrum of the consequences of antibiotics misuse and self-medication extends from resistance to increased mortality and morbidity from infections caused by new strains of bacteria that defies antibiotics (Rather et al., 2017), prolong hospital stay and increase cost of care (Chang et al., 2018)]. Among the various components of antibiotics misuse, self-treatment with antibiotics accounts for the greatest proportion (Mallah et al., 2020). In regard to the World Health Organization (WHO) self-treatment is referred to the process of using any medicine without a proper remedy from a qualified medical personnel (Biudes & Galato, 2014). “Self-medication when utilized in a reasonable manner has beneficial effect and is usually regarded as a form of self-care” (Rägo, 2000). However, it has been associated with deleterious effects on the user and community at large by delaying required care and worsening the under-lying health conditions in majority of the cases.

People living with HIV are the most vulnerable population to the act of self-treatment; there has been increase in concerns about possible harm due to misuse of antibiotics. An increase in availability of treatment facilities for HIV has aided in maintaining high annual incidence of new HIV infections despite several preventive interventions being in place. With the advanced methods of HIV treatment, the worldwide focus has now drifted to addressing long-term complications among PLHA. One of the long-term issues that have sought attention of health care providers, policy makers and researchers is self-prescription tendency among PLHA.

Globally, HIV/AIDS disproportionately affects different groups (UNAIDS, 2016). Currently, 38 million people are living with HIV/AIDS with about 70% of the infections occurring in middle- and low-income countries (UNAIDS, 2019a).

Additionally, majority of those engaging in self-medication come from developing countries (Nyambega, 2017). Worldwide, Nigeria has the 2nd international drain of HIV/AIDS epidemic and 3rd highest problem in Africa (UNAIDS, 2019b). In Nigeria, PLHA tend to engage in self-medication because of the already high prevalence of antibiotic misuse (Ajibola et al., 2018) and the high rate of out-of-pocket payments for any medications (Oburota & Olaniyan, 2020). Currently, there is inadequate literature on magnitude of factors linked to self-treatment among PLHA in Nigeria. Therefore, this study focused on providing reference point assessment on the magnitude and factors linked with antibiotics misuse and self-treatment practice as well as to evaluate the effectiveness of health education intervention in prevention of antibiotics misuse and self-antibiotics treatment practice among PLWHA in Nigeria.

1.2 Problem statement

For several decades, misuse of antibiotics and self-medication practice has been considered as a global public health challenge constituting one of the silent epidemics and has been vindicated by a persistent high and wide range (12%-90%) of prevalence across different cultures and beliefs (Pons & Knauth, 2017). Although the perceptions, attitudes and what exactly constitutes misuse of antibiotics and self-medication differs among societies and even within similar groups, however regardless of the differences in perceptions across cultures and societies, antibiotics misuse and self-medication practices occur in both rural and urban setting as well as in the developed and the developing countries (G Priyadarshini. & Ravikumar, 2016).

A recent report by the WHO on Global Antimicrobial Resistance and Use Surveillance System (GLASS) shows alarming rate of global antimicrobial resistance across 87 countries in the world. This very alarming rate of antimicrobial resistance was trace to perverse antibiotics misuse and self-medication among many other

factors(WHO, 2022). Recent studies have reported even more persistently higher prevalence across various regions and continents. A recent study found a prevalence of antibiotics misuse and self-medication of 82% in a developing country (Borzoe. & et al., 2022). Another study in an African country found self-medication prevalence of 70 percent among study participants (Suciu et al., 2022). About 80% of all antibiotics are used in community, while only 20% are using in hospital setting (Olesen et al., 2018). About 50% of antibiotics used globally are non-prescribed (Belachew et al., 2021).

Even in high income countries, antibiotics misuse and self-medication has been reported to be in high proportion despite better access to improved health systems. In the United States of America, antibiotics self-medication has been reported among 45% of respondents surveyed by Ateshim et al(Ateshim et al., 2019b). In a study done among University Students in China, 48% of the respondents reported self-treatment practices (Pan et al., 2012), while in the United States of America(USA), another study reported antibiotics misuse and self-medication prevalence of 40% among study the participants (Mainous et al., 2014), in Switzerland a prevalence of 34% was reported among (Indermitte et al., 2007). As a direct consequence, antibiotics misuse and self-medication has been reported to costs billions of dollars due to the shifting of patients to 2nd and 3rd generation of antibiotics (Abduelkarem et al., 2019). About 55-70 Dollars increase in costs of treatments are attributed to antibiotics misuse and self-medication (Strumpf G, Sharer G, 2003). In the US, 23,000 deaths annually are caused by antibiotics misuse and self-medication (Haque et al., 2019b). Antibiotic misuse and self-medication is more prevalent in LMICs than in high income countries because of weaker regulations in place (Ivanovska et al., 2013). Across all ages, self-medication and misuse of antibiotics has been reported. A study in Saudi Arabia, reported

60% magnitude of self-treatment among participants surveyed in 2022 (Al-Qahtani et al., 2022) while a study in Brazil among young university undergraduates in 2012, reported 87% magnitude of self-treatment (G. C. da Silva et al., 2012). Antibiotics misuse and self-treatment is a major public health dilemma in Nigeria. Studies have reported antibiotics misuse and self-medication prevalence ranging from 60% in general population in Nigeria (Ayepola et al., 2019), and as high as 90% within specific target populations (Babatunde, Fadare, Ojo, Durowade, Atoyebi, Ajayi, et al., 2016). Deborah et al found a antibiotics self-medication prevalence as high as 81% in western Nigeria (Esan et al., 2018). A recent study done in northern Nigeria, found self-medication prevalence of 70% (Misau et al., 2020), and 74.5% (Sanya et al., 2013). Persistent antibiotics misuse and self-medication ultimately cause distorted or incorrect diagnosis, late presentation, upsurge in illness and deaths, negative drug response and collaboration, rise in antimicrobial not being effective, economic expenditures, this has led to increased burden to health care services. Despite studies claiming a high magnitude of antibiotics ill-use and self-treatment from almost all parts of the world, yet there is inadequate awareness of how antibiotics misuse and self-treatment causes resistance to the drugs (Tadesse et al., 2017). Such poor knowledge has been documented in Nigeria (Salihu Dadari, 2020).

1.3: Study Rationale

According to UNAIDS statistics (UNAIDS, 2018), there has been a steady rise in the population of PLHA in Nigeria from 2.9 million in 2015, to 3.0 million in 2016 and to 3.1 million in 2018 ranking Nigeria 3rd on the global burden of HIV. With the ease of access to ARVs, people living with HIV are more likely to be involved in self-treatment practice making it a public health challenge. Furthermore, Nigeria is one of the poorest nations with socio economic indices showing a Gross Domestic Product

(GDP) per capita income of 5338.45 USD. This in turn has prevented PLWHA in Nigeria from accessing proper health care services and utilize only prescriptions given by a physician (World-Bank, 2018).

Own money payment for healthcare services is the most predominant method of health financing in Nigeria (Uzochukwu et al., 2015). According to (Mukokinya et al., 2018b; WHO, 2017), the formal sector is the only sector that is financed by the Nigeria's Social Health Insurance Schemes (NHIS) while the informal sectors comprising of 95% of the population use of out-of-pocket payment to cater for their medical care. In Nigeria, the first contact point for seeking care is direct contact with medicine vendors of whom a majority of are usually untrained (Daini et al., 2021) The magnitude of self-treatment practice in the community within Nigeria ranges from 40-82% (Babatunde, Fadare, Ojo, Durowade, Atoyebi, Ajayi, et al., 2016). The Rationale for doing the study in Bauchi State were as follows.

Bauchi is one of the oldest states in Nigeria that was created in 1976 (BASG, 2020). With a community of about 8 million lives, and a land area of 49,119Km², the state is bigger than Rwanda or Qatar and Kuwait combined together (Worldmeters, 2021).

Although, a recent study by this Author, among medical students in Bauchi state shows antibiotics self-medication prevalence was as high as 41% (Misau et al., 2020). There was no previous study that has examined antibiotics misuse and self-medication at community level or hospital based among HIV positive adults in Bauchi state or any other state in northeast Nigeria with a total population of more than 35 million people.

Studies have consistently reported a high prevalence of antibiotics resistance in Bauchi state, dating from 2011, 24% (Bello et al., 2011), to 2012, 51% (Ghamba PE, Mangoro ZM, 2012), and 29% in 2018 (Iliyasu et al., 2018). Etiological factors from community-based studies to understand the causes of these antibiotics resistance remains unknown.

Studies have associated high drug resistance in society with antibiotics misuse and self-medication (Wang et al., 2017b)(Peng et al., 2017).

Bauchi State which is in the Northeast region of Nigeria has the highest prevalence of HIV at 0.6% indicating that over 300,000 PLHA live in Bauchi State with only approximately 30% are on HAART (NACA, 2018) (NACA, 2018) hence the 70% are at risk of HIV associated bacterial infections. HIV services are available in all health facilities. Bauchi state has three referral facilities that provide advanced care for patients in advanced stages of the disease beyond what the basic primary and secondary facilities can provide.

The state is served by less than 1000 medical doctors of which half are physicians or general practitioners who are majorly based in the capital city of the state. Additionally, there are over 2000 nurses, mid wives and community workers supporting the health facilities.

Poor Doctor-population ratio could be associated with longer waiting time on hospital queues which in turn is a factor known to be associated with antibiotics misuse by clients who prefers to do self-medication rather than queue in crowded hospital clinics as previously documented in studies conducted within Nigeria (Donald & et al., 2016); (Lawan et al., 2013). Therefore, this study will provide health education strategies to deliver a tailored intervention that is culturally acceptable to residents of Bauchi State. Such like interventions have been shown to have a positive impact on behavior leading to decrease in misuse of antibiotics and self-medication among PLHA(Schulz et al., 2020; Yu et al., 2019).

1.4: Justification of the study

The benefits of short-term health educational intervention in promoting uptake of positive health seeking behavior and reducing or prevention of negative health-

seeking behavior has been documented in the literature (Ebu et al., 2019; W. Liu et al., 2022; Sanaeinasab et al., 2022).

The widely spread menace of antibiotics misuse and self-antibiotics medication in other regions of Nigeria other than the northeast region as reported in the literature is also well established (Ayodele, 2020; Tobin & Atulomah, 2020).

However, paucity of evidence-based public health interventions is a major challenge in addressing antibiotics misuse and self-antibiotics medication practice, especially in developing countries Nigeria inclusive.

Existing literature mostly reported on magnitude and factors related with antibiotics misuse and self-treatment behaviors (Abasiubong et al., 2012; Mallah et al., 2020)

Other literatures mainly examine the effects of antibiotics misuse as it relates to drug resistance emergence, prolong hospital stays, delays in diagnosis and increase cost of care, morbidity and mortality (Hill, 2017; Llor & Bjerrum, 2014).

Almost all participants studied in the existing literature are healthy or patients with acute conditions (Vazquez-Cancela et al., 2021). Therefore, the effect of such interventions on diagnosed individuals remain unknown. More so, there are no literatures addressing interventions to prevent antibiotics misuse and self-antibiotics medication practice, especially among subjects with chronic conditions.

An increase in access to antiretroviral drugs therapy permits longer survival duration among PLWHA just like any other chronic health condition. However, despite being on antiretroviral drug therapy, since the literature has established that PLWHA are prone to common bacterial infections (Rameshkumar et al., 2018) this study is therefore the only source of an evidence on whether PLWHA misuse antibiotics and self-medication, especially in developing countries like Nigeria as well

as the benefit of health education intervention.

1.5: Study Objectives

1.5.1: General objective

The overall objective of this study is to determine the effect of using Health Education (HE) on the prevention of antibiotics misuse and the behavior of self-antibiotics prescribed treatments for common bacterial infections among HIV positive adults residing in Bauchi State Nigeria.

1.5.2: Specific objectives

1. To determine magnitude of antibiotics misuse and self-treatment practice among intervention (experiment) and control (placebo) groups at starting point and post-intervention
2. To determine the association between socio-demographic characteristics and antibiotics misuse and self-antibiotics medication practices in the intervention and control groups
3. To assess the levels of knowledge, attitudes, normative beliefs and perceived control beliefs associated with antibiotics misuse and self-antibiotics medication practice among intervention and the control groups at starting point and after intervention.
4. To determine effects of Health Education intervention by comparing starting point and post-intervention level of knowledge, attitudes, normative beliefs and perceived control beliefs on antibiotics misuse and self-antibiotics medications practices in the intervention and control groups.

1.6: Research Questions

1. What's the magnitude of antibiotics misuse and self-antibiotics treatment among

HIV positive adults in Bauchi State Nigeria?

2. What individuals' factors are linked with antibiotics misuse and self-antibiotics medication practices among adult HIV positive adults?
3. What is the level of knowledge, attitudes, normative beliefs and perceived control beliefs for antibiotics misuse and self-antibiotics medication practice among adults HIV positive adults?
4. What are the effects of health education strategy on prevention of antibiotics mis- use and self-medication practices among adults who are HIV positive?

1.7: Hypothesis

For the purpose of this study, the null hypothesis (H₀):

1. No relationship between individual factors, antibiotics misuse and self-treatment practice among HIV positive adults
2. There is no association between psycho-social variables (Knowledge, normative beliefs and perceived control beliefs with antibiotics misuse and self-treatment practice among HIV positive adults
3. Health education as an intervention does not affect antibiotics ill use and self-treatment practice among HIV positive adults

1.8 Limitations and Delimitations

This work was conducted as quasi experimental study. Hence, this study is neither an explicit experimental study design, nor an observational study, but a combination of features of experimental and observational studies. The biggest drawback of quasi-experimental research is the lack of randomization, which makes it difficult to draw conclusions about the causal relationship between a given intervention and the expected outcome(Andrade, 2021).

Another limitation of quasi-experimental studies is that groups may vary systematically in a variety of ways at baseline; when these differences affect the outcome of interest, comparing outcomes between groups using univariable approaches can lead to false conclusions. Therefore, to counter this limitation, in this study, a multivariable analysis was used, as it is more effective method of data analysis. This is because multivariable regression allows for the adjustment of the effects of confounding variables, allowing for a better understanding of the particular effect of the grouping variable(Andrade, 2017).



1.9 Operational Definitions of Terms

Independent Variables

- A. Age: respondents' biological age as at time of enrollment in the study
- B. Sex: respondents' sex classification
- C. Occupation: Type of job, a respondent is engaged in to make a living
- D. Education: Highest level of education attained by a respondent whether formal or informal
- E. Marital status: Respondents' legal marital status as at time enrolment in the study
- F. Religion: Respondents' faith orientation
- G. Duration of diagnosis: Duration of time since diagnosis as HIV positive
- H. Duration on ARVs: Duration of time since a respondent has been placed on antiretroviral drugs
- I. CD4 cells count: Cluster of differentiation cells count level as at time of enrolment in the study

Dependent Variables

Self-medication: An act of using antibiotics without prescription by competent medical personnel to treat self-diagnosed ailment or previously formally diagnosed ailment

Antibiotics misuse: A combination of self-medication and or misuse of antibiotics previously prescribed by competent medical personnel

Knowledge: Refers to facts, information, and skills acquired through experience or education. In this context the theoretical or practical understanding of antibiotics misuse and self-medication

Attitude: In this context refers to the opinion of respondents regarding antibiotics misuse and self-medication

Belief: in the context of this study this refers to the values held and internalized by the respondents regarding antibiotics misuse and self-medication



CHAPTER TWO: LITERATURE REVIEW

This chapter described the reviews of the current literature about antibiotic misuse and self-medication among HIV positive adults. This literature review highlights historical perspectives on self-medication and definitions of terms in the beginning of the chapter. The chapter is broadly categorized into review of the literature among HIV positive adults, antibiotic misuse and self-medication in the general population, antibiotic misuse and self-treatment in Nigeria, and factors responsible for antibiotics misuse and self-treatment and its consequences. The later part of the review addresses strategies for preventing antibiotics ill use and self-treatment as well as the theoretical frame- work for studying antibiotics misuse and self-medication. The use of planned behavior theory was reviewed and the gaps which study aims to address.

2.1: Antibiotics Misuse and Self-Medication among People living with HIV

Self-antibiotics medication leads to multitudes of challenges including "missed diagnosis, delay in presentation, resistance to prescribed medications, and increased morbidity and mortality" (Bennadi, 2014b). Though AIDS-related mortality has been reducing since the advent of HAART, but problems associated with self-medication and polypharmacy in PLWHA has been on increase (Nachege et al., 2012). In a cross-sectional study among PLWHA in Huston, Texas, Sansgiri et al found among 217 study participants, 37% were misusing Over-The-Counter medications (OTCs), among whom, 17% had Adverse Drugs Events (ADE) from inappropriate use of OTCs. Also, there is a significant association with low Health-Related-Quality of Life. (HRQL) (Sansgiry,2015). Studies have also shown that patients generally have poor knowledge of adverse drugs events due to misuse of prescription medicines (Coleman & Pontefract, 2016) Other than ADEs, self-medication among PLWHA possess a great risk for drug interaction with Anti-Retro-Viral drugs (ARVs) (Biudes & Galato, 2014).

According to Tseng and Fon, Protease Inhibitors in treatment of opportunistic bacterial infections, and The Non-Nucleoside Reverse Transcriptase Inhibitors (NNRTIs) have roles in CYP450 and thus possibly a reason for high risk of significant drug interactions” (Tseng, 2012). In addition to these, self-antibiotics medication has also been shown to cause vital organs damages such as acute liver failure (Oliveira et al., 2014). Several research works have been carried out to not only know the magnitude of antibiotic misuse and self-treatment, but to as well as detect the reasons for self-medications and the effects that come with it. These studies have been done globally in both advanced and emerging nations. Research has also been conducted across different populations like students (Khalid et al., 2019), elites, poor and downtrodden (Barker et al., 2017), gender specific studies and in people with other specific diseases who are at a higher risk of self-medication (Mutagonda et al., 2022). Antibiotic misuse and self-medication are seen more commonly in developing countries making it a major public health challenge. Although it is seen more frequently in developing countries, antibiotic misuse and self-medication is reported to be an emerging public health concern in the advanced nations like United States (Ashraf & Cook, 2016). In developing countries Alnemeri et have reported the magnitude of antibiotics misuse and self-treatment in a systematic review from 41% - 92% (Alnemri et al., 2016). Self-medication by patients living with HIV/AIDS seems to be frequent and is especially related to the use of over-the-counter medicine and symptoms management like pain and fever and to the control of adverse reactions related to the antiretroviral therapy (Djima et al., 2019). Although self-treatment is recognized as part of self-care (Mills et al., 2018) it is important measure this practice once it can be performed in an irrational way (Bennadi, 2014b). However, among HIV positive adults, there is insufficient evidence

with quality data on the magnitude of self-treatment. Paucity of studies on this theme prompt interest among researchers globally (Biudes & Galato, 2014). Initially, the focus of epidemiological studies in PLWHA was to evaluate drug safety of Highly Active Antiretroviral Therapy (HAART) but recently interests have shifted to study self-medications within diverse populations as reported by Fogelman et al, 1994 (Fogelman et al., 1994)] in a clinical study done in the U.S in multiple centers. The findings by Fogelman et al revealed a magnitude of 85% of concomitant self-medication and an average intake of 7.5 drugs per participant at a given time. A study conducted in Thailand by Khamboonruang et al 1995 a year later on self-treatment practice for Sexually Transmitted Diseases (STDs) and HIV reported that 65% of the respondents who were HIV positive had self-medicated for STDs (Khamboonruang & et al., 1996). In a comparison study by Smith et al, in 1999 that first examined the relationship between predisposing factors, motivating factors, desire for care variables and self-medication for HIV then comparing with the disease related factors that come with the medicine used by persons with HIV and socio demographic profiles of the participants found the risk of doing self-treatment among study respondents to be 0.65 with 95% confidence limit was found ranging 0.52-0.81 (Smith et al., 1999). Research done by Furler et al 2004 in Canada to investigate polypharmacy among PLWHA found that the use of drugs among majority of the patients was at 15.7+/-7.7 which is higher than 8.8+/-5.0 prescription on the medical chart (Furler & et al., 2004). Sujit et al (Sansgiry et al., 2008) carried out a study to evaluate the effect of over-the-counter use of medication and the effects on the quality of life of HIV patients. The magnitude study was adopted with a study population of HIV positive patients receiving their care at a HIV clinic in Houston Texas from 1st April 2005 to June 30, 2005.

A self-administered inquiry form (including questions on OTC medications used; adverse drug events (ADEs) experienced; and Health Related Quality of Life (HRQL) assessment tool, short form-12, version 2 scale) was managed through face-to-face interviews. In order to evaluate the internal consistency for HRQL scores, Cronbach's was calculated. The effects of OTC misuse on ADEs and HRQL, were assessed using the t-test of statistical analysis. The study findings showed that 80 (37.2%) of the 215 respondents misused OTC medications while 16.7% had experienced ADEs from use of OTC medications. Those patients misusing OTCs had significantly higher rates of ADE. Lower HRQL scores was associated with OTC-associated ADEs among HIV infected patients. Therefore, tailored interventions aimed at reducing misuse of OTC medications would lead to improved life quality and care among HIV positive adults (Hughes & et al., 2002).

A study conducted among Commercial Sex Workers (CSW) in the Cebu city of Philippines revealed the extent of unprescribed drug use/drug abuse by the CSW which they perceived among their selves to be a means of prophylaxis in a case an exposure to Sexually Transmitted Diseases (STD) vulnerability as well as to reduced their perceived risks(chance) of having Human Immune Virus (HIV) (ABELLANOSA & NICHTER, 1996). 2) The study which was conducted in Thailand portrays the extent at which northern Thai men embrace the use of antibiotic for prophylaxis against sexually transmitted diseases (STD) and HIV, however the exercise of self-treatments happens to be common among, which may significantly reduce bacterial STD as a result of HIV infection in most common population (Chanvatik et al., 2019). Adverse Drug Event (ADE) related to mis-use of over the counter (OTC) medication experienced by patients living with HIV tend to cause lower health-related quality of life (HRQL) score than in those who did not (Suleiman et al., 2020). Based on research

done on patient's awareness and insights on side effect of Over the Counter (OTC) treatments, the results revealed that many patients do have minimal knowledge on the potential drug side-effects, though they were able to detect having an adverse drugs reaction as a result of self-medication. It also shows that many patients are able to get information on certain medication from family and friends with some health care professionals not exclusive, which makes them careless on the information given in the poorly design and information loaded in the leaflets as per their perception. In another study by Sanko et al, found most elderly people living with the HIV condition in African sub-Saharan region commonly use multiple drugs, which is more prevalent among poor health status that have been hospitalized or have been seeing internal medicine specialist, though findings show no negative effects of polypharmacy on the patients (Ssonko et al., 2018)(Furler & et al., 2004). In addition, studies show considerable number of non-prescribe drugs like vitamins, hematinic, analgesics, mineral supplement etc. used by HIV adult patient is found to be more common in females than males and it mostly is a precursor of several issues including patient risk of drug-drug interaction and decreased adherence to ARVs medication (Johnson et al., 2009). According to Anderson et al, most common concomitant medication used by patients living with type 1 HIV during clinical trials of zidovudine (ZDV) are found to be anti-infective, anti-pyretic and vitamins, and are more rampantly used by AIDS patient followed by AIDS related complex then asymptomatic patients (Anderson & Rower, 2010). Disposable syringe and needles reuse and sharing is found to be prevalent among Latina women in Los Angeles to administer home medication injections (antibiotics, vitamins and contraceptives) in which may be a risk to contacting HIV (Flaskerud & Nyamathi, 2010) (Kerr et al., 2010). the research which was aimed at revising the practice of self-medications by HIV/AIDS infected patients

has revealed high prevalence of practice of self-mediations by people living with HIV/AIDS, the most common medication used were analgesic, vitamins and anti-diarrheal in case of treating adverse reaction cause by anti-retroviral drugs, and antibiotic to deal with sexually transmitted disease, in which the medication are mostly acquired through previous prescription or information provided from package leaflet. Chronic non-communicable disease, common infections and mental illness are the most common condition that lead to self-treatment as portrays by this research, the prevalence use of cough syrup is found to be 90% among student as sedative, with 90% use of sildenafil in men above 40years, use of bleaching steroid is about 73.5% in woman followed by 73% use of antibiotics and anti-malarial (Matthias et al., 2021)(Smith et al., 1999). In a study in Khartoum state, Sudan, majority of respondents reveals that social media, waiting time, hospital bills, fragmented health and lack of awareness are the major factors leading to self-medication. Simultaneous use of drugs and abuse of over-the-counter medication is common among individuals living with HIV. The most commonly used OTC treatments were analgesics/antipyretics (64.2%) with non-steroidal agents being used at a greater proportion 38.4%. About 80 (37.2%) of the study's respondents mis-used OTC medications. The highest occurrence was in misuse in terms of length (46.3%), frequency misuse at (45.6%), and circumstance misuse at (8.1%)(Ajuoga et al., 2008) (Furler & et al., 2004). There was an overlap in misuse categories in 30 about cases representing (20.1%). While 36 (16.7%) respondents felt at least 1 or more adverse drug events linked to over-the-counter medication ill use. Comparing with to those that did not misuse OTC medications; incidence of adverse drug events was outlined to be high in patients who ill-used OTC medications. Self-remedy and inappropriate use of multiple drugs is a common behavior among people active with HIV. The use of un-prescribed medications initiates

the vulnerability to adverse drug side effect (Fogelman et al., 1994). According to the study, some areas possible improvement in antibiotics prescription such as frequent use of antibiotics by inpatient, long time use of antibiotics in surgical prophylaxis, too much prescription of antibiotics spectrum agent such as ceftriaxone less frequent targeted antibiotics prescribing. According to Chanchala et al, in a study which was aimed at evaluating the levels of knowledge, attitude and practice regarding antibiotics self-medication among dental unit adults out-patients care attendees at a dental college and hospital in Karnataka India, more than half of the number of patients attending dental hospital have initial knowledge in regards to the dental products, dentist, television and friends are the significant sources of information on self-prescribed antibiotics, a large portion of the society have an awareness that prescription is also crucial in obtaining, proper dosage, and frequency of drug intake. The study shows, Of the 271 respondents, 88.4% of them agreed that a prescription is necessary for the pharmacy to dispense the medication. 48 percent of them said a prescription were necessary in order know the proper dose of the drug, 14.8% believed it was necessary to know the proper time to take the drug, and 35.2% believed it was necessary to know both of the aforementioned. 78.8% of respondents thought it was unacceptable to buying over the counter (OTC) medications without having a prescription (OTC). 37.2 percent of those surveyed thought that the only way to treat dental issues was to take the prescribed medicine. However, 62.8 percent of them disagreed with the previous statement. In response to a question regarding adherence to the post-prescription instructions to be followed, 52.2% of the respondents did so (Chanchala et al., 2016). In another research carried out in the eastern, southern and vardar (central) region of Europe it portrays that majority of the population have minimal knowledge on the use of antibiotic to treat upper respiratory infection (URTI), despite their significant use of

antibiotic though about half of the respondent are aware of antibiotic resistance(Ivanovska et al., 2013). The use of un-prescribed drugs (Over the counter) is a common behavior even among health workers who may even have significant influence among others (Hanumaiah & Manjunath, 2018). A significant percentage of respondents attribute their self-medication practice to being exposed to a previous prescription by a health worker, regardless of whether or not the index illness requires the use of the previous prescription made by the health worker. In research done in Lebanon, education level was found to significantly correlate with self-medication, as well as previously used prescriptions without experiencing side effects. In about (53.4%) was the foremost reason for using OTC, followed by the need to save time (25.7%), minimizing costs that come with visiting a physician (18%), fear of worsening of the disease (11.5%) and ease access of over-the-counter drugs likely for abuse from available pharmacies (10.6%). 20 In appropriate use of home stored antibiotic that is mostly obtained from previous prescription by doctors or advise from family and friends are found to be a common practice among people living in Gaziantep-Turkey, it was found out that majority of the participant self-treat themselves with drugs mostly to treat common cold & flu, fever, sore throat, among others. Avoiding hospital bills and time saving are found to be the major reason for self-treatment (Awada et al., 2020). In a study to assess the knowledge, attitude of antibiotics misuse among pregnant women in Italy, Navaro et al enrolled a total number of 503 women. The study showed that women age between 31-40years employed, who had problem in the previous year have higher knowledge, have increased risk of antibiotics misuse and self-medication during pregnancy. Less than half of women aged between 26-35 years, non-graduate, in their 3rd trimester with risky pregnancy had use medication without doctors' advice. Older Italian,

multiparous with no history of abortion were more likely to have self-treatment. And do not know the risk of using non-prescribed medicines during medication, therefore need education on non-prescribed medication (Navaro et al., 2018).

2.2: Antibiotics Misuse and Self-Medication in General Population

Numerous studies have attempted to estimate magnitude of antibiotics misuse and self-treatment in either hospital based or general population settings. In community-based studies as well, higher prevalence of SM was found by various authors. In a recent study among the rural residents of Lagos state in Nigeria, Ayanwale et al, reported self-medication prevalence of 92% among respondents surveyed (Ayanwale, Okafor, 2017). In Jordan, Shehadeh et al found 49% of their respondents in community based study had used antibiotics without being prescribed (Shehadeh, Suaifan, Darwish, Wazaify, Zaru, & Aljassari, 2012).

According to Mousumi et al, in a research work that assessed “Self-medications practice among undergraduates medical students of Gauhati medical college in India, 73.3% among the students reporting practicing self-medications and the researcher also found that practice of doing self-medications significantly increases with an increase in years of the work ($p=0.0001$) (Mousumi K et al., 2018).

According to Antonius Nugraha Widhi pratama et al, in a study on “the act antibiotics purchases without prescriptions among the non-medical students in Jember Indonesia in order to identify the sources of non-prescription antibiotics 58.5% of the respondents admitted to have obtained antibiotics without the presence of a health worker prescription. This survey was conducted between April & June 2016. ($p = 0.04$) (Pratama et al., 2018).

According to Ateshim et al, in a study on “Self-medication with antibiotics in the community of Asmara city, in Eritrea, beginning September until November, in 2017 (Ateshim et al., 2019a).

This study indicated that 45.1 percent of participants self-medicated with antibiotics, with the majority doing so once or twice over the course of a year due to prior, effective experiences (34.4%). Even if the majority of respondents thought using antibiotics for self-medication was a good idea, half of them still did.

In a study on "self-medication among undergraduate medical students at a rural medical school from western Uttar Pradesh, A study was carried out among the undergraduate students studying in a rural medical school from western Uttar Pradesh to analyze the factors in influencing adverse effect of self-medication among undergraduate students, researchers found out the overall prevalence of self-medication to be 71.5 percent, according to Jai Krishna et al. The study, which was conducted from March to October 2014, found a rising tendency of self-medication among medical students, with time savings and immediate relief being the most frequent reasons given. (Krishna et al., 2015).

According to Suzana Mlinar et al in a study on the use of over-the-counter medications by nursing students, researchers discovered that prescription drug use was much more common in women ($p=0.029$). The fact that nursing students frequently use over-the-counter medications on their own initiative and receive safety instructions along with their purchases suggests that enough safety promotion is being done. In a study conducted in Slovenia from February to April 2013, it was discovered that women used OTC medications to treat minor psychological issues more frequently as they

aged, and that males felt healthier and were less prone to use drugs. (Mlinar & Raskovic-Malnarsic, 2015).

In another research, Chandani et al, have examine “self-medications pattern in a remote rural area south of India, the research reports the prevalence of self-medication to be 51.75%, more than 90 percent of the respondents have considered self-medications as not harmful & acceptable and 92.8 percent were willing to still continue with the practice in future. Self-medication is preferred by patients. Study was conducted February 2014 – March 2014, with a sample size of 377 considering a prevalence of 81.5% (Ashok Kumar & Revannasiddaiah, 2018).

According to Nitya Selvaraj et al, Researchers in a study carried out in Sweden by evaluating the prescription drug register and birth register discovered that 57.6 percent purchase at least one prescribed drug during pregnancy in a study on drug Utilization pattern in pregnancy at a tertiary care hospital in Puducherry. Another study conducted in north India indicated that throughout the first, second, and third trimesters of pregnancy, pregnant women used an average of 1.73, 2.89, and 2.49 medications. Sample size was calculated to be 71.2% (Selvaraj et al., 2018).

According to Gayathri S. et al., in a study on self-medication practices among rural Kanchi Puram, India, studies on self-medication showed that it is influenced by many factors like educational status, family, and cultural practices. Researchers also discovered that purchases of drugs that can only be purchased with a prescription in developed countries are OTC drugs. Self-medication was mostly prompted by the subpar care provided in government institutions. Sample size was found to be 246 (Gayathri et al., 2017).

According to Nithin Kumar, in study on “the perception and practice of self-medications by medical students at a coastal part of south India, the prevalence of self-mediations was shown to be 78.6%. It was also found in some research done within India the prevalence of self-mediations among medical students were ranging from 57.1% and 92%. The study’s sample size was estimated assuming 50 percent of the participants practices self-mediations. The study was carried out in March – April, 2011 (N. Kumar et al., 2013).

According to J. Indermitte et al, in a study on “patient level of awareness of some selected drugs interactions with self-mediations, researchers found out that of 1183 passer-by customers 164 (14.4%) purchase one of the OTC drugs selected, while (42.2%) taking prescribed drugs ($p=0.0001$). Younger customers show higher levels of awareness of potential drugs interactions and so effects to increase awareness of potential drug interactions is needed. The survey was conducted in April 2005 in Basel Switzerland (Indermitte et al., 2007).

According to Varun Kumar et al, in a study on patterns of self-mediations practice in some urban areas of Delhi city in India, it was found by some researchers that prevalence of self-medication was 92%.8% and that practicing self-mediations was shown to be higher among younger persons than older aged persons ($P=0.000$). The study was conducted in March 2013, and sample size calculated was 211 (V. Kumar et al., 2015).

Researchers have discovered that self-medication practices are more common in medical and nursing students because of their proximity to the health setup, knowledge, and easy availability of drugs, according to a study by Purna Pandya et al. on self-medication for skin diseases among medical undergraduate students. 90% of

participants used self-medication to treat skin issues. The study was conducted from May to July, 2017 (Pandya & Pandya, 2018).

According to Abdulrahman AI Rasheed et al, in a study on self-medications using antibiotic in the Al Wazarat healthcare center, in Riyadh, Kingdom of Saudi Arabia, the prevalence of self-prescriptions with antibiotic was 78.7 percent, where Amoxicillin drugs were the most frequently used self-prescribed antibiotics having a prevalence as high as (22.3%) (P=0.000) (Rasheed et al., 2016).

The study also found that significant disparities exist in self-prescribed antibiotics between users are 13.0% females and 87.0% males. The research further shows the drugs amoxicillin, ciprofloxacin and penicillin were the antibiotics more frequently self-prescribed and mis-used. The study was conducted February and November 2014, and sample size calculated was 757.

According to Alireza Abdi et al in a research on self-medications practice amongst health sciences students at Kermanshah, Iran the most predominant reasons for self-medication were inadequate information about the disease, financial difficulties and lack of adequate time to visit a health care workers, and for that the using of the over-the counter medications by the youth most especially students is on increase which is as a result of ease of accessibility to pharmaceutical in formation. The self-medications prevalence was 89.6%, the study was conducted in 2016 in Iran (Abdi et al., 2018b).

According to L.P.F Kojom et al, in a study on self-medications with anti-malaria drug among mother who are Cameroonians, study was conducted in 2016 in the town of Douala, with the prevalence of self-medication 49.30% and reasons are habit, 38.75 percent, not having money (22.48%). Researchers also found in the study that malarial drugs self-medications was commoner among women (Kojom et al., 2018).

According to Fernando et al, in research on “self-medications among Urban older Mexicans, research has shown that self-medications was remarkably most frequent among older adults who living alone as compared to married one’s ($P=0.0274$) and among illiterates or those with low level of education. The study further found that more than (60%) of the drugs being consumed were available in pharmaceutical stores and patent medicine stores without restrictions, study conducted in September and October, 2006 (Balhuena et al., 2009).

According to Albatti et al, in a study on “self-medications amongst adolescents 13 – 18 years old in the Riyadh city, researchers found that self-medications amongst adolescents were found to be high 94.5 percent. Medications most commonly used were pain relievers (87.3 percent) while the reason reported by most students was headache, result also shows that the type of school adolescents attended and self-medications were statistically significantly associated with ($p<0.011$) study conducted from 2014 to 2015 (Albatti et al., 2017a).

According to Oluwole et al, in a study on “self-medication among health workers in tertiary institution in south-west Nigeria, were researcher’s shows that among some of the causes for practicing self-medication by the health workers to be financial problem, mild sickness, time constrains, lack of doctors, the study also shows that the prevalence of self-medications is to an extent higher, and that calls for the need for education on the consequences and dangers of self-medication. The study also indicates that the prevalence of self-medications remains high (52.1%) (Babatunde, Fadare, Ojo, Durowade, Atoyebi, Ajayi, et al., 2016).

Most of the health care centers are located in the urban areas while majority of the population still have in the rural areas where healthcare facilities are inadequate. A study in Nigeria showed that 85% practice self-medication.

According to PR Shankar et al, in a study on self-medications and non-Physician's prescriptions practice in Pokhara valley, West Nepal, it was shown by researchers that due to the difficulties in access to the healthcare services in Nepal, self-medication is often the simplest option for the patient, self-medications were prevalent in the Pokhara valley among 59 percent of respondent's uses one form of self-medication or the other. Study also shows that urban respondents were more frequent users of self-medication (Shankar et al., 2002).

According to Marilia et al, in study on "self-medication amongst university students from city of the Rio city of Brazil, researchers found out that differences in self-medications practices between healthcare and non-healthcare student's nor between first year & last year students, were not significant (86.4% self-medicated) while (88.5% healthcare student's).

Being a student of healthcare provides a better medication knowledge but not necessarily with self-medications, research conducted in April and July, 2010 (M. L. Silva et al., 2019).

In a study by Conrad et al self-medication practices amongst amateur athletics runners, it was found that amateur athlete's resort to self-medication for different reason's such as pain, tiredness, injuries and sometimes to enhance their physical performance, the survey also shows that Self-medication is a widely practiced, documented behavior among amateur athletes that is influenced by peers. Analgesics and non-steroidal anti-inflammatory medications were the two treatment groups that were most frequently

reported. 32.1 percent admitted to using two or more medicines, whereas 67.0 percent admitted to using just one before exercising.(Médéa. Locquet. et al., 2016).

In a research by Banerjee et al, on “self-medications practices in a tertiary care medical college, in west Bengal, amongst under-graduate medical students it was found that 57.05% of the participants practices self-medications and the motivations for their self-medications include cough, and cold, as reported by (35.21%), fever (15.73%). The research also shows that practices of self-medication were highly prevalent amongst female than male($P<0.006$) (Banerjee & Bhadury, 2012a).

In a study conducted by Sara et al, on research on self-medication practices in the community of Harar City revealed that many participants did so to treat respiratory disorders (29.50 percent), gastrointestinal disorders (27 percent), and headaches (30.30 percent). More than half of the participants said they self-medicated because of prior experience or to save money. The Study conducted in Harar city from March to April 2017. Sample size was calculated to be 384. (Mamo et al., 2018)

In research conducted by Luca Garafalo et al, on self-medications practices among parents at Italy, the researchers shows that 69.2 percent of respondents practiced self-medications at least once, and the practice is higher in female. It was also found that respondents were engaging in self-medications mainly based on their feelings that the illness was very mild as such do not requires the services of a doctor. Study was conducted October to December 2012, in total the sample size for the study was estimated at 770.(Garofalo, Di Giuseppe, et al., 2015)

Whereas Tadele et al, in a research work on “self-medications practices in Mekelle, Ethiopia, researchers found that reasons for self-medication were mild nature of the disease, previous experiences and lesser costs. Most of the respondents made request

by telling self-symptoms and also by showing old samples. The most commonly used classes of drugs were antipyretics and pain relievers. Major illness reported were headache, fever (20.7%), respiratory tract infections (15.9%). Sample size was calculated to be 307, study performed from February to March 2013 (Eticha & Mesfin, 2014).

According to Bhandari et al, in a study on behaviors of self-medications among nursing students, according to the research findings, the majority of participants 66 percent were using medications without a prescription, and the majority of students 62 percent were using antipyretics. It was shown that the majority of students (83 percent) self-medicate for fever and headache (64 percent). Additionally, it was shown that the majority of nursing students (53%) self-medicate using already given medications by doctors. (Bhandari et al., 2018)

Self-medications prevalence was overall 29.1 percent (urban) and 7.7 percent (rural) in research by Dnyanesh et al. on "Self-medication practices in Urban and Rural Areas of Western India" (rural). Additionally, the study revealed that conserving time and having outdated prescriptions (rural 53.5 percent vs. urban 39.8 percent (rural, 23.3%, urban 35.9%). The study also showed that living in metropolitan regions was linked to taking medications without a doctor's prescription; this association was also observed to depend on one's income, employment, and level of education. Survey conducted June 2015 and August 2015 (Limaye et al., 2018).

According to Emma et al., the response rate for their study on "self-medication with antibiotics in a broad population of Sweden" was 69 percent. According to research done in March 2003, the most prevalent cause for self-medication was cystitis, with 46% of men and 54% of women coming from urban areas and 51% from rural areas.

In research on "self-medication with antibiotics amongst Greece respondents," according to Eystathios et al, it was found that self-medication with antibiotics was quite common in the rural population of Southern Greece. The survey reveals that 44.6% of people obtained antibiotics without a doctor's prescription at least once in a 12-month period, with pharmacies serving as the primary source of these prescriptions. Antibiotics are frequently used for fever, the common cold, and sore throats. Study conducted between November 2009 and January 2010 (Skiros et al., 2010).

In research on "self-medication with antibiotics in southeast Asian areas," Gaurav et al. found that the prevalence of self-medication with antibiotics ranged from 7.3% to 85.59% with an overall frequency of 42.64%. Self-medication was frequently used for a number of reasons, including past experience managing illnesses of a similar nature and cost- and time-saving convenience. Amoxicillin and macrolides were the two most often used antibiotics for self-medication; the widespread usage of amoxicillin may be attributable to its inexpensive cost, convenient availability, and little side effects (Nepal & Bhatta, 2018a).

According to Sayer I. Al-Azzam et al, in a study on self-medication, researchers found that self-medications with antibiotic was statistically significantly associated with the age, incomes and levels of education, and major reason for self –medications were previous experience on treatment. Survey also found that (39.5%) antibiotic users used antibiotics without prescription and the prevalence of self-medications with antibiotic in Jordan is staggery high (Al-Azzam et al., 2007).

Elizabeth Dorothy et al. report that in a study on "self-medication with common household medicines by young adolescents," the researchers discovered that 64% of the students asked for the most recent medication they had taken, leaving 36% of them

self-medicating. The study also indicates that there is significant self-medication among young adolescents, as 42% reported getting household medicines for themselves, but this study found self-medication to be low (Sloand & Vessey, 2001).

Self-medications contributed causally to an adverse drug reaction (ADR), according to a study by Sven Schmiedl et al. on "self-medications with over-the-counter and prescribed drugs causing adverse-drug-reaction-related hospital admissions. The research showed that ADRs were caused by prescription drugs only, self-medication contributed causally to an ADR patients with medication-related ADRs leading to hospital admission were younger, more often, male, had fewer diseases, took (Schmiedl et al., 2014).

In a study on older people's use of self-medication, Y-F Chen et al. reported that researchers discovered the overall prevalence of medication usage was 75% for older adults aged 65 to 74 and 84 % for those aged 75 and beyond. The study's findings appear to be consistent with other findings about the frequency of medication usage and the total quantity of pharmaceuticals used by older participants. According to the survey, more than 10% of those in the 65–74 age group and over 15% of those in the 75–plus age group were concurrently using five or more medicines (Y F Chen et al., 2001).

In a study on antibiotic self-medication in Lithuania, Ausra et al. found that 53.2% of respondents reported using antibiotics for self-medication, with 39.9% of respondents reporting using them in the 12 months before to the survey. In general, 22.0 % of people took antibiotics without a prescription, whereas 45.0 % intended to self-administer them. Self-medication was more common in healthy individuals compared to chronically ill individuals, and non-prescription antibiotic usage was higher in rural

regions than in metropolitan ones. In Lithuania, self-medication with antibiotics was very common. The study suggested that sales of antibiotics ought to be strictly regulated (Berzanskyte et al., 2006).

Research conducted by Mainu et al. at Malaysian National Defense University on the use of antibiotics for self-medication among university students revealed that 39.3 percent of participants admitted to doing so. The majority stated that convenience and cost reductions were the key drivers of SMA, which was often purchased from neighborhood retail pharmacies. Despite the fact that medical students are more knowledgeable about the use of antibiotics than non-medical students, 89 percent of the research participants said that SMA was an appropriate and worthwhile practice. Despite knowing that SMA is dangerous, many Malaysian students still self-medicate, especially medical students. The study was conducted between January and April 2018 (Haque et al., 2019a).

In a study on "self-medication with antimicrobial drugs in Europe," according to Larissa et al., it was discovered that many people used antimicrobial drugs that had been left over from previous prescriptions. The study also revealed that people who were more likely to self-medicate with antimicrobial drugs were younger, more educated, and suffering from chronic illnesses. Self-medication with antibiotics is a problem throughout Europe. Even the lowest prevalence, 1 person per 1,000 responders, suggests that 10,000 people self-medicate on a yearly basis in a population of 10,000,000. Self-medication is done for bronchitis, gum symptoms, and throat symptoms (Grigoryan et al., 2010).

However, antibiotics misuse is not exclusively a community based or individual based problem. In a study conducted by Yue et al on the "clinical patterns of

antibiotics over-use and mis- use in primary health care settings China's South West" (Chang et al., 2018) the study involved sixteen primary health care facilities in the rural regions of Guizhou province of China through a retrospective review of medical records. Records were retrieved from the facilities Health Information System in 2018. The study showed that inappropriate antibiotic prescriptions were more than 90%. Infection of the respiratory system was majorly associated with inappropriate antibiotic preparations. While penicillin-based antibiotics were the most widely prescribed antibiotics followed by macrolides and cephalosporines. Sree Nagamani and Lalitha Halimanthu conducted a "comparative survey on self-treatment behavior in a public medical school in India" (Penupothu & Hanumanthu, 2018). In the study, most respondents sought self-treatment for fevers and common colds ailments. Analgesics are the most frequent pharmacological class of drugs taken for fever and headache. In both semesters, paracetamol and diclofenac were the most frequently used analgesics. Another finding also confirmed that Amoxicillin containing clavulanic acid has been used antimicrobial by both batches in the study. It has been reported that self-prescribed drugs use, or self-medication is more prevalent in developing countries. The magnitude of antibiotic misuse has remains alarmingly high. Activation of laws are highly recommended to prevent pharmacies from dispensing antibiotics without prescription and to prevent supermarkets from dispensing antibiotics as OTC drugs (Alotaibi et al., 2018). A survey that sought to explore the magnitude of antibiotic self-treatment done in Khartoum state, Sudan found a significantly high prevalence of 73%. Such high magnitude of antibiotics self-treatment in upcoming nations like Sudan has been linked with the growing global challenge of antimicrobial resistance and other health related complications that come with misuse of antibiotics (Eldin & ELKhawad, 2014). Amer et al investigated the prevalence of antibiotics ill use at Ummul Al-Qoora

University Faculty of Medicine, Makkah among senior medical students. As noted in this review, the prevalence of antibiotic misuse has been demonstrated to be higher in developing countries and seems to be on a steady rise compared to the developed countries, where there are stricter rules in dealing with antibiotic prescriptions hence making medical prescription the only way to access antibiotics. Findings from their re- search revealed a high prevalence 68% of misuse of antibiotics. Augmentin was the most misused antibiotic while antibiotic misuse was more common among females than in males (Alboush et al., 2017). Other than frequent use of antibiotics revealed by the study, findings from a study by Atefeh Moienzadeh et al demonstrated several knowledge gaps on proper antibiotics use. Majority of the study participants 80.5% (305/379) were aware that viruses were the most common causes of cold, cough and flu. However, only 43.5% (165/379) knew that antibiotics were ineffective in the treatment of cold and flu. About 47.0% (178/379) believed that infections caused by viruses could be treated using antibiotics. About one-third (29.8%, 113/379) of the participants reported that in cases where symptoms improved, they preferred to stop taking antibiotics. Furthermore, 40.1% (152/379) of the respondents believed that the duration of illness would prolong if one does not receive an antibiotics for colds, coughs and viral flu symptoms (Moienzadeh et al., 2017). Khazir et al, examined the magnitude of self-treatment practice amongst dental clinic attendees. Among 500 participants enrolled in the cross-sectional study, 445 participants representing 89% of the research respondents were practicing self-treatment. However, in this study, men were shown to have higher prevalence of self-medication than female (Khaazer et al., 2022). Jamaica S. Bulario et al, conducted a study on the issues related to parental self-treatment of antibiotics in Health centers of Manila. The methodology of this study was a prevalence descriptive

study and purposive sampling was used. The study sampled 390 mothers and data collection was conducted via interviews using a questionnaire. The study reported a 42.05% magnitude of self-treatment using antibiotics among moms. The only issue that was linked with antibiotic self-treatment was the mother's age ($p < 0.029$ OR = 1.02) demonstrating that as the mother's age increases the tendency to self-medicate her children also increases. The most common symptom that motivated mothers to self-medicate was cough. The choicest antibiotic by moms for treating symptoms like sore throat was amoxicillin. From the list of antibiotics mostly used by mother, all of them had a higher occurrence of improper use than the recommended (Bulario et al., 2018). Among students, antibiotics misuse and self-medication has been examined by comparing students in medically related programs versus students in non-medically related programs. In more comprehensive evidence available in the literature, Meyasam et al in a systematic review study examine the magnitude of self-treatment among university students. The study included publications up to 2017, with the findings showing magnitude of self-treatment among health students in the university globally was at an alarming rate of 97.2% as compared with non-medical students which was 44%. Overall prevalence of self-treatment among university students was found to be 70.1% (95% CI:

64.3–75.4%) (Behzadifar et al., n.d.). In a community-based study conducted in Nigeria, (5-2) focused on the evaluation of self-treatment practices for treatment of diseases among school- children. It was a descriptive prevalence study that was carried out in a number of Elementary schools in Nsukka Area, Enugu state, Nigeria. The study sampled 512 parents for the interviews. The findings revealed a high magnitude of self-treatment. Although most parents who were well educated agreed that self-treatment poses danger to the health of the children, they adept self-

treatment more because of their prior knowledge of the diseases and the treatment options available. Other key reasons for self-medication were need for quick relief of illness symptoms, financial difficulties and ease of access of the medicines. Successful interventions include strict regulations on drug advertisement, creation of public awareness and proper counselling. Tobin et al, carried out a study to “determine the magnitude and pattern of antibiotic self-treatment and associated risk factors among out-patients clinic attendees in Edo state, Nigeria”. Using a cross-sectional study design with 800 study respondents who consented to engage in the study. The study showed 47% of the respondents are engaged in antibiotics misuse and self-medication. Major reason associated with antibiotics self-medication was easy access at the pharmacies. Most utilized drugs for self-treatment among the respondents were Ampicillin/Cloxacillin (31.3%) and Amoxicillin (24.8%). Respiratory tract conditions were the most common reasons for taking antibiotics, 100 (27.2%) (Tobin et al., 2020). Zeru et al, in a study in Ethiopia examine reasons responsible for self-treatment and antibiotics misuse among college students in Gondar Ethiopia. The study shows 53% of the participants engaged in self-antibiotics treatment. Most reported reason for self-medication being self-perception of their illnesses as being minor. The variables of sex, income and level of study were statistically significant associations with self-medication (Zeru et al., 2020). Arikpo et al in a study on “self-medication profile of the rural Africa: The Nigerian experience”, described pattern of self-medication among the rural people of Cross River and Akwa Ibom States of Southeastern Nigeria. About 552 out of 736 persons, who were randomly selected, were interviewed using structured questionnaires. The study established that 99.4% of the respondents relied on self-treatment, while only 0.6% consulted medical experts. A wide range of substances

including antibiotics and traditional herbs, substances as ash, crude oils, etc, were used as remedies, and no specific drugs are used for specific ailments, depicting a puzzling state of folk medicine in rural Africa (Arikpo et al., 2009). In another subgroup study among 132 Nigerian medical practitioners, it was found that 93% of the respondents engaged in self-medication (Babatunde, Fadare, Ojo, Durowade, Atoyebi, & Olaniyan, 2016).

A comparative study in India by Kumar et al among two groups of medical students found a 75% and 69% prevalence of self-medication (R. Kumar et al., 2016). Similarly, a study in Belgrade Serbia, done by Lokovic et al among medical students reported a high self-medication prevalence of 80% (Lukovic et al., 2014). In a research carried out in China among 2600 university scholars reported that 74% of the survey students engaged in self-treatment with at least one or two drugs (Zhu et al., 2015). Another study in Egypt that survey medical students reported a 62% magnitude of self-treatment as reported by Helal and Abou ElWafa (Helal & Abou-ElWafa, 2017). A study in Kuwait by Al-Hussaini et al that surveyed medical students similarly reported a higher magnitude of self-antibiotics treatment of 98% (Al-Hussaini et al., 2014). A high magnitude of 85% of self-treatment was reported in a study conducted in Iran by Pirzadeh et al (Pirzadeh & Mostafavi, 2014). Many studies have reported high prevalence of self-medication in community-based studies in Nigeria. In a recent study done among rural residents reported a 92% prevalence of self-medication. (Ayanwale MB, Okafor IP, 2017). Another community-based study in Jordan found a 49% magnitude of antibiotic use without prescription (Shehadeh, Suaifan, Darwish, Wazaify, Zaru, & Alja'fari, 2012). According to Mousumi et al, in a study on "self-treatment practice among undergraduates in Gauhati medical college in India", 73.3% of the college students reported practicing self-medication and the

researcher also found that practice of self-medication significantly increased with increase in years of study ($p=0.0001$) (Mousumi K et al., 2018). According to Antonius Nugraha Widhi Pratama et al, in a study conducted between April and June in 2016, on “buying of drugs over the pawn without doctor’s remedy among non-medical students in Jember Indonesia” with the aim of identifying the sources of un-prescribed antibiotics, 58.5% of the respondents acknowledged to acquiring antibiotics without a doctor’s prescription. (Pratama et al., 2018).

According to Ateshim et al, in a study on “self-treatment with antibiotics in the community of Asmara, Eritrea”, from September to November 2017. This study found a self-medication magnitude with antibiotics of 45.1% with majority of them reporting use once or twice annually and the major reason for use was having used them previously with success (34.4%). Although a large position of the participants considered self-treatment with antibiotics as in-appropriate practice but half of them still practicing it (Ateshim et al., 2019a). According to Jai Krishna et al, A study done among undergraduate students studying a in a rural medical school from western Uttar Pradesh in other to analyze the factors in influencing adverse effect of self-medication among undergraduate students, researchers found out the overall magnitude of self-treatment to be 71.5%. The study shows growing trend of self-medication among medical student’s common reason reported by a large portion of study respondents was time saving also for quick relief, study carried out March-October 2014 (Krishna et al., 2015). According to Suzana Mlinar et al in study on “over the counter use of medicines by students pursuing nursing, Researchers found out women were likely to use prescription drugs than males ($p=0.029$) Also nursing students tend to use OTC treatments on their own accord, while ensuring they get proper instructions on safe use of these drugs implying sufficient promotion of

safe use while on the other hand, men felt they were more healthier than the women who were more likely to take drugs with use of OTC drugs to get rid of minor psychological problems increasing with the age of the women, study was carried out from February to April 2013 in Slovenia (Mlinar & Raskovic-Malnarsic, 2015). According to Chandani A Kumar et al, in a study on “self-treatment outlines in a rural area of south India, the study reports the magnitude of self-treatment to be 51.75%, more than 90% of the participants considered self-treatment as harmless & acceptable and 92.8% would have liked to continue the practice even in future. Self-treatment is preferred by patients. Study was conducted February 2014 – March 2014. Sample size was premeditated to be 377 based on the magnitude of 81.5% (C. A. Kumar & Revannasiddaiah, 2017). According to Nitya Selvaraj et al, in a study on “Pattern of Drug Use in pregnancy at a tertiary care hospital in Puducherry, the researchers assessed the prescribed drug and birth register and found out that 57.6% purchase at least one prescribed drug during pregnancy. In another study in north India, it was found that an average of 1.73, 2.89 and 2.49 drugs per pregnant mothers during first, second and third trimester of gravidity were used respectively. Sample size was calculated to be 71.2% (Selvaraj et al., 2018). According to Gayathri S. et al, in a study conducted among 246 participants, on self-treatment practices among rural Kanchi Puram, India, the study showed that many factors such as educational status, family, cultural practices influenced self-medication, researchers also found that OTC drugs in developing countries comprised those that can only be purchased with a prescription. Insufficient of care in government facilities was the main reason for self-treatment. (Gayathri et al., 2017). According to Nithin Kumar, in a study that comprised of medical students in coastal south India on “perceptions and practices of self-treatment magnitude of self-treatment was found to

be 78.6%. Similarly, other studies conducted in India have reported magnitude ranges of between 57.1% and 92%. The sample size was calculated assuming that the practice of SM among doctors was 50%. The study was carried out in March – April, 2011 (N.Kumar et al., 2013).

According to J. Indermitte et al, in a study on “patient alertness of particular drug relations with self-medication, researchers found out that of 1183 passer-by customers 164 (14.4%) purchase one of the selected OTC drugs, and (42.2%) taking prescribed drugs ($p=0.0001$). Younger customers were more aware of potential drug interface implying the need to increase awareness potential drug interactions that can be harmful. The survey was conducted in April 2005 in Basel Switzerland (Indermitte et al., 2007). According to Varun Kumar et al, in a study on “self-treatment practices in terms of patterns in urban area of Delhi in India, it was found by some researchers that prevalence of self-treatment was 92%.8% and that self-treatment was found to be practice more among younger person’s than older age person’s ($P=0.000$). The Study was conducted in March 2013, and sample size calculated was 211 (V. Kumar et al., 2015). According to Purna Pandya et al in a study on “self-treatment for skin diseases among medical undergraduate students, various researchers have found that self-treatment practices are more prevalent because of their closeness, ease of access to health set up and prior knowledge of the drugs. Self-treatment was prevalent in 90.09% participants for skin conditions, the study was conducted May to July, 2017 (Pandya & Pandya, 2018). According to Abdulrahman Al-Rasheed et al, in a study on self-treatment with antibiotics in Al Wazarat health center, Riyadh city, KSA, a 78.7% prevalence of self-prescription with drugs was reported while the most self-prescribed antibiotic was amoxicillin at 22.3% ($P=0.000$) (Rasheed et al., 2016). The study found that significant inconsistencies in self-treatment antibiotic among users are

13.0% females and 87.0% males. Amoxicillin, ciprofloxacin and penicillin were the most ill-used antibiotics in this study. Study was conducted February and November 2014, and sample size calculated was 757.

Alireza Abdi et al in a study on “SM practice among doctor students in Kermanshah, Iran most common reason for SM include inadequate information about the illness, financial limitation, lack of time to visit a physician, and for that the use of OTC drugs among the youth mainly students is on a steady rise due to access to medical information. The magnitude of self-treatment was 89.6%, study was conducted in 2016 in Iran (Abdi et al., 2018a). According to L.P.F Kojom et al, in a study that included mothers from Douala town, Cameroon in the year 2016 on “self-treatment with anti-malaria drugs”, the magnitude of self-treatment was 49.30% and reasons are habit (38.75%), lack of money (22.48%). Researchers also found in the study that malaria self-treatment is common among women (Kojom et al., 2018). According to Fernando et al, in a study on “self-treatment in older Urban Mexicans, research has shown that self-treatment was significantly more frequent among older adults who did not live with their spouses than those married ($P=0.0274$) and among the illiterates. The study also showed that more than (60%) of the medicines consumed could be accessed from the pharmacies without any restrictions, study conducted in September and October, 2006 (Balhuena et al., 2009). According to Albatti et al, in a study on “self-treatment among teenagers 13 – 18 years old in Riyadh, researchers found that self-medication was high (94.5%) and 87.3% used analgesics being the most common medication used (87.3%) and reason reported by most students was headache, result also showed that self-medication was suggestively linked with the type of school the teenagers attended ($p<0.011$) study conducted from 2014 to 2015 (Albatti et al., 2017b). In Nigeria, while most of the health care centers are

positioned in the urban areas while vast of the population still dwell in the rural areas where hospitals are scarce. Studies in Nigeria showed up to 85% prevalence of self-medication practice. According to Oluwole et al, in a study conducted in tertiary institution in south-west Nigeria on “self-mediction among health employees” found out some of the reasons for practicing self-treatment by the health workers to be financial problem, mild sickness, limited time, non-availability of doctors, the magnitude of SM was quite high at 52.1% indicating the need to create awareness to educate on the dangers of SM.(Babatunde, Fadare, Ojo, Durowade, Atoyebi, Ajayi, et al., 2016).

According to PR Shankar et al, A research Pokhara valley, western Nepal, it was found by researchers that SM was practiced by 59% of the residents as it was the simplest option for patients because of inaccessibility to health services in Nepal. Urban respondents showed higher rates of self-medication (Shankar et al., 2002). According to Marilia et al, in study on “self-treatment in tertiary institutes from city of Rio, Brazil, researcher’s found out that there was no statistical difference in self-medication between health and non-health student’s nor between first year & final year students, (86.4% self-medicated) while (88.5% healthcare student’s) (G. C. da Silva et al., 2012). Being a healthcare student provides a higher knowledge regarding medication but not on self- medication, research conducted in April and July 2010. According to Conrad et al in research on “self-treatment practice among Amateur runners, it was revealed that amateur athlete’s resort to self-medication for different reason’s such as pain, tiredness, injuries and sometimes to enhance their physical performance, the survey also showed that unprofessional athletes practices SM and is a wide spread behavior influenced by peers. Analgesics were the two most commonly abused therapeutic drugs with 67.0% attested having consumed only one during be-

fore running and 32.1% consumed 2 or more drugs (Garofalo, Giuseppe, et al., 2015). According to Banerjee et al, in a study done in Beghal that surveyed undergraduate medical students, it was found that (57.05%) practice self-medication and reason include cough, and cold, as reported by (35.21%), fever (15.73%) it was also revealed that coughing and influenza which is (35.21%) was the most reason for which students practiced self-medication (Banerjee & Bhadury, 2012b). The study also found that practice of SM was more widespread among female than males ($P < 0.006$). Ali A Jandani et al in a study "On the behavior of SM of drugs among the tertiary care hospital practicing nurses" found 68% of participants have undertaken self-antibiotics medication (Ali et al., 2021) with more males having practiced self-antibiotics than females. The study found amoxicillin & clavulanic acid as the most commonly used drug for SM. However, in a recent society-based survey in The city of Madina in the Kingdom of Saudi-Arabia, Allam and Amer, found 74% of their respondents practicing self-treatment with antibiotics (Allam & Amer, 2020). According to Sara et al, in a study on "self-medication practices among community of Harar city, research showed that many respondents practice self-treatment to relieve headache (30.30%), to treat respiratory diseases (29.50%) and gastrointestinal diseases (27%) were more than half of the respondents attesting that they practiced SM because of desirable previous experience and because it was less expensive (Mamo et al., n.d.). The study was conducted in Harar city from March to April 2017. Sample size was calculated to be 384. Malak et in another survey on antibiotics misuse and self-medication reported a prevalence of 98.4% (Malak & Moh'd AbuKamel, 2019). According to Luca Garafalo et al, in a study on "self-medication practices among parents in Italy, researchers found that 69.2% practiced at least once, and the practice is higher in female. It was also found that the main reason for SM was because

they felt that the ailment was too mild hence no needs to seek the services of a physician. Study was conducted October to December 2012, with a total sample size of 770 (Garofalo, Giuseppe, et al., 2015).

According to Tadele et al, in a study on “self-treatment practices in Mekelle, Ethiopia, researchers found that reasons for self-treatment were leniency of the disease, prior use with pleasant involvement and less costly. Majority of consumers made request by telling their symptoms and by showing old samples. Major illness reported were headache, fever (20.7%), Respiratory Tract Infections (15.9%). Sample size was calculated to be 307, study performed from February to March 2013 (Eticha & Mesfin, 2014). According to Bhandari et al, in research on “self-treatment practices in Nursing students, Research findings revealed that majority of the participants 100 (66.7%) were taking drugs without prescription and antipyretics were being used by a maximum number 93(62%) of the students. It was revealed that maximum number of scholars self-medicate during fever (83%) & headache (64%). It was also revealed that majority of nursing students (53%) self-medicate using drugs previously prescribed by doctors (Bhandari et al., 2018). According to Dnyanesh et al, in a study on “Comparison of self-medication practices between urban and rural areas of Western India, over all prevalence was 29.1% (urban) and 7.7% (rural). The study also revealed that most urban residents consumed medicines without a doctor’s and SM was influenced by income level, occupation and education. Survey was conducted June 2015 and August 2015 (Limaye et al., 2018).

Conferring to Emma et al, in a research on “self-treatment with antibiotics in a Swedish general population, the study showed that response rate totaled 69% , with 46% male and 54% female were 49% originated from urban area and 51% came from rural area and common reason for self-treatment was cystitis, study conducted in

March 2003 (Svensson et al., 2004). Referring to Eystathios et al, in a study on “self-treatment with drugs in Greece, it was discovered from the study that prevalence of SM with antibiotics in rural population in Southern Greece was high. The study shows that (44.6%) had used self-treated once in 12 months and the main point of contact was the pharmacy, and the antibiotics are commonly used for fever, common cold, and sore throat. Study conducted between November 2009 and January 2010 (Skliros et al., 2010). According to Gaurav et al, in a study on “self-medication with antibiotics in southeast Asian regions, prevalence of SM with antibiotics fluctuated from 7.3% to 85.59% with an overall magnitude of 42.64%. Major reasons for self-treatment were prior experience of treating similar illness. The most common antibiotics used for self-treatment was amoxicillin followed by macrolides, this has been linked to low cost, easy availability and low side effect (Nepal & Bhatta, 2018b). According to Sayer I. Al-Azzam et al, in a study on self-medication, researchers found that self-treatment with antibiotics was suggestively associated with level of age, income level and level of education, and main reason for self-treatment was previous experience on treatment. Survey also found that (39.5%) antibiotic users used antibiotics without pre- scription and the magnitude of self-treatment with antibiotics in Jordan is distressingly high (Al-Azzam et al., 2007). According to Elizabeth Dorothy et al, in a study on “self-treatment with common domiciliary treatment by young adolescent, researchers found that 64% of the student’s used the medicine they had previously taken while 36% self-medicated themselves independently, implying that SM among young adolescents is high, 42% said they got medicines meant for households for themselves, but SM was lower than in other studies (Sloand & Vessey, 2001). According to Sven Schmiedl et al, in a study to “assess hospital admissions related to self-treatment with OTC causing side effects showed that ADRs were caused by Rx

drugs only, self-treatment contributed causally to an ADR patients with treatment-related ADRs leading to hospital admission among the young, more often males reported fewer ailments, less treatments and shorted hospital stays with women aged 70-79 years and men aged 60-69 years having higher rates of ADRs related admissions in hospital and causal effect could only be shown in 3.9% of 6887 (Schmiedl et al., 2014). According to Y – F Chen et al, in a study on self-medication use for older people, researchers found the overall prevalence of medication use was 75% for older people aged 65-74 and 84% for people aged 75 and over. Among older people, the prevalence of medication use and the number of drugs taken was comparable to previous findings (Y F Chen et al., 2001). Conferring to Ausra et al, in research on self-treatment with antibiotics in Lithuania, researchers found that 39.9% of participants reported antibiotic use annually prior the study and 53.2% of those used them in self-treatment 22.0% used antibiotics without prescription while 45.0% used antibiotics for intended self-treatment. Health people showed the tendency to self-medication than those with chronic diseases and countryside people used OTC more often than urban residents (Berzanskyte et al., 2006). According to Mainu et al, in a study on self-treatment of antibiotics, behavior among university scholars at Malaysian National Defense University, research showed that 39.3% informed self-treating with antibiotics. Saving on costs and convenience in accessing medication were reported as the principal reasons for SMA which could be easily bought from local retail pharmacies. Despite better knowledge of antibiotics among health students than among non-health students, 89% attested that practicing SMA was a good and acceptable practice. Amongst Malaysian students SMA is common despite understanding SMA is risky, even healthy students self-treat themselves. Study was

conducted between January and April 2018 (Haque et al., 2019b) . Referring to Larissa et al, in a study on “self-treatment with antimicrobial drugs in Europe, research found that many persons used antimicrobial remedies left over from previous remedies, the study also showed that younger persons, those more educated and those suffering from a chronic condition were more prone to self-medication. In Europe, antimicrobial drug self-treatment is a cause for concern. Even the lowermost prevalence, 1 person per 1,000 respondents, implies that 10,000 persons in a resident of 10,000,000 are self-treating yearly. Reasons for self-medication are throat symptom, gum symptom and bronchitis (Larissa Grigoryn et al, 2006).

Section 2.2 is too long covering about 25 pages. Divide it into subsections for coherence e.g. prevalence, type of drugs used in self-medication consequences etc.

2.3: Antibiotics Misuse and Self-Medication in Nigeria

Poor health seeking behaviors increase the risk of drug resistance. In a study is to investigate self-treatment behavior among scholars through their paternities by their attitude and insight towards the habit and contributory factors to self-medication, in Nsukka local government area, Enugu state Nigeria a descriptive prevalence study was carried out with total of 517 parents participated in the study which took place in selected basic schools between October 2017 and January 2018. The net results showed self-medication occurrence over that period of time was 75.8% in total with an individual distribution of to some of the common juvenile illness malaria 39.9%, cold 28.3%, catarrh 23.8% and cough 17.9. The sources of medications were pharmacy stores 66.8% and medicine vendors due to ability, availability and expenses are the main reason for preference. Self-medication was influenced by factors such as drug advertisement 27.1% and a previous advice from health personnel 57.0%. Self-medication was observed to have high prevalence in schoolchildren by the respondents

at the end of the study. It has a greater burden to the health system and an action need to be taken to prevent ongoing problem (Nworie & Ezeh, n.d.). Another project accesses antibiotic resistance in relation to socio-demographic status, antibiotic utilization and application among nursing mothers. Pre-evaluation questionnaire was issued to nursing mothers in six municipal hospitals in Kaduna state. The knowledge, practices, antibiotic application was compared to the socio-demographic qualities. The antibiotic resistance was understood by various logistic regression models. The net result after the survey of 321 nursing mothers 25.27% believed its usage in treatment of infection, 43.7% are ignorant and 45.7% disbelieve its harm to the infants and 74.58% believe that is about their system being resistance to the antibiotics. A diverse model indicated that unemployment and low level of education makes them susceptible to antibiotic abuse. The study demonstrated that drug resistance is directly proportional to the lack of adequate knowledge and drugs abuse. Maternal misuse while breastfeeding could be an important indicator in development of antibiotic resistance in children mainly in the intestinal normal flora.(Salihu Dadari, 2020). Antibiotic self-medication is a worldwide health related problem leading to antibiotic struggle. Curiously, there is little knowledge about antibiotic self-treatment among undergraduate pharmacy students. In a study to develop, validate and utilize online survey via WhatsApp, Facebook and Twitter as a tool to investigate the prevalence of antibiotic self-medication in Northern Nigeria. A total of 217 responded out of 200 participants with a completion rate of 100% and at least practice self-medication once in their lifetime. The data collected from qualified respondents and were analyzed using descriptive statistic. The major contributory factors of antibiotic self-medication were previous knowledge 40.4%, limited time for hospital consultation (27.5). Cough, diarrhoea, typhoid and wound are the vastest conditions associated with antibiotic

usage. The community pharmacies (24.4%) and patent medicine street hawkers (45.4%) are the most communal origin of antibiotics imperiled to antibiotic self-medication. Antibiotic self-medication tends to have an increased worldwide distribution among BSc pharmacy undergraduate students in Northern Nigeria. The study concludes, to tackle this problem there is a need to implement Antibiotic stewardship in health care practices. Microbial resistance is currently recognized as a solemn globally health related issue which is directly proportional to antibiotic misuse (Murray et al., 2022). Recognizing this as global public health dilemma, and to investigate the relationship between having adequate knowledge on antibiotics and their application by accessing the awareness, attitude and practice of the people, a study was carried out among undergraduate students in Ogun state Nigeria. A magnitude study based on the knowledge, attitude and practice of anti-microbial usage was carried out using 357 participants from the undergraduate students attending Covenant University in Ogun state by distribution of questionnaire to individual participants. The net result from the study is 60.6% has taken anti-microbial in the 6months preceding the research of which two- third stated that they infrequently finished the anti-microbial dosage. Medical experts (53.1%) and guardians (22.9%) are the most contributory factors to antibiotic prescription in this study. Knowledge assessment showed a fair knowledge of antibiotic use and antibiotic resistance. The study concludes that there is an average awareness of anti-microbial ill use hence the need for enhanced awareness (Ayepola et al., 2019). The impact of self-medication on community and societies was further studied by Iyabo et al in Ilorin suburbs in north central Nigeria. The study assesses improper usage of antibiotics and analgesics', and its relationship with the pervasive culture of out-of-pocket preference of access to health care in the study area. The prevalence study was carried out between January to May 2019 among residents of

the Abooba area of Ilorin, Kwara state. Participants were selected by the convenient sampling method. The mean age of the study participants was 38.5 to 11.5 with age less than 19 and greater than 70 years of age. The most common age group was 26 to 35 years of age. Respondents with education ending at the primary level and Artisan/trader were most prevalent in self-treatment. Antibiotics were the most misused drugs followed by steroids. Females are more likely to engage in self-treatment as compared to males. Status of being married and education level were the key elements that affect awareness of the risk issues linked with self-treatment. P value is 0.017 and 0.039 among the respondents of the study. The net result of the study was self-treatment with prescription drugs have a higher frequency and tends to be commoner in female than male especially due to misuse of. Status of being married and occupational type are strong indicators of knowledge of potential risk related to self-use of prescription drugs (Jamiu et al., 2020). Omolase et al describes self-medication simply to mean the use of drug or drug related substances to cure one's ailments without consulting doctor. This according to Omolase et al has led to various forms of improper diagnosis and treatment. A crucial setback of self-medication especially with antibiotics is that it creates an avenue for anti-microbial resistance. The study was done in order to find out the percentage of clinic patients who practice self-medication, types of drugs they use and reasons for using it. The research was carried between the month of June and December 2007 at out-patient clinic of Federal Medical Center, Ondo in Nigeria. Two hundred participants were identified by random sampling and were assessed using a questionnaire. 85% of the participants conceded to practicing self-medication, of which pain relievers (26.5%), anti-malarial (15.9%), a combination of anti-malarial and analgesic (22.4%), anti-malaria, analgesic and antibiotic (15.3%) and antibiotic-analgesic (10.0%). Reasons study participants have, was either due to

financial constraint or because they consider their ailments as minor, which does not require hospital visit. Most of the participants practice self-medication in various forms and types reason for this practice were that the condition are minor or due to financial constraint (C O Omolase et al., 2007). Abdulraheem et al extensively studied self-medication in rural Nigeria. According to the study, rural Africa has quite a high burden of self-medication where people consume all sort of substances including those that are capable of causing harm. The study examined self-medication status among randomly selected participants who were assessed using a structured questionnaire. The research revealed that 99.4% are of the habit of practicing self-medication. On the other hand, 0.6% visit healthcare centres for management. The locality was of the belief that no particular drug can be used to cure a particular sickness. As a result, they have a vast array of drugs and other strange substances which include ash, kerosene, petrol etc. that they use to cure themselves. However, they have consented that antibiotics and some herbs (9.1%) in combination have succeeded in curing any of some sixteen listed sickness in their locality. The study recommends state to take action in alleviating poverty and improving education and healthcare systems in order to curb self-medication (Ajibola et al., 2018). Self-medication is a great antecedent of antimicrobial misuse that has the tendency to cause multidrug resistance. This quite a detrimental health condition globally. The study aimed at assessing the widespread nature of antibiotic self-treatment and its contributors in rural communities attending primary well-being centers in Niger state of northern Nigeria. It is a cross-sectional review which uses a standardized questionnaire to assess one thousand one hundred and fifty randomly chose clinic participants in twenty-five primary health centers in Niger state. The study was carried from August 2014 to February 2015. Only study respondents who solely live in Niger state are selected for this research. The

widespread use of antibiotic self-medication was 82.2% whose sources include chemists (58.2%), drug stores (20.4%) and pharmacies (10.9%). Antibiotics mostly used are amoxicillin/cloxacillin (24.1%) ampicillin (20.3%), sulfamethoxazole/trimethoprim (14.2%), metronidazole (13.9%) and tetracycline (13.1%). Cough, sore throat, fever, dysuria and vaginal discharge were among the usual reasons for the use of these antibiotics. Participants also attributed the self-treatment to being cheap (79.3%), availability (68.4%) and the use of previous remedies (60.4%). The research concluded that even though, there is a significant access to primary health care services, antibiotic self-medication is still high in rural communities of Niger state. Chemists are advised not to sell any drug to buyers without a doctor's remedy. This research was conducted to analyze antibiotic consumption and knowledge of anti-microbial resistance in among farmers of Oyo state in Nigeria using questionnaire and interviews. Using snowball sampling technique, one hundred and fifty farmers and veterinary shop owners were chosen. The farmers admitted that they give sick and healthy animals that are having viral infection antibiotics due to ease of access to most of the farmers. A significant number of farmers do know about antibiotic resistance, and that is a dilemma is not present in Nigeria though, they do not know how it spread. They believe under treatment is not attributable to antibiotic resistance. In conclusion, there is need to increase knowledge in the society regarding antibiotics misuse or animal under treatment and its detrimental effects to health.[9] Anti-microbial resistance poses a big threat to the public health domain mostly as a result of its misuse. The population's Level of knowledge in antibiotics needs to be assessed in order to arrest this problem. This is a cross sectional research carried on university students of Ogun state Nigeri. Awareness, attitude and practice of antibiotics were acquired using self-administered

questionnaire. Out of three hundred and fifty-seven students, 60.6% consumed antibiotics within 6 months of the research of which less than one third finish the complete dose. The populations have some knowledge of antibiotics and effects of its misuse. Doctors (53.1%) and parents (22.9%) are among the major sources of antibiotics prescriptions in this research. The research concluded that it is of great reputation to increase the level of awareness of anti-microbial among the population.

This research is put in place to evaluate the abuse and the effect of anti-microbial in university students across Northwest region of Nigeria. Questionnaire was designed and used to assess the use of anti-microbial, its use on instruction, indication for its use, how it is used and the effect upon its long-term use. Feedbacks were studied and interpreted using descriptive statistics. 1230 participants from university students and community members yielded a result of 33% and 57% respectively. We assessed the participants' understanding which showed minimal understanding on how self-treatment with anti-microbial reduces the full potential of the drugs action on the body. (32.6% and 42.2 respectively). Occurrence of self-treatment with anti-microbial drugs is peaking in the Northwest Nigeria. With most over the counter drugs gotten from illegally existing chemists not instructed by a by a medical practitioner. We also noticed an interlude in participants understanding of anti-microbial long term use effect. Hence, the need for pressing intervention by Public Health Organizations in Nigeria to install regulatory protocols and also breach the interlude of information on the menace caused by anti- microbial long-term use and its effect. Research to point out the variety of drugs in pharmacy students' hostels and figure out the association between drugs in custody of the students and self-treatment behavior. A cross-sectional study of an arbitrary selection of 240 university pharmacy students in Jos Nigeria. Respondents were given self-monitored questionnaires. Information

received were evaluated using SPSS 16 and X²-test to figure out the relationship between the variables. Outcome showed 66.0% of participants with drugs in their possession. 318 drugs (2.56% per room) of which 37.1% were remnants from the excess found in participants' rooms. Pain killers (34.3%) and anti-microbial (25.2%) were the most found. Participants revealed their sources to be 25.8% on instruction by a practitioner, 56.6% on self-treatment or 7.7% for both found among them. Self-treatment was common among participants (53.2%); though no tentative association ($p>0.05$) found with having drugs in hostels and self-treatment. Most responses gotten from participants for having them in their possession were because those remnants of the excess will be useful in times of emergency or in conditions of appropriate use. Most participants (72.2%) were found to get rid of unused drugs in the waste bin. This research showed the occurrence of drugs kept by students in the hostels and self-treatment to peak with pain killers and anti-microbial drugs to be the most used. Undergraduate MBBS stay is at times fatiguing in various ways be it psychosocial, financial an even physically most seen in developing nations. Nowadays, Public Health authorities worldwide have taken it as challenge to conquer self-treatment. Health students are remarkably involved in such behavior which has put a setback towards the fight against anti-microbial resistance in communities. This research is put in place to evaluate anti-microbial self-use in MBBS scholars in Abubakar Tafawa Balewa University (ATBU), Bauchi Nigeria. A probing prevalence analysis was done at college of Medical Sciences ATBU Bauchi in the months June and July 2018. Years one and two admitted MBBS pupils were put into this analysis. A single population percentage formula and a close ended 25 items self-monitored analysis tool was created and driven review on related papers. All replies were studied using the following software: SPSS version 21 and STATA version 13 software for statistical analysis. A total of 81

MBBS pupils' responses were analyzed. There were 39 males and 42 females. The average age among participants was 20. 41% of them were found to have engaged in self-treatment. 27.2% of all participants' reason was "Health experts give the same drugs", for (20) 24.7% "the disease was not severe", while (9) 11.1% "time management" in self-treatment and (2) 2.5% responded with "saving money". On organized regression, the important statistically noticed variable was gender, Wald X²-square test 6.050 odds ratio 2.019 (P-value: 0.0014). The occurrence of ST within MBBS students in ATBU Bauchi Nigeria. Organized advocacy awareness programs to lower ST among MBBS students in Northeast Nigeria, is necessary. Implementation of rules and regulations on un-instructed gotten medicines and uninterrupted monitoring of pharmacies/chemists and other sources to ensure drugs are given only on instruction by a health practitioner is important to lower self-treatment. Self-treatment has its very significant repercussion but its overall occurrence in students is unknown. The purpose of this analysis was to figure the occurrence of self-treatment among students across the globe. Analysis showing the occurrence of self-medication in university scholars was used.

A random-effect model was used to determine effect size with a 95% confidence interval (CI). Diversities over several analyses were evaluated with I² test. A sensitivity test evaluated accuracy of the outcomes. A total of 89 analyses were put into evaluation, which contained 60938 students. The total occurrence of self-treatment in university pupils was 70.1% (95% CI: 64.3-75.4%). Female scholar's self-treated more than male scholars: odds ratio = 1.45 (95% CI: 1.17-1.79). The occurrence of self-treatment in MBBS scholars (97.2%) was more noticed than the non-medical scholars (44.7%). The I² test showed rise, data driven important diversification. The sensitivity test showed that the outcome was reliable. The occurrence of self-treatment

in students all over the globe was peaked. Programmes on the causes of self-treatment and rise in sway and attention on the dispensing of medicines are suggested. Easing students' access to medical practitioners and health facilities may decrease self-treatment in students. Self-treatment with anti-microbial is a renowned cause of occurrence of bacterial antimicrobial resistance. The main purpose of this research was to study the occurrence of self-treatment with anti-microbial for the cure of menstrual symptoms in university females in Southwest Nigeria. A prevalence study was done to female university students and graduates (n= 706) at 4 universities in southwest Nigeria in 2008. The universities were picked by will and the analysis samples within the universities were picked in cluster samples randomly. The study was self-monitored and involved inquiries on menstrual symptoms, pain killers and anti-microbial use patterns, and geographical location. Information was studied using vivid statistics and logistic regression. The outcome rate was 95.4%. Eighty- six percent of respondents had menstrual symptoms, and 39% found to use pain killers to cure them. All in all, 24% of respondents were found to self-treat with anti-microbial to cure these menstrual symptoms. Elements linked with these were: least education level (odds ratio(OR): 2.8, 95% CI: 1.1-7.1, p-value: 0.03); non-science major (OR: 1.58, 95% CI:1.03-2.50, p-value: 0.04); use of pain killers (OR: 3.17, 95% CI: 2.07-4.86, p-value:<0.001); and mild to thrilling bleeding (OR: 1.64, 95% CI: 1.01-2.67, p-value:0.05) and pimples/acne (OR: 1.57, 95% CI: 0.98-2.54, p-value: 0.06). Doctors or nurses (6%, 95% CI: 4-7%), friends (6%, 95% CI: 4-7%) members of the family (7%, 95% CI: 5-8%) mostly advised the use of anti-microbial for menstrual symptoms, while these drugs were most often obtained from local drug vendors or chemists (10.2%, 95% CI: 8-12%). This is the first conventional analysis to show that estimated 1 out of 4 university women studied in southwest Nigeria self-treat with anti-

microbial to cure menstrual symptoms. This habit could provide monthly, low-dose disclosure to anti-microbial in users. More analysis is important to show the effects of self-treatment on student's wellbeing.

Self-treatment is one of utmost global health significance as it often overrides the existing governing protocols to achieve adequate healthcare. Even with this, there's no existing pattern on the means to obtain self-medication. Firstly, we aim to strategically restore questionnaires and survey tools that are being employed to apprehend self-medication, saddled with the ultimate goal of outlining the scope and similarities between the tools based on this context. Also, stemming and shortening was adequately utilized to capture all differences and dissimilarities in search terms. Restricted exploration was utilized to materials produced from January 1st, 2000, and December 31st in 2015, human studies and English language. Verily the final review was devoid of unimportant and strikingly identical survey. During the course of the review, a total sum of 158 surveys was added to be part of the final review. With surveys of vast demographic setting cutting across vast localities, mostly from Nigeria 16(10.1%), India 10(6.3%) and lastly Iran 8(5%). A total of 43 studies (27.2%) laid more emphasis (106; 67%) on self-treatment with immense focus in the adult age group. At the end, the questionnaires employed were competent enough to answer the following: motives for self-treatment in 147 (93%) studies, source self-medication in 136 (86%) studies, common medical illnesses for which treatment is sought in 153 (96.8%) studies, negative events in 67 (42.4%) studies, use of prescribing inform in 24 (15.1%) studies and awareness on anti-microbial resistance in 20 (46.5%) studies. Furthermore, self-administered questionnaire (57; 36%) was used to assess 74 (46.8%) studies, and usually done most of the time at the participant's residence. A total of about thirty-seven (23.4%) surveys were unable to capture and document

any recall period for SM practices. The response during the survey ranges from 17.9% to 100%, and while 100 studies (63.3%) reported validity of the study questionnaire while reliability was reported by 15(9.5%) studies.

There's a wide spectrum of research questions being employed for assessing self-treatment behavior, making equivalence and meta-analysis very cumbersome. Lastly at this juncture, is far better to have a baseline solid survey questions on this specific subject in view in order to smoothing and encourage subsequent research groups in this field. Self-treatment is viewed to be the inappropriate, incessant and incoherent explorations of medications. This is a survey that strives to ascertain their understanding, approach and tradition of healthcare givers with respect to self-medication in a tertiary health facility in southern region of Nigeria. This is a prevalence study design which took place from 2018 June to 2018 December at a tertiary health facility in Edo state where a group of voluntarily agreeing participants, about 206 were carefully dialogued with legitimate questions to ascertain their understanding, approach and traditions of self-medication. Therefore, with this survey, it was documented that there is about 89.3% increased occurrence of self-medication was recorded over the previous 4 months 89.3%, and extensively declined with progressing age ($p = 0.04$) and harboring a good character and behavior with regards to self-medication. There is equitable and candid understanding generally 111 (53.9%) on self-medication. High number of the drugs mostly used for healing of headaches (92.4%), fever (81.5%) also comprising also of antimalarial (91.3%), analgesics (81.0%), and antibiotics (71.2%). About a total of about 39 subjects (21.2%) sougheed the usage of tranquilizers. 60.9% of the participants actually ventured into this in order to further get know the available medical treatment options. Majority of the healthcare givers in the study location were using self-medication. Collaborative and

joint efforts are required to further enlighten workers on self-medication. Globally speaking, laws should be enacted tightened in order to reduce the prevalence of self-medication, and pharmacists should provide adequate counseling before giving drugs. This is research performed with the ultimate aim of assessing the proportion of outpatients who practice self-medication, the medications used and basis for consulting self-medication. This research took place from January to December 2007 at clinic of hospital of Owo, Ondo state, Nigeria. Simple randomized sampling strategies was applied in choosing the respondents of this study, who were later interrogated using semi structured questionnaire by the researchers of this study. There demographic and drug history was also gotten along with the reason the employed use of self-treatment. Most of the respondents practiced self-treatment while the others don't. Mono-therapy or some- times poly-therapy was employed often involving analgesics, antimalarial or antibiotics. Most of the participants attributed their basis for exploring self-treatment to financial limitations and benign medical conditions. Finally, this survey depicts that large portion of the participants engaged in using self-treatment either in a form of monotherapy or poly-therapy, Reasons mostly attributed to lack of funds and benign cases. Health-care workers are important set of community figures. Vast array of detrimental effects could arise from indulging in self-medications in our society. Most importantly, this study aims to assess the preponderance of self-treatment with drugs amidst Nigerian undergraduate students. 200 respondents studying dental medicine were surveyed using the cross-sectional study design from April and June 2009. Detailed and efficient enquiry was made using a self-structured questionnaire to ascertain self-medication by use of antibiotics. Evaluation of data was conducted using SPSS version 15.0. Associations were assayed using X^2 -square, and $P < 0.05$. During the course of this research, the response rate was obtained to be

96.2%. With the participants ages ranging between 16 to 35 years and male to female ratio of 1.9:1. The preponderance of antibiotic self-treatment about 6 months prior to this research was 53.5%. Major contributing influences on the choice of drug were prior history of similar illness and influence of healthcare professionals. The most encouraging influence for self-medication among the participants was prior experiences with similar conditions. Finally, Self-medication was found to very common mostly involving amoxicillin among Nigerian dental students. This is a survey that aims to ascertain the understanding and practice of consumers in Jos, regarding the antibiotic usage. 430 customers of an accredited and certified pharmacy in the vicinity of Jos, Nigeria, carried out in November 2011. Evaluation of the poised data was done using the SPSS version 16 and logistic regression was judiciously employed to ascertain the independent predictors of poor antibiotic knowledge. One month preceding the survey 56.5% of respondents reported having used an antibiotic and a prevalence of 22.3% of SM was found. The assessment test on the antibiotic knowledge revealed that 30.5% of respondents had poor, 40.9% moderate and 28.6% had high knowledge levels. Low level of education was the most striking pointer of poor antibiotic knowledge. Lastly and most importantly, this survey showed that lack of good antibiotic knowledge and bad character with respect to antibiotics usage exists among consumers.

Antimicrobial resistance depicts as a global health burden across the world. Pharmacy students found to be prospective antimicrobial prescribers and custodians upon graduation as pharmacists in future. The goal of the research was to evaluate the awareness in regard to antibiotics misuse and in-effectiveness among final year pharmacy scholars of Bauchi state university, Nigeria. A cross sectional design was administered to all the 184 pharmacy final year students of the faculty of

pharmaceutical sciences at Bauchi state university Gadau, Bauchi state, Nigeria. Data was collected in June 2019 using structured, self-administered questionnaire and data were studied with (SPSS) version 23.0. analytical decisions were considered significantly at $P < 0.05$ Participants were majorly males 62.5%, aged 20-30 years eighty-seven percent of them wanted knowledge on antibiotics use and resistance. Most of them 67% had enough knowledge of antibiotics use and resistance. Hence, 39% wrongly responded that bacteria cause common cold. Only 56% had good idea about antibiotics use, whereas 8.2% of them frequently consulted doctor prior to use of antibiotics. 37.2% never disposed their leftover antibiotics. Knowledge attributed with participants' gender ($P = 0.035$), whereas practice linked with the class of the study ($P < 0.001$). There was fair knowledge about antibiotics use and resistance. Hence, practice level was not good enough, there is need to improve present courses of the training in the curriculum with more emphasis on antimicrobial stewardship.

There is global practice of self-medication across the world. Previous studies have prevailed on it's used for medical diseases, although there is scanty of information for dental conditions more often, in northeastern part of Nigeria. Thus, this study was projected to ascertain the magnitude of self-treatment for surgical conditions prior to surgical consultation and its consequences amidst patients seeking care at ATBUTH, surgical outpatient clinic, Bauchi, Bauchi state, Nigeria. A descriptive prevalence study placed on a designed pretest closed ended inter- viewer administered questionnaire was disseminated amidst matured patients presenting at ATBUTH surgical outpatient clinic, Bauchi, Nigeria for a span of 7 months. Two main categories were instituted in the questionnaire: geographical factors and questions evaluating the behavior of self-treatment. The non-probability suitable sampling technique and scrutinized using SPSS version 23.0. The result displaced that about

41.5% was found to be prevailing cases of self-treatment with a larger prevalence amongst females (55.1%) than their male counterpart having (44.9%). The generality of the patients was in 2nd to 4th decades of their life. Level of education was essentially linked with self-medication. NSAID amounted for the highest percentage (59.8%) of orthodox medication used then followed by penicillin 37.9%. whereas, with respect to individual drugs used, diclofenac counted more often 28.4% could not recall the trade name of orthodox drugs they consume prior to presentation. Street vendors were the prime source of these drugs 36.6%. fear of surgical medication 20.1%, disease is minor and need to consult a surgeon 20.1 were attributed to be prime excuse for indulging in self-medication with appendicitis 53.1%, proctitis 13.9% and mastitis 10.8% the main instigators. The prevailing cases of self-medication of surgical conditions in this study were found to be increasing with the use of both modern and unidentified herbal drugs. NHIS should be able to cover all social groups of Nigerians in order to motivate easy obtainability of people to a vast range of medical and surgical consultations, there by discouraging the practice of self- medication. Rising in antibiotics resistance have become major health care burden across the globe. Poor obtainability to antibiotics commonly in upcoming nations is among the predisposing factors. The target of this survey is to evaluate the obtainability and use of antibiotics. A descriptive prevalence design was administered in a public pharmacy in Kano State, Nigeria. A semi-structured, self-administered questionnaire was used for data collection. Administrative permission was obtained from the superintendent pharmacists whereas informed consensus was acquired from all the study participants. The information gathered from the study was evaluated using SPSS version 22. Of the 450 respondents in the survey 75.11% had used antibiotics in the last seven months prior to their present presentation to the pharmacy, 46% of them consumed the

antibiotic without laboratory investigation. Most of them 60.89% of the respondent had an antibiotic among the drugs obtained from the pharmacy on their present visit. Over half 64.22% of the respondent sometimes obtain antibiotic without prescription. Usually, pharmacists recommended antibiotics than doctors to the respondents with that ratio of 44.11%:24.44%, whereas more than half of the survey group 62.89% obtained their antibiotics from pharmacies. Many (65.56%) of the respondents assumed that the country should control the antibiotic use. The study has depicted that community pharmacy is one major source where patients obtain antibiotic sometimes without prescription. Consequently, denoting that many patients self-medicate with antibiotics. Therefore, there is need for relevant authorities to establish critical guidelines from proper handling of antibiotic use and obtainability.

The rising problem of antiseptic self-treatment is becoming an international health concern as result of increase in resistance to antibiotics. Nevertheless, there is less knowledge about antibiotic self-medication amidst medical students who are in time ahead the over- seers of antibiotics. Hence, this survey tries to elucidate, determine and employ online survey tool to explore the magnitude of antibiotics self-medication amidst medical students in southern Nigeria. A prevalence online survey model was distributed with medical students in southern Nigeria through Instagram, WhatsApp and twitter. Data were accumulated from entitled respondents and studied using expressive statistics. It has been found out that 217 medical students attempted to the online survey, with an accomplishment rate of 100%. Out of the whole participants, 200 notified engaging in antibiotic self-medication once in their life. The prime motive from antibiotic self- medication was previous awareness 40.4% and lacking time to consult skill personnel 27.5%. ciprofloxacin 32.6%, amoxicillin 32.1%, ampicillin/clavulanic acid 21.7%, and ceftriaxone 22.6% were most often attributed

antibiotics in antibiotic self-medication. Fever, vomiting, cough and swelling were frequently indicated problems. Street drugs hawkers 75.4% and medicine stores 29.4% were the main foundations of drugs subjected to antibiotics self-treatment. A study tool to evaluate antibiotic self-treatment amidst medical students has been elucidated, determined and utilized. The increase of antibiotic self-medication is rising amidst medical students in the southern part of Nigeria. Intervention to upgrade knowledge and sensitization on antibiotic self-medication are needed among medical students to strengthen antibiotic stewardship. The study determined the nature and relationship between self-prescription and diseases response among self-employed workers in Nigeria. In this prevalence study design, a multistage sampling method was introduced to choose 186 respondents (age range = 18-60 years; mean =31.5) in Southwestern Nigeria. The Nigerian self-employed employees resorted to self-prescription test (SPT) and ailment response questionnaire (ARQ). Frequency sums were introduced to evaluate the respondents' geographical variations, whereas linear regression analysis was used to respond to the study questions. The outcomes from the study depicted about 47.8% magnitude of self-prescription (SP), varying from 14.2% of penicillin self-prescription to 51.0% of alternative self-prescription. Self-prescription was noticed to freely and importantly to foresight disease outcome ($R=0.030$, $P=0.018$), body perception ($R=0.034$ $P=0.012$), disease response ($R=0.0064$ $P=0.000$) and generalize illness behavior ($R=0.028$ $P=0.023$) of the respondents. The outcome revealed that there is need for more community awareness and sensitization among self-employed workers on consequences of self-prescription. Psychoeducation was also recommended among at risk group. (25)

Esan et al, conducted a study to assess the magnitude of antibiotics self-treatment and aspects linked with the practice of self-treatment among undergraduate university

scholars. Using an observational study design, a cross-section of the target population numbering 384 was sampled and administered a validated structured questionnaire. Statistical analysis including X²-square test and Fisher's exact test were done. The study shows 82% of the enrolled participants were engaged in self-medication practice. 11% of the participants used antibiotics for self-medication. Age, gender, study year and college were found to be significant associates of self-treatment practice. Perceived poor attitude of health workers was the most commonly reported motive for engaging in self-treatment practice. The study however did not provide a recommendation as part of its conclusion.

In a strategic study with significant public health impact, Auta et al examine self-medication and level of awareness on self-treatment among medicine vendors in Jos Plateau state Nigeria. The study employs observational cross-sectional design with 236 medicine vendors enrolled. A validated structured questionnaire was used to obtain data and statistical analysis including chi-square test as well as analytical inferential statistic was done. The study showed 75% of the participants were engaged in self-medication. Although there were no associations with all tested socio-demographic factors. About 11% of the respondents were specifically using antibiotics for self-medication. The research did not establish a relationship between self-treatment and medicine knowledge among the participants enrolled. Babatunde et al however examine self-treatment among health workers in Nigeria. The role of health workers as enablers of self-treatment has been widely documented in the literature. In a cross-sectional observational study design, 305 health workers were enrolled using simple random sampling technique for the study at a Federal Medical Center Ado-Ekiti, Nigeria. Data was collected using a validated semi-structured study tool. The study found as high as 95% of the participants enrolled were aware of self-treatment but only 47% of

them had good awareness of self-treatment. Most of the respondents reported practicing self-medication due to financial constraints, followed by those who perceived their ailments as being mild, time constraints, perceived self-knowledge of diagnosis, convenience and non-availability of Physicians. About 19% of the participants used antibiotics for their self-treatment. The study self-treatment was found to be high among the study respondents and recommends health education to raise knowledge and awareness and stricter law enforcement to decrease uncontrolled access to prescribed medicines.

In a recent study in 2021, Isabella examines awareness, attitude and practice of self-treatment with antiseptics among out-patients department attendees in a general hospital in Lagos Nigeria. The study was observational cross-sectional design and data was collected using a planned questionnaire. About 402 participants were enrolled in the study recruited using multi-stage probability sampling technique. The study shows 72% of all the respondents have used antibiotics for self-medication, while 94% said they have once used antibiotics, 48% of the respondents believe antibiotics works in curing diseases even without taking prescribed dose completely. As high as 33% of the respondents believe antibiotics can cure any infection regardless of cause of the infection. Similarly, Fadare and Desalu examined self-medication among Nigerian medical Doctors in a prevalence observational study conducted at two public health facilities, in Federal Medical Center Ido-Ikiti and University of Ilorin Teaching Hospital Nigeria. Using semi-structured questionnaire, respondents were assessed on their self-prescriptions, prescriptions for family members and for friends as well as triggers for such prescriptions. Among 132 participants enrolled for the study, 92% were engaged in self-prescription. Also 80% said they have prescribed medicines for family members and 70% have prescribed for friends by telephone. The study

concludes there was high magnitude of self-treatment among the study participants, and further recommends strategies to be employed to reduce the harmful practice.

2.4: Factors responsible for self-antibiotics medication

Studies have examined both the immediate and remote factors associated with antibiotics misuse and self-medication in the general, and among subgroups in population. Weaknesses in the health care systems, associated with high cost of treatments, inadequate professionals in the health sector and poor regulations, mood disorders (Wallis et al., 2022) are among societal factors attributed to antibiotics misuse and self-medication (Ocan et al., 2015). Very few studies have attempted to examine the factors that promote self-medication in PLHA. Interestingly, some studies have reported that the patterns and causes of self-medication are similar in PLWHA and the general population like one by Fulco et al (Fulco et al., 2006) as reported by Ajuoga et al in 2008 (Ajuoga et al., 2008). Earliest known studies done on reasons for self-treatment among PLWHA include Khamboonruang et al in 1996, which associated self-treatment with the need to prevent Sexually Transmitted Diseases (STDs). Among sex workers working in brothels in Cebu City, Philippines the motivation for SM was perceived benefits of STD prevention using antibiotics (ABELLANOSA & NICHTER, 1996). Smith et al, conducted more extensive research to examine the association between influencing, inspiring and the desire for care variables and self-medication using antibiotics in HIV treatment. The study found that race and level of college education were associated with predisposition to use of non-prescribed drugs in PLWHA (Smith et al., 1999). However, Fogelman et al in an extensive multicenter study identified major determinants of use of OTC drugs in PLWHA as stage of the disease and gender differences among surveyed participants. In the general population, poor mental health state, being married and

having competing demands (Dollar & Hendrix, 2018), “ medical fees charged in hospitals and time-consuming clinic visits, recurring minor ailments” (Maria & Pratinidhi, 2018), “habits, funds and mild symptoms” , poor knowledge and age, “occupation” (Navaro et al., 2018), “previous prescription, pharmacist’s prescription, leaflets”, “need for self-care, sympathizing with sick family members, limited availability of medical services, extreme poverty, lack of knowledge on effects of SM, misconception, strong advertisement and access to treatments with ease in shops” (Jain et al., 2011), “with previous exposure with medicine that worked effectively” (Khalifeh et al., 2018). Being exposed to a medical environment has been shown to influence self-medication and antibiotics misuse in the general population. Sadiq et al examine the factors associated with self-medication practice in a comparative study among 250 medically exposed and non-medically exposed subjects in Sialkot, Pakistan. The study shows 79% of medically exposed subjects accepting self-medication compared with 64% acceptance among non-medically exposed (Sadiq et al., 2021). However, studies have also shown lack of good understanding of antibiotics use and misuse even among Physicians. Parekh et al in a study to evaluate the awareness, Attitude and Practice of dentists surgeons in India, reported 66% of the respondents never considered antibiotics culture and sensitivity prior to prescription for their patients even when there were clear indications for doing so, 93% of the respondents also never heard about the WHO advocated antibiotics stewardship and 51% of the respondents had never come across patients who failed to respond to antibiotics treatments (Parekh et al., 2020). In another prevalence study in China, Bai et al found statistically significant low knowledge score among Physicians regarding antibiotics misuse and self-medication (Bai et al., 2016). Nabawaseesi et al also examine the perceptions and practices of about 279 respondents in a cross-sectional survey in Uganda. The study

shows 22% of the respondents had engaged in antibiotics self-medication and misuse. Being male sex and being Muslim shows statistically significant association with self-antibiotics medication, while having tertiary education is statistically associated with less likelihood to engage in self-antibiotics medication and only 45% of all the respondents believed that self-antibiotics medication and misuse can harm their health (Nabaweesi et al., 2021). Mostafa H G in a study among 1035 students to evaluate awareness, attitude and behavior of non-medical students on antibiotics self-treatment and misuse found 68% of the respondents have poor knowledge of appropriate antibiotics use and 54% used antibiotics based on previous prescription 63% discontinued antibiotics once symptoms have disappeared and significant proportion of the respondents used antibiotics based on their personal experiences or advice from the pharmacy outlets they patronized. The study further shows 45% of the respondents were not able to recall the type of antiseptics they used for self-treatment (Mostafa-Hedeab, 2018). However, in contrast with the above findings, Beatrice et al examine knowledge and behaviors concerning antibiotics misuse and self-medication in Northeast France in community-based study. The survey shows good knowledge of appropriate antibiotics use among 75% of the respondents and 95% shows good knowledge of risk of lack of efficacy when antibiotics were misused, while 92% has good knowledge of consequence of antibiotics resistance arising from misuse of the drugs in the population (Demoré et al., 2017). In a qualitative study of social factors of antiseptic misuse, Baker et al showed that gross lack of knowledge about proper antibiotics use; logistics and socioeconomic factors were the major drivers of anti-microbial misuse and self-treatment in an Indian Community. Majority of respondents were unable to correctly define what an antibiotic is, poor access to doctors compelled community members to resort to self-antibiotics

medications practice. Income and Health care access were therefore factors found to be linked with antiseptics ill use and self-treatment (Barker et al., 2017). Sawsan et al in year 2020 examine whether a law enacted in the Kingdom of Saudi Arabia to check-mate misuse of antibiotics in the society has had a significant impact or not. The study which was conducted among 570 community respondents shows no significant impact in the manner of use of antibiotics 6 months into the enactment of the law compared with the period without the law. The survey shows prior to the law, 7% of respondents obtained their antibiotics without prescription, while 4% used previously prescribed antibiotics packs and 1% consults with friends for antibiotics use, 6 months after the law, the findings were 5%, 4% and 1% of the respondents respectively according to the previously described proportions (Kurdi et al., 2020). Another qualitative study attempted to explore the people's perceptions regarding causes and effects of antibacterial ill use in a study by Al-homoud et al. The study showed Pharmacies dispense antibiotics without prescription out of fear of losing income as no one is willing to pass through the stress of consultations to obtain Doctors' prescriptions, also clients seems to have trust in the expertise and judgments of the pharmacists hence they do not see the need for Physician's' prescription, other reasons were ease of accessibility to the pharmacies, cost of non-prescribed antibiotics compared to prescribed antibiotics and general perceptions of the community that antibiotics are required in almost every ailments (Alhomoud et al., 2018). Mahmud et el in a study to identify causes of self-treatment with antibacterial, reported the most significant reason for self-medication with antibiotics among respondents surveyed in a society- based study was perceived lack of seriousness of symptoms to warrant for Physician's consultation (Mahmoud et al., 2019). Among all antibiotics used, the survey shows Azithromycin was commonest with rate of 67%. Major ailment requiring self-

medication with antibiotics was fever followed by common flu. Karuniawati et al examine the Knowledge, Attitude and Practice towards antibiotics misuse in a community-based study in Indonesia. In a cross-sectional study conducted among 575 respondents, 73% of the respondents reported antibacterial can be used to treat viral diseases. Another 50% of the respondents thought antibiotics can be stopped once the symptoms for which the drugs were being used for disappeared. The study shows a statistically significant association between sex, income and level of education with antibiotics self-medication and misuse (Karuniawati et al., 2021). However, Amanda Naves de Silva conducted a mixed-method model of study to “investigate the Situations leading to self-diagnosis and self-treatment in the Municipality of Marabá (State of Pará, Brazil)”. The study contradicts Baker et al as it finds knowledge about antibiotics use not to be a significant factor in carrying out antibiotics misuse and self-medication, rather the motivation for choice of drug to be ingested as well as quality of care and Doctor-patient relationship (A. N. Silva et al., 2018). Also, Maria et al in a study on “Comparative assessment of self-treatment practice in a western town of Maharashtra”, found among major reasons for practice of self-medications are time-saving, cost effectiveness as most respondents found medical bills to be high if they were to go for prescribed antibiotics and the fact that minor illness are commonly reoccurring hence the need to do self-medication. But for Atolaibi et al, in a study to “investigate the ill use of antibacterial therapy among study respondents of Saudi Arabia” the major reason for antibiotics misuse and self-medication among participants was because they had used similar drug before. Sree Nagmani et al have also found use of old prescription as most significant factor in self-treatment with antibacterial among study respondents. But B Gupta et al in a proportional research on use and non-use of self-treatment among medical students found knowledge of previous treatment as

the most significant driver of self-treatment among respondents (Gupta et al., 2016). Benmazouga et al studied the causes of antibiotics misuse and self-treatment in Kingdom of Saudi-Arabia, the survey shows 25% of the respondents took antibiotics without knowing why they were taking it (Benmerzouga et al., 2019). In a large scale cross-sectional study in Qatar, Ameera et al have extensively studied about the in appropriate use of antibiotics in a study titled “Discernments and behavior of doctors and pharmacists regarding antibiotic ill use at primary health center in Qatar: A prevalence study”, both Physicians and Pharmacist identified poor patient education as the major cause of self-medication (Alkhuzaei et al., 2018). Atefah et al have examined the general public perceptions on antibiotics use in a cross-sectional survey: “Assessment of the wide-ranging public’s awareness, views and practices relating to suitable antibacterial use in Qatar”, the study shows most respondents (95%) had used antibacterial without remedy in the past, and most have misconceived viral infections as bacterial infections. Other than the misconceptions about nature of their ailments, most have shared an antibiotic with a relative or friend. While Bader et al in another community-based study found most respondents abandoned antibiotics once symptoms were relieved after initiation of treatment (Alsuwayt & Shiromwar, 2020). Chang et al in a study on “clinical pattern of antibacterial ill use and misuse in healthcare facilities in the southwest of China” have examined causes of antibiotics misuse in a hospital set- ting environment. In the retrospective study, it was found that penicillin groups are the most frequently used antibacterial followed by cephalosporins and macrolides. New physicians are more likely to misuse antibiotics as well as those with lower level of professional training. Adult uninsured patients living in countryside areas are more likely to be given unnecessary antibacterial as well. Mukokinya MM et al in a study on Antimicrobials dispensing in Kenya equally identified penicillin-based antibiotics

as the most prescribed group in Kenya. Although the study found lower levels of antibiotics misuse in Kenya as compared with previous studies and also compared with other African Countries (Mukokinya et al., 2018a). Jeon Sil and Ka Young Kim in a study on factors influencing antibiotics misuse and self-medication however found that among Nursing students, knowledge is an important factor leading to prevention of antibiotics misuse however, family and personal medical history negatively associates with antibiotics misuse and self-medication (Choi & Kim, 2019). Raghda M El-Hawy et al however as in most community-based studies found female gender and having low level of education to be significant predictors of antibiotics misuse and self-medication. Main reasons attributed to self-antibiotics medication practice were time-saving and unwillingness to see Doctors (El-Hawy et al., 2017). Bulario et al similarly identified lack of education as key driver of antibiotics misuse and self-treatment among caregivers in a survey on aspects linked with parental self-treatment in primary health care centers in Manilla. Cecilia et al in a qualitative inquiry on factors associated with self-medication practice in a community-based study showed that organizational structure was most influential factor contributing to self-medication practice (Brata et al., 2016). Similarly, Naim Haliti et al in a study on Antibiotic prescription patterns in primary dental health care in Kosovo found very high level of “irrational” prescriptions of antibiotics for common ailments in primary health care settings. Also, penicillin based antibiotics were the most common group of antibiotics being prescribed (Haliti et al., 2017). Erin M Hill examined “the role of antibacterial resistance, awareness, concern, and previous inappropriate antibacterial use on decision making about an antibacterial use”. The study shows poor knowledge about antibiotics use and previous antibiotics use significantly impacted on decision to use self-antibiotics medications or visit physicians for range of ailments studied

(Hill, 2017). Asma A Elsayed et al have studied tendencies for even greater antibiotics misuse with the advent of COVID-19 in a community-based study “antibacterial ill use and amenability with contamination control procedures during COVID- 19 pandemic in community pharmacies in Egypt”. The study shows about 67% of patients were more likely to receive antibacterial drugs regardless of the type or nature of symptoms they are reporting. Thus, there were clearly no clinical indication for such antibiotic’s usage (Elsayed et al., 2021). However, as documented by previous researchers, Antoun Jamhour et al in a study on knowledge and self-treatment in Lebanon, also found that respondent’s educational level and knowledge of antibiotics were the two most significant factors linked with the exercise of antibiotics misuse and self-treatment in Lebanon (Jamhour et al., 2017).

2.5: Consequences and Effects of Antibiotics Misuse and Self-Medications

Antibiotics resistance is now universally accepted as a global phenomenon with significant public health implications (Serwecińska, 2020). Although, the precise effects of antibiotics misuse and self-medication are usually underestimated especially in low and middle income settings (H. H. Chen et al., 2019), Self-antibiotics treatment and antibacterial drugs misuse and overuse are reported to be the major precursors of antibiotics resistance at individual and community levels, therefore, efforts to control antibiotics resistance must be hinged on controlling self-medication with antibiotics (Sunny et al., 2019). Although the need for compliance with antibiotics medication when prescribed, is well understood at community level, knowledge and awareness regarding antibiotics resistance remains very poor (Cambaco et al., 2020). Antibiotics misuse and self-medication is mostly seen as endemic community problem, but studies have also documented antibiotics misuse among Physicians who prescribed for unwarranted reasons (Oberoi et al., 2015). Qamar and Ayub found 47% of their

study participants unaware that antibiotics misuse can be harmful to their health or to their community (Qamar. et al., 2015). In a study on effects of antibiotics misuse and resistance to antibiotic drugs among Urology patients, Maimonah et al, found respondents with history of antibiotics misuse have higher rates of resistant bacteria in their specimens after culture (Yahya et al., 2021). In a survey to assess the awareness, attitude and practice of pilgrims on use of antibacterial drugs during the hajj rituals in the kingdom of Saudi Arabia, Yezli et al found 25% of respondents thinks antibiotics cures all forms of diseases, as high as 63% of all respondents thinks antibiotics cures flu and common cold and about 50% of all respondents uses antibiotics for prophylaxis purposes. While only about 19% of all respondents took their antibiotics are directed by Physicians, 50% of respondents purchased their antibiotics from their country of origin ahead of travelling to Saudi Arabia (Yezli et al., 2019). Wang et al examine the implications of widespread use of antibacterial drugs among students in China in a cross- sectional random cluster survey conducted in 2017, the study shows 29% of the 11,000 respondents used antibiotics for self-medication, about 23% used antibiotics for prophylaxis of self-perceived symptoms while 63% stock antibiotics for their future personal use. There was poor knowledge of appropriate antibacterial drugs use among majority of the study participants, there was a relationship between lower awareness of good antibacterial drugs use and using antibacterial drugs for self-treatment among the respondents surveyed (Wang et al., 2017a).

2.6: Intervention Strategies for Antibiotics Misuse and self-medication

Several literatures have backed the use of educative programs to expand knowledge and awareness on self-medication. But there is paucity of effective public health interventions to increase uptake of positive health behavior (Hardcastle et al., 2015).

In their conclusion, Syed et al reported, "There is need for an educational program to increase awareness and reduce antibiotics self-medication" (Husnain et al., 2018). Cost-effective public health interventions are now gaining support with increasing scarce resources for healthcare interventions in a scoping review, Herval et al, shows various health education strategies are of proven benefits in uptake of positive health seeking behavior (Herval et al., 2019). Physicians and other health workers have embraced educational interventions to increase the knowledge and awareness on risky health behaviors that negatively impact the health of the patients (Ruiz, 2010). It is hypothesized that when knowledge on the dangers of self-treatment and sensible use of medicines is improved, it will translate into reduced risk associated with SM in the general society (Bennadi, 2014a). Although in a community-based public health intervention to estimate the effects of health education intervention in decreasing antibacterial drugs ill-use and self-treatment among the Latinos population in United States of America, the study, which compared two groups of participants did not show a statistically difference between the two groups post intervention (Mainous et al., 2014). However, Yakubu et al examined the effects of health information intervention on promoting sexual self-restraint among young adolescent girls in a cluster randomized control trial in Ghana. The study shows a statistically significant difference in mean knowledge score and attitude between treatment and control groups, P-Value <0.003 (Yakubu et al., 2019). Richmond et al had reported similar findings of statistically significant decline in incidence of alcohol consumption, cigarette smoking and stress among treatment group compared with control group following a brief exposure to health education intervention in a study on "Quantitative and qualitative assessments of brief interventions to change excessive substance abuse and stress in the police force" (Richmond et al., 1999). Floreskul et al reported the effect of

education intervention for pre-driver enrollment in a study "Efficiency of Pre-driver education sequencer for high school students using Theory of Planned Behavior". The study shows more negative attitude for road risky behavior among participants in experiment group compared with those in control group. The study concludes that educational intervention was successful in changing behavioral component that predicts participant's risk taking during road driving (Floreskul et al., 2016). Although most studies on effects of educational intervention focuses on adolescents and young adults, but Marvin and Karen in their study on Antibiotics misuse by the elderly, focuses on the effects of education on antibacterial drugs ill use and self-treatment among the elderly. The review study emphasized the role of patients' education by health care workers among key strategies for control of antibiotics misuse and self-medication. Amin Kouhpayeh et al examined the effects of health education on self-medication among Iranian Mothers in a quasi-experimental study design. Health education intervention was given, and post intervention data was collected 3 months after the intervention. The study found an association difference with reduction in self-medication rate among intervention group compared with the control group. The study recommends application of health education strategies for reducing antibacterial drug ill use and self-treatment in general society. In a quasi-experimental study in Indonesia, Arneliwati et al examined the efficacy of health education intervention to improve family knowledge on prevention of viral hemorrhagic fever among treatment and intervention groups. The study showed statistically significant increase in the level of attitude and action among treatment group participants compared with control groups after intervention. Moshi et al, reported on the utilization of health education to "promote positive behaviors towards birth attentiveness, male engrossment and maternal service application among expectant mothers". The comparative study

involves two groups with pre and post intervention data collection. The study shows health education is ineffective in influencing uptake of positive health seeking behavior among experimental group (Moshi et al., 2018). Sadeghi R & Khanjani N. in a study on “Impact of Educational Intervention Based on Theory of Planned Behavior (TPB) on the AIDS-Preventive Behavior among Health Volunteers” found following educational intervention, average score across all variables increases among intervention group respondents with statistically significant difference compared with control group responders. Lu Chu-Hong in a study in China, examined the effects of health education intervention among hypertensive patients. Proportion of responders with normalized blood pressure increased significantly among intervention group who received health education compared with the control group. Sanchez in a study of effects of educational intervention also compared experimental and control groups using a pretest and post-test assessments in quasi-experimental study design which employs the theory of planned behavior. The study found significant increase in intention to carry out the desired behavior following educational intervention among experiment group respondents without any significant increase among the control group. Al-Ajeel et al scrutinized the effects of health education on self-care and knowledge among respondents regarding primary dysmenorrhea. A pre and post assessment shows statistically significant increase in knowledge and self-care for primary dysmenorrhea compared with the respondents in control group. Omura et al also uses educational program intervention and demonstrated significant increase in positive intention among experimental group compared with control group in a quasi-experimental study design. Dsauza et al examine the effects of educational intervention in promoting oral health in a quasi-experimental study design. The study shows statistically significant increase in knowledge scores post intervention as well as

statistically significant increase in confidence score for practicing oral screening in post intervention assessment among intervention group respondents. Hadi Alizadeh Siuki et al examine the effectiveness of health education intervention using theory of planned behavior in uptake of HIV/AIDS prevention behaviors among volunteer health care workers. The study found significant difference in mean scores for knowledge, attitude and behavior in performance and intention between experiment and control groups post intervention. Kandeel et al assess the effectiveness of health education in promoting appropriate antibiotics use. The study uses pretest and post-test assessment. Results from the study shows 23% decrease in inappropriate antibiotics prescription at post intervention. Kumar et al examined the effectiveness of educational intervention in uptake of use of enduring insect repellent treated mosquito nets to prevent malaria among pregnant women in Pakistan. The study found statistically significant difference in mean knowledge score and use of long-lasting insecticide treated mosquito net between experiment and control groups post intervention. Chiswell et al, in a study to test the effectiveness of education program to reduce antibiotics misuse among both patients and care providers in a rural primary health care center, conducted a pre-test and post-test assessment following intervention. The study shows a reduction in rate of inappropriate antibiotics prescription from 56.3% pre-intervention to 28.8% post-intervention with P-value < 0.001 among experiment group. No statistically significant change was found in the control group pre-intervention and post-intervention.

2.7: Theoretical framework

Theory of planned behavior (TPB) founded by Ajzen in the 1980s, has since then became one of the most widely used in behavioral research in medicine and social sciences (Hardeman et al., 2002). The TPB has been mostly used to predict intention

to carry out a given behavior (Armitage & Conner, 2001). The key constructs of the theory are that human actions and behaviors are products of conscious plan or decision to carry out such target actions or behaviors (Ajzen et al., 1991). Although there are instances where the key constructs of TPB failed to predict intention to carry out a given behavior (Liddelow et al., 2020). Prior to TPB, in the 1970s, Fishbein and Ajzen had founded the theory of reasoned action (TRA). The TRA seek to give the rational basis of human actions/behaviors (Fishbein, M., & Ajzen, 2010). Two constructs, according to TRA, attitude towards a given behavior as well as subjective norms, determines one's intention to carry out the behavior. Attitude is the individuals' assessment of a giving behavior, which according to Ajzen is "a learned Temperament to respond in a consistently satisfactory or uncomplimentary manner with respect to a given object". Subjective norms, on the other hand, refers to an individual's beliefs on whether or not important others approve or does not approve of his engaging in the target action or behavior (Ajzen, 1985). A subjective norm is also referred to a social pressure. Ajzen extends TRA by addition of 3rd construct called Perceived Behavioral Control (PBC) to form the (TPB). The PCB assesses individual's perception of level of control over concert of a given behavior. Such as spectrum of one's ability e.g., daily exercise, to implementing behavior change that requires resources and other aspects of enabling environment (She et al., 2020). The constructs of TPB assess the following viz: (a) Behavioral intention assess likelihood of practicing the behavior (b) Attitude assess perception of outcome of behavior (c) Subjective norm assess approval of important others (social pressure) (d) Perceived behavioral control assess degree of confidence that one can engage in the behavior at his own volition Just as the constructs of attitude, SN and PBC determines behavioral intention, Intention, the three constructs are as well indirectly determined by salient

behavioral beliefs, normative belief, and control beliefs, respectively (H. Liu et al., 2020).

Studies therefore continuously used the premise of TPB to explore intention to carry out a given health behavior or otherwise, as well as test the effectiveness of public health intervention strategies by measuring the theories' key constructs pre-intervention and post-intervention. Being a parsimonious model, TPB can be applied to various conditions to predict intent towards behaviors (McEachan et al., 2011). It is seen that "Generally, the more positive the boldness, idiosyncratic norms and alleged behavioral control towards a specific behavior are, the stronger the person's intent to perform it" (Hadadgar et al., 2016). The TPB has been shown to be useful in behavior change interventions specifically. There is vast literature about behavior change interventions from around the world showing diverse approaches from self-management approach to operant conditioning to modeling and cognitive-behavioral change approaches. Most of the interventions targets participants who were at the stage of intention to change their behavior. However, the utility of TPB in this thesis is to establish its effectiveness in evaluation of intervention by changing behavior among participants who apparently lack the intention to change. The subsequent part of this thesis provides a review of the available literature on potentials of TPB in behavior change interventions. To utilize a behavior change using TPB, it involves a 3-stage approaches: Elicitation of salient beliefs among a sample of target population, construction and assessment of beliefs among subjects to differentiate those willing to change from those who not and application of intervention and subsequent measurements of changes. Previous systematic reviews as argued by Hardeman et al (Hardeman et al., 2002) have mainly focused on the ability of TPB to predict a change in an intention These include for example Armitage et al (Armitage & Christian,

2003), (Godin et al., 1998), and (Conner & Armitage, 1998). But it has been further argued that more studies are needed to establish evidence whether changes in the beliefs actually translates into changes in the behaviors. Hardeman et al therefore explicitly provided the first attempt to review evidence on use of the TPB to either evaluate or develop behavior change interventions. Hung et al explored the factors that influence nurses' attitudes and intention toward the reporting of medication errors. The study shows "The predictors of nurses' attitudes towards MAE reporting included altruism and attitudes of nurse managers and other co-workers and the nurses' intention to report MAE were influenced by their attitudes and that of their co-workers". No link was found between report control and intentions of the nurses toward MAE reporting" (Hung et al., 2016). The utility of theory of planned behavior was extensively studied by Bryne et al in the study on "The drivers of antibacterial drug use and misuse: the advances and enquiry of a theory driven community measure". In an attempt to understand some of the major causes of antibiotics resistance in a community-based study, Bryne et al developed and investigated the psychometric qualities of a tool based on theory of planned behavior. In a 3-stage process, which include literature review followed by selections of questionnaire items, piloting through expert assessment, and finally deployment among 373 participants, the study successfully developed a validated tool based on the 3 constructs of theory of planned behavior for intervention studies using the key constructs of the theory of planned behavior. Few studies have attempted a quantitative assessment of antibiotics misuse and self-medication using TPB. Pineles and Karante reported on use of TPB to predict intention to self-medicate with antibiotics and analgesics in a community-based survey, where findings shows TPB can effectively be used to predict intent to self-medicate (Pineles & Parente, 2013). Karimi et al, assess SMP among 360 women in Iran 76%

of the participants had reported SMP, 98.9% stored drugs at home. Perceived harmlessness of SMP was the most important reason for SMP. All three constructs of TPB were statistically significant predictors of SMP (Karimy et al., 2019). Armitage et al, studied the legal and illegal use of drugs in 1999. The result shows TPB was a momentous prognosticator of intention to use alcohol and marijuana (Armitage et al., 2010). Andrew et al found PCB as a strong factor associated with antibiotics misuse and self-medication practice (Gallucci et al., 2015).

2.8: Conceptual Framework

Three domains are conceptualized for this study from the literature review: Normative beliefs, Behavioral beliefs and Perceived control beliefs. The problem to be studied is antibiotics misuse and self-medication practice among adult people living with HIV/AIDS. Outcomes of interests include prevalence of self-medication practice after health education intervention, long term outcomes which may not be feasible to immediately study include changes in CD4 Counts, Opportunistic infections prevalence and incidence, Treatment failure and other morbidity and mortality. It is conceptualized that intervention (health education) will influence outcome variables post intervention.

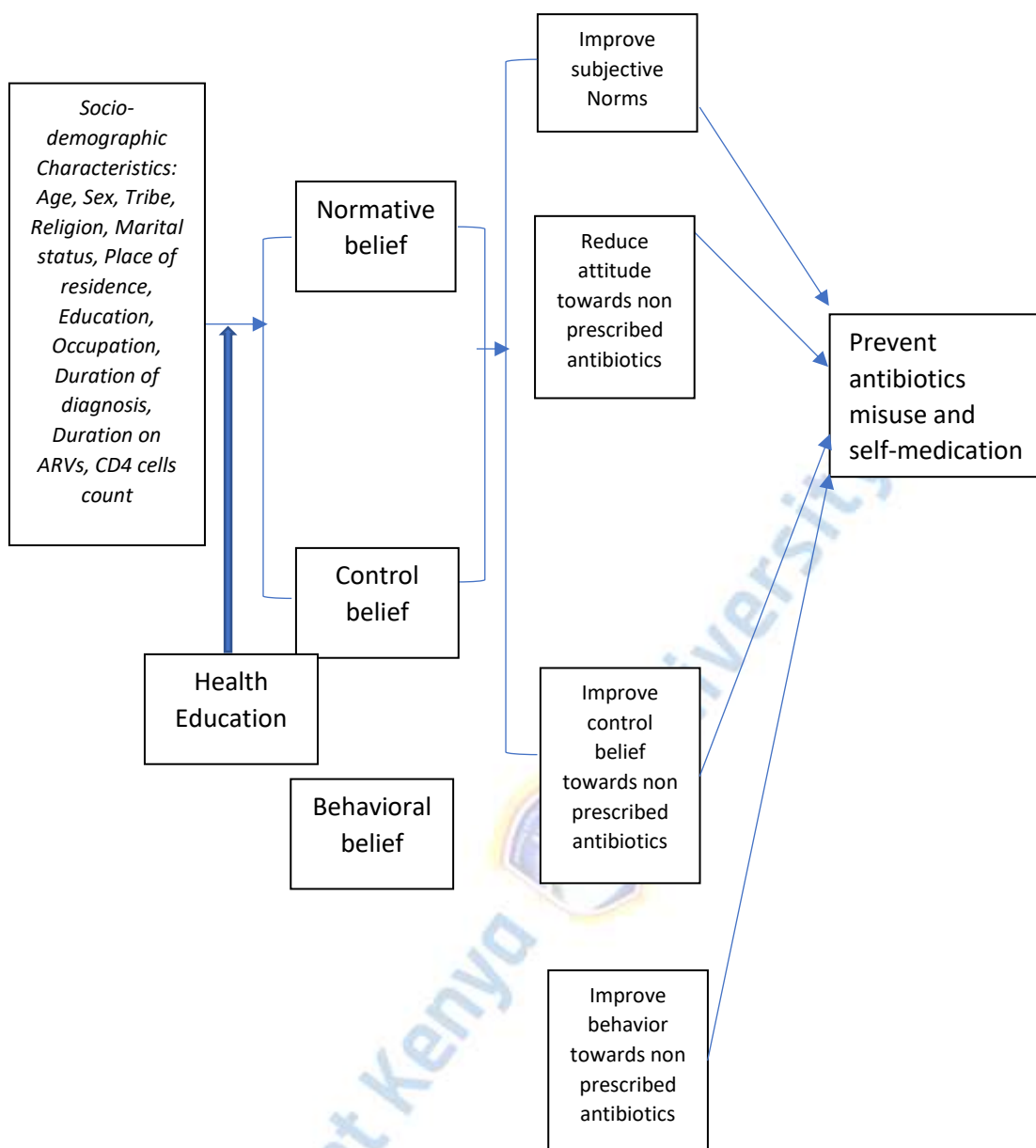


Figure 1: Study Conceptual Framework

2.9: Criticism against TPB

The TPB has been criticized on three grounds not long after it became famous: It's over assumption on rationality of human behavior not taking into account the unconscious, emotional and irrational determinants of human behavior. The measures of behavior are based on self-reports and unexplained variance in intention & behavior (Sniehotta et al., 2014). Another criticism for TPB is its "static explanation nature". With no

attempt to explain future behavior. Furthermore, TPB has been criticized for limited predictive variability” (Sniehotta et al., 2014).

2.10: The gap expected to be filled by this study

Extensive fiction done has recognized self-treatment and misuse of antibiotics as a public health issue particularly among HIV infected persons, but the effects of any behavioral intervention have not been demonstrated. Therefore, this research provided a useful link between behavior intervention and alleviation of antibiotic self-treatment and misuse among persons living with HIV which is currently not provided in the available fiction. The impact from the intervention will guide decision-making by relevant stakeholders as well as guide any further explorative research.

CHAPTER THREE RESEARCH METHODOLOGY

This chapter highlights the methodological approach applied in this thesis. The design of the study as quasi-experimental was well explained, including the fundamental reasons for the choice of the design, advantages, and disadvantages of the design were also highlighted. Detailed descriptions of the study site, the study participants, criteria for inclusion and exclusion, and sample size determination were made, and the process of study tool development was enumerated. The validation of the tool, data collection procedures, proposed statistical analysis, and the ethical consideration process were discussed in the concluding part of the chapter.

3.1: Study design

In many instances, it is not feasible to use absolute randomized clinical trials study designs for evaluation of public health interventions or to assess the effectiveness of intervention strategies in a population with an aim to increase uptake of positive health seeking behaviors (Lopez Bernal et al., 2019). A quasi-experimental design used in this study comprises both experimental and observational components which therefore permits a determination of causal evidence outcomes (Bärnighausen, Röttingen, et al., 2017). Although it is not meant to be a replacement for frank randomized control clinical trial, quasi-experimental study designs are increasingly used in health care with satisfactory results (Bärnighausen, Tugwell, et al., 2017). More so, both Cochrane Collaboration group and Campbell Collaboration now advocates for reviews of non-randomized studies as means of evidence synthesis in addition to reviews of randomized intervention studies (Rockers et al., 2017). Quasi-experimental study is though an observational study but similar to randomized clinical trials in many aspects. The major difference between the two study designs is the lack of randomization in the former (Maciejewski Matthew L., 2020). Until recently, researchers had shy away

from using quasi-experimental study designs mainly due to poor understanding of the key assumptions of the study design (Bärnighausen, Oldenburg, et al., 2017) In this study, non-equivalent groups quasi-experimental design(Krishnan, 2019) was selected because the directionality of the study is known to a certain extent, just as is the case in most studies(Grimshaw et al., 2000). However, beyond the causal evidence, this design will enable quantification of the magnitude of causal effect (Bärnighausen, Tugwell, et al., 2017). In order not to put study participants in a harm way, there are ethical concerns if a full-scale randomized control trial (RCT) were to be done. More so, since the intervention, which is the exposure (Health education) cannot be concealed or masked, full-scale RCT is by default not feasible in this study. Among the advantages of choosing this design over full scale randomize control trial are lesser ethical constraints, less funding requirements (Harris et al., 2005), and the study can be done in the shorter time frame (Geldsetzer & Fawzi, 2017). Studies have rated quasi-experimental design higher than randomized control trial in external validity (Concato et al., 2000). Data from all the participants were used in this study design, and intervention was delivered in real-life and data collected in real-world, which constitute one of the major advantages of this study design (Harris et al., 2006). Hence this design has provided stronger causal evidence than full-scale randomized control trial where various procedures may be subject to the manipulation of the investigator (Ioannidis et al., 2001). Further advantage confers by the quasi-experimental design is in its high internal validity, since participants in the treatment group are unaware of the specific outcome of interest, artificiality is significantly controlled (Shardell et al., 2007). The study progressed with both pre-intervention reference point evaluation of both the magnitude and linked aspects for self-antibiotics medication behaviors among the study respondents and also in the post-intervention

reference point regarding the effect of well-being education intervention among the experimental study participants who were then compared with the control intervention respondents. Concerning ethical issues, the control group study participants were later provided with the same intervention that was subjected to the intervention group after the study. This was necessary to ensure both groups received the benefits of the interventions evaluated in this study. To safeguard against biases, this study employed the techniques identified in the risk of bias evaluation of tools for quasi-experimental study designs (Waddington et al., 2017).

3.2: Study Area

Northern Nigeria has 19 states in number whereby Bauchi is one of them. Bauchi states belong to the six states located in the northeastern area of Nigeria. The states border Jigawa and Kano states in the north region, while it also borders Kaduna, Yobe, Gombe, and Plateau states in the east region and lastly west and south respectively.

3.3: Vegetation

The vegetation nature of Bauchi state is tropical and resembles that of Sudan and Sahel savannah regions. Yearly the rainfall pattern ranges from 102 to 103 mm and mostly the rainfall is endured in June and September.

3.4: Administrative, political and economic structure

The Bauchi region has 20 local institutions that govern the local administrative issues of the state to enhance easy administration each region has counselors and chairpersons who serve as the legislative functions of the LGAs. The state also has traditional leaders whose roles have not been fully defined but their functions are well understood by the community they serve. Farming is the most economic activity in these states ranging from small to large-scale farming, entailing millet, corn, and

ground nut farming. In the rural areas of the states, animal keeping is majorly done there. The state has been known for lower life expectancy entailing both higher mortality and birth rates. The state has various ethnic tribes who have different languages, but the majority speaks the Hausa language, nevertheless, the English language is the official mode of communication.

3.5: Bauchi State Health Systems

The Bauchi state has three tertiary health facilities that are located in the majority of geopolitical zones. The state capital has a referral-specialized hospital, however, in the other 26 local administrations; each has a health facility meant to serve the community's needs. There are maternity hospitals and primary health centers scattered all over the state. More than 0.6% of people living in this state are HIV positive, thus encompassing 300000 persons living with HIV & AIDs. However, of the individuals living with HIV in this state (NACA, 2018). Only 30% are on treatment (NACA, 2018), this could be linked to high bacterial infection rates in this region. HIV services are well provided in these states due to the presence of several health facilities.

3.6: Study Site

This research was conducted in the Bayara general hospital situated in the capital of Bauchi. The hospital serves both the states and its neighboring communities. Although this is a single secondary health institution in Bauchi state, but it is the largest hospital providing care to over 10,000 HIV positive clients. The hospital is divided into two, the infectious diseases hospital (IDH) which was established before Nigeria's independence by the colonial masters and the general hospital site provide routine patient care. Both the two sites provides HIV care and therefore the treatment arm of this study were selected from the IDH, while the control arm were selected from the general hospital. The two arms attends clinics on different days and therefore chances

of contamination of our intervention group participants is considered minimal.

3.7: Study Participants

The target population for this study were individuals living with HIV living in the Bauchi state of Nigeria. The prevalence of HIV in this state stands at 0.60%. The population of this state is approximated to be 8 million with more than 80000 individuals living with HIV (NACA, 2018). While the study population for this study were individuals living with HIV who were accessing care at Bauchi metropolis Bayara hospital, it's estimated that more than 15000 HIV-positive clients do have access to this facility annually.

3.8: Sample Size Determination

Persons living with HIV were the target population for this study. To regulate the sample size for this study multiple tactics were used to determine the appropriate sample size for the intervention group. This was key to ensuring that the power of association could be established if the association truly existed between the dependent and the covariate variables. Individuals living with HIV have been regarded as hard to reach population. While individuals living with HIV who are easy to access may not truly represent the entire population, notably a large percentage of people living in the society may not be aware of their HIV status. While some may be aware of their status, they might be afraid to seek care from the existing health facilities due to the fear of stigmatization. Studies have suggested the use of HIV peer support groups, wide nets, HIV testing sites, or even local counseling areas as an easy means of reaching these people. According to Biswas (Biswas, 2013), Calculating the sample size for both intervention and the comparison group with expected natures of qualitative data has been suggested by Using: The sample Size formula below

$$\text{Sample size} = 2(Z_{\alpha/2} + Z_{\beta})^2 P_c(1 - P_c) \div (P_1 - P_2)^2$$

(3.1)

Where: $Z_{\alpha/2} = Z_{0.005/2} = Z_{0.025} = 1.96$ at type one error of 5%, $Z_{\beta} = 0.842$ (80% Power), $P_1 - P_2 =$ expected effect size of the Intervention. $P_1 =$ Magnitude of the result in intervention group, $P_2 =$ Prevalence of the outcome in control group. $P_c =$ Pooled Magnitude.

$$= P_1 + P_2 \div 2$$

Assume

$$P_1 = 82\% \quad (3.2)$$

from research done regarding self-treatment in Nigeria (Abdulraheem, Adegboye & Fatiregun, 2016) and

$$P_2 = 52\%$$

(3.3) We presumed Health Education intervention could reduce antibiotics misuse and self-Treatment behavior ($P_1 - P_2$) by 30% (effect size)

$$\text{Pool magnitude} = 0.82 + 0.52/2 = 0.67 \quad (3.4)$$

$$\text{Sample size} = 2(1.96 + 0.842)^2 \quad (3.5)$$

$$0.67(1 - 0.67) / (0.30)^2 = 77 \text{ persons per group.} \quad (3.6)$$

Therefore, both Experiment and control groups will have a total of 144 participants. However, assuming a 10% attrition rate, the total desired sample size to account for the possible attrition will be 158. The choice to use two groups is based on literature suggesting quasi-experimental studies with concurrent control groups and

preintervention assessment gives stronger evidence than those without (Shardell et al., 2007).

3.9: Sampling Method

For any research to be successful there is a need for equal representation in the sample. People living with HIV in Bauchi state were sampled in this study. Systematic random sampling was used to identify the required number of study personnel needed in this study; the majority of these respondents were outpatient adults seeking care at the health facility. SRS is one among other probability sampling methods that guarantee that every member within the sampling population has a probability of being selected (Mostafa & Ahmad, 2018). The purpose of using these techniques was to minimize selection bias. The hospital register was used as the sampling frame whereby the sample size was obtained from.

STEP ONE Sampling interval for sample selection was decided by dividing a total number of clinic attendees by the desired sample size which has been determined as 158. Since participants were attending the clinics only on Mondays through Fridays, enrolments were therefore spread over a week for either of the two groups until desired sample size was attained. STEP TWO After the interval was determined, a selection was started with nth random number from the random number table which must fall within the sampling interval calculated. The interval was repeated to select the next participant and continuously until the desired number for the day. Equal quota was used across all clinic days until desired sample size has been attained. In step three a random sampling table was employed to recruit the number of study respondents who were to be recruited every day of the clinic until the desired sample size was attained in the desired period.

3.10: Inclusions Criteria

1. All study respondents who were 18 years and above and who could understand the administered questionnaire
2. HIV-positive patients who were accessing care at the health facility
3. HIV-positive patients residing in the study area
4. A patient who consented to partake the study.

Exclusions Criteria

1. Any person who is not proven to be a HIV positive was not included even if such person is on ARVs as in the case of persons on post-exposure prophylaxis.
2. Also, Children or any person below the age of 17 were not included even if proven to be a HIV positive individual.
3. Health workers (Nurses, Doctors, Pharmacists) even if HIV positive.
4. Living outside the study area even if attending clinic in the study area
5. Those who are qualified but withhold their consent for participation
6. Those who are qualified but unable to participate due the certain unavoidable circumstances such as severe illness or disabled persons.

3.11: Data Tool and Collection Method

3.11.1: Study Tool Development

After a detailed literature review, a structured closed-ended questionnaire was applied which captured all variables in the study objectives. The tool was divided into 5 sections including demographic profiles, knowledge about antibacterial drugs ill-use and self-treatment practice, attitude to antibiotics misuse and self-medication practice, normative beliefs towards an- antibiotics misuse and self-medication, and control beliefs towards antibiotics misuse and self-medication practice.

Section 1

Social demographic factors for people living with HIV & Aids: this objective collected information on the following indicators, this included, gender, age, marital status, duration of ARV therapy, updated CD 4 cell count, and time from diagnosis as HIV positive status.

Section 2

Latent Construct 1: Knowledge regarding antibiotics mismanagement and self-medication practice for the last three months among study participants

Section 3

Latent Construct 2: Attitude towards antibiotics misuse and self-administration of medicines among the study respondents

Section 4

Latent Construct 3: Perceived normative beliefs towards antibiotics misuse and self-administration of medicines among the study respondents

Section 5

Latent Construct 4: Perceived control beliefs towards antibiotics misuse and self-medication practices among the study participants.

3.11.2: Study Tool Validation

Concerning validity, ten study participants were asked to review and assess the appropriateness of the questionnaire; their insights were then used to modify the study questionnaires.

To check for reliability, Cronbach alpha was applied to check for internal consistency by using SPSS version 23. An alpha of 0.8 was determined which is greater than 0.7 and was regarded as appropriate. To enhance reliability, a CR value of 0.7 was obtained, which is greater than 0.6 set target. Data Collection Plan: The technique of

data collection in this study was using interviewer-administered closed-ended structured questionnaire. To ease the process of data collection, the study instrument was transformed into an electronic form and developed as an app which was installed on android systems. Pre-intervention (baseline data) was then collected immediately after enrolment and obtaining consent. Trained research assistants were used to collect data in addition to the primary researcher who also served as supervisor during data collection. Each research assistant was sufficiently trained on how to collect data using the electronic instrument. Paper back-up was also made available in the event of any failure of the electronic instrument. Where respondents were not literate in the English language, administering interviewer was trained and instructed to translate the content of the study tool into the local language. Data management and data quality process were proceeded concurrently as the data was being collected. Microsoft Excel software was used to record the data for initial tracking and cleaning purposes. The short-term post intervention data was collected using the similar processes of data management and data quality which was used during pre-intervention data collection. After completion of data collection, comparative statistical analysis for both groups were done immediately. Dependent and explanatory variables that were measured in this study included the socio-demographic variables included: Age, level of Education, Sex, Marital Status, Employment status, Place of residence, Years on ARVs, Presence of co-morbidities, Weight, Height, CD4 Cells count, Class of ARVs, Number of previous hospitalizations, and Intervention received. The dependent (outcome) variables that were measured included knowledge of antibiotics misuse and self-medication, attitude, perceived normative beliefs, and perceived control beliefs about antibiotics misuse and self-medication.

3.12: Statistical Analysis Plan

To measure knowledge, a mean score on knowledge, attitude, perceived subjective norms, and perceived control beliefs towards antibiotics misuse and self-medication practice was done. A correct response to stated questions earned a mark. The acceptable score regarding very good knowledge was maintained at 70. Scores below or equal to 35 ($< 50\%$) were graded as poor knowledge of antibiotics mis use and SMP while 36 scores and above ($\geq 50\%$) were graded as good knowledge of antibiotics misuse and SMP. The highest earned score on attitude was maintained at 25. A Score that was less or equal to 12.5 ($< 50\%$) were graded as poor practice while a score of 12.6 and above ($\geq 50\%$) was graded as good attitude of antibiotics misuse and SMP, this was also employed in perceived subjective norms and perceived control belief scores. The scores gotten were graded according to previous studies in the literature. Categorical data was presented in form of percentages, while quantitative data was presented using mean and STD. Student 't' test was enrolled to compare mean scores in knowledge, attitude, normative beliefs, perceived control beliefs towards antibiotics misuse and self-medication practices among control groups at baseline and after the intervention. Percentage differences were calculated between post-intervention and pre-intervention value differences. X²-square test for independence was applied to determine the relationship between categorical dependent and independent variables. A p-value of less or equal to 0.05 was considered significant. Logistic regression analysis was done to account for possible effect of compounds between independent and dependent variables.

Table 0.1: Intervention Domain I: Awareness (Need for Behavior Change)

Activity	Aims	Expected Outcomes	Evaluation method	Means of Confirmation
Activity 1: Introduction, meaning of bacterial treatments and key terms involved	1: Awareness of common bacterial infections self-administration	Have the Respondent learn the basic ART- common bacterial infections self-administration ideas	Verbal question on the basic ART- common bacterial infections self-administration ideas	Numbered question
Activity 2: use of video posters, pictures	2: Awareness of self-administration ideas	Is the respondent aware of bacterial infections	Demonstration by use of visual aids.	Numbered questions, (Objective form)

3.13: Intervention Plan

Plan for health education about antibiotics misuse and self-medication practice for common bacterial infections among study participants:

A three consecutive 90 minutes sessions of health education before monthly drug refills were conducted with the intervention group by the researcher, research assistants and clinic matrons who were present to provide logistic support. Participants were asked to discuss effects of self-medication with antibiotics in smaller groups and asked to present over few minutes. Questions and comments from the participants were entertained by the researcher before closing each session.

Table 0.2: Intervention Domain II: Information (Gather facts about behavior change)

Activity	Aim	Expected Outcomes	Evaluation Method	Means of confirmation
Action Risks ART-common	Awareness of bacterial infections ART- common bacterial infections self-administration	Have the Respondent learnt the basic ART- common bacterial infections ART- common bacterial infections self-administration ideas	Numbered question Numbered question	Numbered the question Marking scripts
Activity 2: use of videos, posters and pictures	Awareness of self-administration ideas	Is respondent aware of ART bacterial infections	Demonstration by use of visual aids.	Numbered questions, (Objective form)

Table 0.3: Intervention Domain III: Knowledge (Learn about facts)

Activity	Aim	Learning	Assessment	Verification
Activity 1: Definition of terms	Awareness of factor linked with Opportunistic bacterial infections	Does the respondent understand common factors linked ART- bacterial	Number Factors linked with ART- Opportunistic bacterial	Number of questions of marking script (objective form)
Activity 2: ART- severe effects of ART-	Awareness of side effects linked to ART-	Does the respondent understand	Number the dangers of ART- Opportunistic	

Table 0.4: Intervention Domain IV: Skill (Psychomotor-physical movement and coordination)

		Expected	Assessment
Activity	Aim	Outcomes	Method of
Activity 1:	awareness of common bacterial infections	of Have the importance of common bacterial infections	the Highlight factors of inducing ART- common
Disclosure of common bacterial infections	Disclosure of common bacterial infections	Disclosure of common bacterial infections	of ART- common
drugs used for	drugs used for	for common bacterial	common
			List of
Activity 2:	Awareness of importance of stopping the ART- common bacteria	of Have the importance of common bacterial infections	the List of questions
Intention and readiness to stop ART-	importance of stopping the ART- common bacteria	of Participants learned importance of	questions
			question

Table 0.5: Intervention Domain V: Attitude (Constants feelings and predisposition)

Activity	Aim	Expected outcome	Assessment method	Verification method
Activity 1: Opportunistic use of bacterial infections	1: Consciousness of the importance of not miss using antibiotics in the future	Are respondents aware of the importance of not miss using antibiotics	Number of questions	List of questions
Activity 2: Self efficiency and adherence	2: Awareness of Self-efficiency and adherence	Does respondent understand steps to take for Self-efficiency, and adherence	Numbering Self-efficiency and adherence steps	Number of questions
Activity 3: Social networking	3 Awareness of friends socialize with	Are respondents aware of bad habits linked to misuse of antibiotics	Questions regarding bad habits or antibiotics missuses	Number of questions

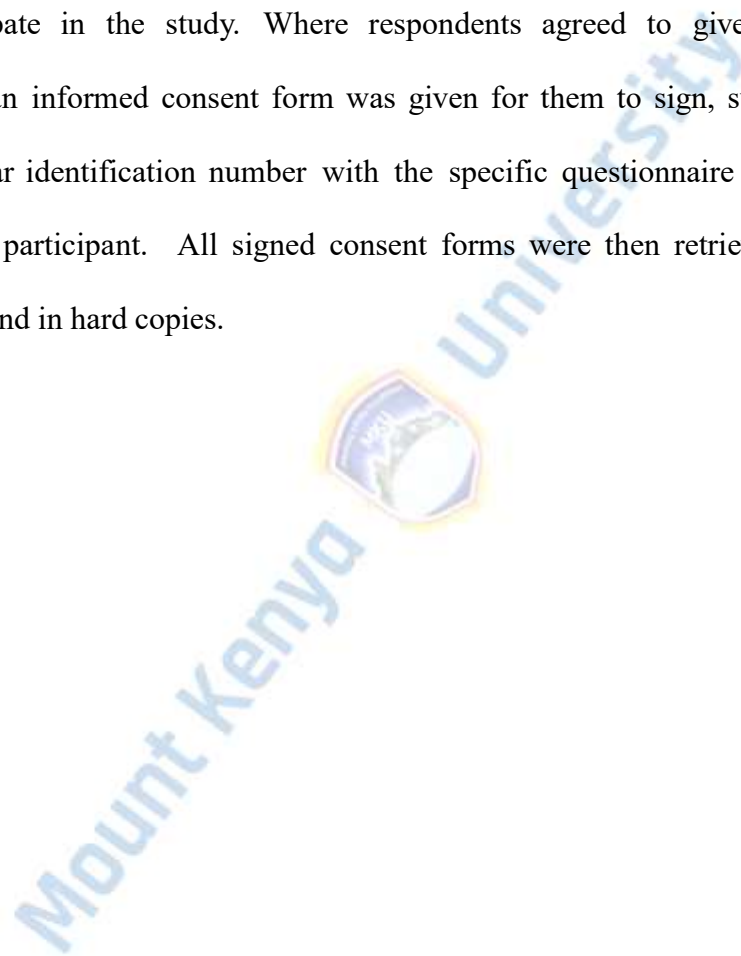
Table 0.6: Intervention Domain VI: Value

Activity	Aim	Expected Outcome	assessment Method	Confirmation method
Action 1: willingness to endorse others to stop ART- Opportunistic bacterial diseases treatment	Awareness of techniques to identify friends with bad practices and habits of ART- Opportunistic bacterial diseases treatment	Is the respondent aware of strategies to identify bad practice and habit of friends towards ART- Opportunistic diseases self-treatment	Questionnaire on strategies to identify bacexercise and habit of ART- opportunistic bacterial infections self-treatment	List of questions
Activity 2 Raising awareness of admittance care	Strategies to help or admittance to	Have others care learnt the importance of stopping the ART-common bacterial infections self-treatment	List of questions	List of questions

3.14: Ethical Considerations

The study sought ethical approval from Mount Kenya University. Thereafter, an ethical clearance license was also sought from Bauchi State Human (Health) Research Ethics Committee and ethical approval from General hospital and the infectious diseases hospital Bayara in Bauchi state. All the afore mentioned bodies granted permissions for this study to be done. In line with the international codes of conduct for human subject research, participants were given detailed explanation

about this study before asking for consent. Participants were adequately informed about how this study might be of benefit to them and to the society in general. They were also assured of confidentiality protection during and after the study as well as their right to participate or not. Also, study respondents were informed that they can pull out from the study at any given time they deemed uncomfortable to proceed with the study. They were further assured that no harm will be done to them by their decision not to participate in the study. Where respondents agreed to give consent for participation, an informed consent form was given for them to sign, such form was assigned similar identification number with the specific questionnaire we issued to the respective participant. All signed consent forms were then retrieved and store electronically and in hard copies.



CHAPTER FOUR: RESEARCH RESULTS AND DISCUSSION

4.1: Introduction

This chapter comprises explanations of the results and discussions of the results. This first section explains the results. The section describes a detailed explanation of the results of this work following data analysis. Univariate descriptive analysis was provided in the first segment of the chapter using narratives and tables comparing rates, frequencies, and percentages between two sections of the research at the starting point and after the intervention. The subsequent segment describes a bivariate analysis comparing the two sections of the study at the pre intervention of the study and after the intervention. The final segment of this chapter explains the multivariate analysis done to compare results among the two study arms at baseline and post-intervention. In the discussion section, the section provides details, what was done in this study, what was found in the course of the study and the meanings of what was found (our results). Furthermore, the discussion section of this chapter highlights the strengths as well as the limitations of this work. Efforts done to address the identified limitations were also discussed. The discussion further includes recommendations arising from the findings of this work.

4.2: Baseline Findings (Univariate Analysis)

Table 4.1: Socio-demographic profiles of the study respondents

Variable	Intervention Group		Control Group	
	Frequency(n)	Percent(%)	Frequency(n)	Percent(%)
Age (years)				
21-25				
26-30	22	25.9	24	28.2
31-35	27	31.8	25	29.4
36-40	15	17.6	16	18.8
>40	11	12.9	12	14.1
Sex				
Males	48	56.5	45	52.9
Females	37	43.5	40	47.1
Marital Status				
Single	15	17.6	17	20
Married	34	40.0	35	41.2
Divorced	16	18.8	14	16.5
Separated	10	11.8	12	14.1
Widow	10	11.8	7	8.2
Occupation				
Student	12	14.1	15	17.6
Unemployed	10	11.8	12	14.1
Self-employed	25	29.4	21	24.7
Employed	38	44.7	37	43.5
Education				
None	25	29.4	27	31.8
Informal	15	17.6	14	16.5
Primary	27	31.8	22	25.9
Secondary	11	12.9	10	11.8
Post Secondary	7	8.2	12	14.1
Religion				
Islam	64	75.3	66	77.6
Christianity	21	24.7	19	22.4
Tribe				
Hausa	55	64.7	60	70.1
Igbo	15	17.6	12	14.1
Yoruba	9	10.6	6	7.1
Others	6	7.1	7	8.2
Diagnosis(Years)				
1-5	25	29.4	20	23.5
6-10	36	42.4	31	36.5
> 10	24	28.2	34	40.0
CD4 Count				
<200	15	17.6	20	23.5

200-500	41	48.2	36	42.4
> 500	29	34.1	29	34.1
ARV Years				
< 5	26	30.6	30	35.3
>= 5	59	69.4	55	64.7

Table 4.1 presents the results of the analysis of the demographic characteristics of respondents. It can be observed that 10(11.8%) and 8(9.4%) of the study participants in the intervention and control group were amongst the age of 21-25 years; 22(25.9%) and 24(28.2%) of the respondents in the intervention and control group were between the age of 26 –30 years; 27(31.8%) and 25(29.4%) of the respondents in the intervention and control group respectively were amongst the age of 31 – 35 years; 15(17.6%) and 16(18.8%) of the respondents in the intervention and control group were between the age bracket of 36 – 40 years and 11(12.9%) and 12(14.1%) of the participant in the intervention and control group were above 40 years. The results of the analysis based on sex revealed that 48(56.5%) and 45(52.9%) of the participant in the intervention and control group correspondingly were males and 37(43.5%) and 40(47.1%) of the participant in the intervention and control group were females. The analysis based on marital status revealed that 15(17.6%) and 17(20.0%) of the study respondents in the intervention and control group were single; 34(40.0%) and 35(41.2%) of the study respondents in the intervention and control group were married; 16(18.8%) and 14(16.5%) of the participant in the intervention and control group were divorced; 10(11.8%) and 12(14.1%) of the study respondents in the intervention and control group were separated and 10(11.8%) and 7(8.2%) of the participant in the intervention and control group were widowed. Furthermore, it can be observed that 12(14.1%) and 15(17.6%) of the study persons in the intervention and control group were students; 10(11.8%) and 12(14.1%) of the study persons in the intervention and control group were unemployed; 25(29.4%) and 21(24.7%) of the

study persons in the intervention and control group respectively were self-employed and 38(44.7%) and 37(43.7%) of the study respondents in the intervention and control group were employed. Also, 25(29.4%) and 27(31.8%) of the study persons in the intervention and control group had none education background; 15(17.6%) and 14(16.5%) of the study respondents in the intervention and control group had informal education; 27(31.8%) and 22(25.9%) of the participant in the intervention and control group had primary education; 11(12.9%) and 10(11.8%) of the study respondents in the intervention and control group had secondary education; 7(8.2%) and 12(14.1%) of the study respondents in the intervention and control group respectively had post-secondary education. The results of the analysis based on the religion of the study respondents revealed that 64(75.3%) and 66(77.6%) of the study respondents in the intervention and control group were in Islam and 21(24.7%) and 19(22.4%) of the study respondents in the intervention and control group were in Christianity. It also found that 55(64.7%) and 60(70.1%) of the study respondents in the intervention and control group respectively whereas Hausa; 15(17.6%) and 12(14.1%) of the study respondents in the Intervention and control group were Igbo; 9(10.6%) and 6(7.1%) of the study respondents in the Intervention and control group respectively were Yoruba and 6(7.1%) and 7(8.2%) of the study respondents in the Intervention and control group belongs to other tribe. The results based on duration with disease (years) revealed that 25(29.4%) and 20(23.5%) of the study respondents in the intervention and control group had the disease within 1 -5 years; 36(42.4%) and 31(36.5%) of the study respondents in the intervention and control group correspondingly had the disease between 6 – 10 years and, 24(28.2%) and 34(40.0%) of the study respondents in the intervention and control group had the disease for more than 10 years. Based on CD-4 count, it was observed that 15(17.6%) and 20(23.5%) in the

intervention and control group respectively had CD-4 count less than 200; 41(48.2%) and 36(42.4%) in the intervention and control group respectively had CD-4 count between 200 – 500 and 29(34.1%) each in the intervention and control group had CD-4 count more than 500. It was also found that 26(30.6%) and 30(35.3%) of the study respondents in the Intervention and control group reported that their ARV's started less than 5 years and 59(69.4%) and 55(64.7%) of the study respondents in the intervention and control group started their ARV's at least 5 years.

Table 4.2: Baseline Magnitude of antibiotics misuse and self-antibiotics medication among respondents

Variable	Intervention Group		Control Group	
	Frequency(n)	Percent (%)	Frequency(n)	Percent (%)
Uses Antibiotics	57	67.1	55	64.7
Don't Use Antibiotics	28	32.9	30	35.3
Total	85	100	85	100

Table 4.2 present the analysis results of baseline magnitude of self-antibiotics medication among the study respondents. It can be observed that about two third of the study respondents in both the intervention (67.1%) and control (64.7%) group uses antibiotics without prescription (self-medication) while the remaining (32.9%) and (35.3%) in the Intervention and control group do not self-antibiotics.

Table 4.3: Aggregate knowledge scores for antibiotics misuse and self-antibiotics medication among the respondents at baseline

Variable	Intervention Group		Control Group	
	Frequency(n)	Percent (%)	Frequency(n)	Percent (%)
Good Knowledge	38	44.7	40	47.1
Poor Knowledge	47	55.3	45	52.9
Total	85	100	85	100

Table 4.3 presents the results of analysis of aggregate knowledge scores for self-antibiotics medication among the study respondents at the starting point. It can be observed that more than half of the study participants in both the study (55.3%) and control (52.9%) group have poor knowledge on antibiotic misuse at baseline. However, (44.7%) and (47.1%) in the intervention and control group have good knowledge on antibiotic misuse at baseline.

Table 4.4: Aggregate attitude scores for antibiotics misuse and self-antibiotics medication among the respondents at baseline

Variable	Intervention Group		Control Group	
	Frequency(n)	Percent (%)	Frequency(n)	Percent (%)
Good attitude	63	74.1	65	76.5
Poor attitude	22	25.9	20	23.5
Total	85	100	85	100

From Table 4.4, it can be observed that about three quarter of the study respondents in both the intervention (74.1%) and rheostat (76.5%) group had good attitude on antibiotic misuse at baseline. However, (25.9%) in the intervention group and (23.5%) in the control group had poor attitude on antibiotic misuse at the baseline.

Table 4.5: Perceived control of antibiotics misuse and self-antibiotics medication among the respondents at baseline

Variable	Intervention Group		Control Group	
	Frequency(n)	Percent (%)	Frequency(n)	Percent (%)
Easily available	74	87.1	70	82.4
Prior knowledge	21	24.7	23	27.1
Cost-effectiveness	75	88.2	75	88.2
Friend or relative	63	74.1	65	76.5
Ease of access	72	84.7	71	83.5
Part of self-care	63	74.1	62	72.9
Saves time	73	85.9	70	82.4

Study findings presented in Table 4.5 revealed that most of the variables or statements on the perceived control of self-antibiotics treatment among the study respondents were high in both the intervention and control group, ranging from cost-effectiveness to previous experience with friends or relatives as well as part of self-care. 74(87.1%) in the intervention group and (82.4%) in the rheostat group reported ease of availability; 75(88.2%) in the Intervention and control group reported cost-effectiveness; 63(74.1%) in the Intervention and 65(76.5%) in the resistor group reported previous experience in friend or relative; 72(84.7%) in the intervention and 71(83.5%) in the control group reported ease of access; 63(74.1%) in the intervention and 62(72.9%) in the control group reported part of self-care and 73(85.9%) in the intervention and 70(82.4%) in the control group reported saves time. However, the frequency count for prior knowledge of condition or problem was below 50% in both the Intervention and control groups.

Table 4.6: Aggregate perceived control scores for antibiotics misuse and self-antibiotics medication among the respondents at baseline

Variable	Intervention Group		Control Group	
	Frequency(n)	Percent (%)	Frequency(n)	Percent (%)
Good Control	23	27.1	26	30.6
Poor Control	62	72.9	59	69.4
Total	85	100	85	100

From Table 4.6, it can be observed that only slightly about one quarter of the study participants in intervention (27.1%) and control (30.6%) group have good perceived control on antibiotic misuse at baseline. Majority (72.9%) and (69.4%) in the intervention and control group have poor perceived control on antibiotic misuse at baseline.

Table 4.7: Comparison between socio-demographic profiles of participants in the intervention and control group at pre intervention

Variable	Intervention Group	Control Group	χ^2 P-value	
	Frequency(n)	Frequency(n)		
Age (years)			0.9771	0.4618
21-25				
26-30	22	24		
31-35	27	25		
36-40	15	16		
>40	11	12		
Sex			0.2137	0.6439
Males	48	45		
Females	37	40		
Marital Status			0.9841	0.9122
Single	15	17		
Married	34	35		
Divorced	16	14		
Separated	10	14		
Widow	10	12		
Occupation			0.8763	0.8311
Student	12	15		

Unemployed	10	12		
Self-employed	25	21		
Employed	38	37		
Widow	57	55		
Education			1.9885	0.7385
None	25	27		
Informal	15	14		
Primary	27	22		
Secondary	11	10		
Post Secondary	7	12		
Religion			0.1308	0.7176
Islam	64	66		
Christianity	21	19		
Tribe			1.2276	0.7468
Hausa	55	60		
Igbo	15	12		
Yoruba	9	7		
Others	6	7		
Diagnosis(Years)			2.6528	
1-5	25	20		
6-10	36	31		
> 10	24	34		
CD4 Count			1.0390	0.5948
<200	15	20		
200-500	41	36		
> 500	29	29		
ARV Years			0.4261	0.5139
< 5	26	30		
>= 5	59	55		

Table 4.7 provides findings of data analysis on the relationship between the individual factors of respondents in the intervention and control group at baseline. The results of the analysis revealed no statistically significant relationship in all the parameters related to individual characteristics and health status of the respondents in both the intervention and control group. This means that, the two groups were comparable at baseline.

Table 4.8: Comparison of magnitude of self-antibiotics medication among the study respondents at baseline

Variable	Intervention group	Control	χ^2	P-value
	Frequency(n)	Frequency(n)		
Uses Antibiotics	57	55	0.1047	0.7463
Don't Use Antibiotics	28	30		
Total	85	85		

Study findings presented in Table 4.8, it can be observed that about two-thirds of the respondents in both the intervention (67.1%) and control (64.7%) group use antibiotics without prescription (self-medication). However, there was no statistically significant difference between the intervention and control groups in terms of the magnitude of self-treatment with antibiotics at baseline ($\chi^2 = 0.1047$, P-value = 0.7463 >0.05).

Table 4.9: Comparison of aggregate knowledge score between intervention and control group at baseline

Variable	Intervention group	Control	χ^2	P-value
	Frequency(n)	Frequency(n)		
Good knowledge	38	40	0.0948	0.7582
Poor knowledge	47	45		
Total	85	85		

Table 4.9 reveals the results of analysis of comparison of aggregate knowledge score between intervention and control group at baseline. More than half of the study participants in both the study (55.3%) and control (52.9%) group have poor

knowledge on antibiotic misuse at baseline. The $\chi^2 = 0.0948$, P-value = 0.7582 > 0.05, indicates that, there was no difference between the intervention and control groups in terms of knowledge of antibiotics misuse and resistance.

Table 4.10: Comparison of aggregate attitude score between intervention and control group at baseline

Variable	Intervention group	Control	χ^2	P-value
	Frequency(n)	Frequency(n)		
Good attitude	63	65	0.1265	0.7221
Poor attitude	22	20		
Total	85	85		

From Table 4.10, it can be observed that about three quarter of the study respondents in both the intervention (74.1%) and control (76.5%) group have good attitude on antibiotic misuse at baseline. However, the χ^2 value of 0.1265 with P-value = 0.7221 > 0.05 indicates that there was no difference between the Intervention and control groups in terms of attitude scores of antibiotics misuse and resistance.

Table 4.11: Comparison of aggregate perceived control score between Intervention and control group at baseline

Variable	Intervention group	Control	χ^2	P-value
	Frequency(n)	Frequency(n)		
Good control	23	25	0.1161	0.7333
Poor control	62	60		
Total	85	85		

From table 4.11, it can be seen that only slightly about one quarter of the study

participants in the Intervention (27.1%) and control (30.6%) group have good perceived control on antibiotic misuse at baseline. However, the χ^2 value of 0.1161 with P-value =0.7333 > 0.05 indicates that there was no difference between the intervention and control groups in terms of perceived control scores of antibiotics misuse and resistance at baseline.

4.3 Post Intervention Univariate Analysis

Table 4.12: Post-intervention Magnitude of antibiotics misuse and self-antibiotics treatment among participants in both intervention and control groups

Variable	Intervention Group		Control Group	
	Frequency(n)	Percent (%)	Frequency(n)	Percent (%)
Uses Antibiotics	20	24.4	56	67.5
Don't Use Antibiotics	62	75.6	27	32.5
Total	82	100	83	100

Findings from Table 4.12 revealed that only about one quarter of the intervention (24.2%) and nearly three quarter in the control (67.5%) group of the study participants uses antibiotics without prescription (self-medication) after intervention.

Table 4.13: Cumulative knowledge scores for self-antibiotics medication among the participants at post-intervention

Variable	Intervention Group		Control Group	
	Frequency(n)	Percent (%)	Frequency(n)	Percent (%)
Good knowledge	63	76.8	39	47
Poor knowledge	19	23.2	44	53
Total	82	100	83	100

From Table 4.13 it can be observed that more than three quarter of the respondents in the intervention (76.8%) group and less than half of the respondents in the control (47.0%) have good knowledge on antibiotic misuse and resistance at post-intervention. While (23.2%) in the Intervention and (53.0%) in the control group have poor knowledge on antibiotic misuse and resistance at post-intervention.

Table 4.14: Aggregate attitude scores for self-antibiotics medication among the study participants in both intervention and control at post-intervention

Variable	Intervention Group		Control Group	
	Frequency(n)	Percent (%)	Frequency(n)	Percent (%)
Good attitude	21	25.6	64	77.1
Poor attitude	61	74.4	19	22.9
Total	82	100	83	100

Table 4.14 present the results of data analysis about one aggregate attitude scores for self-antibiotics medication among the study participants in both intervention and control at post-intervention. The result revealed that quarter of the study participants in the intervention (25.6%) and more than three-quarter in the control (77.1%) group have good attitude on antibiotic misuse at post-intervention. While more than half (74.4%) in the intervention and (22.9%) of the control have poor attitude on self-antibiotics medication among the study participants in both intervention and control at post-intervention

Table 4.15: Perceived Control of Self-antibiotics Medication among study participants at post-intervention

Variable	Intervention Group		Control Group	
	Frequency(n)	Percent (%)	Frequency(n)	Percent (%)
Easily available	71	86.5	68	81.9
Prior knowledge	18	22.0	22	26.5
Cost-effectiveness	21	25.6	73	88.0
Friend or relative	63	76.8	62	83.1
Comfort of access	68	82.9	69	83.1
Part of self-care	21	25.6	64	77.1
Saves time	24	29.3	68	81.9

Findings from Table 4.15 provided results of analysis of perceived control of Self-antibiotics Medication among study respondents at post-intervention. It can be observed that most of the variables or statements on the perceived control of self-antibiotics medication among the study respondents were found to change slightly in both the Intervention and control group, ranging from cost-effectiveness to previous experience with friends or relatives as well as part of self-care. 71(86.5%) of the participant in the Intervention group and 68(81.9%) of the participant in the control group reported ease of availability; 63(76.8%) and 62(74.9%) of the participant in the intervention and control group reported previous experience in friend or relative; 68(82.9%) and 69(83.1%) of the participant in the intervention and rheostat group reported ease of access. However, only 18(22.0%) and 22(26.5%) of the participant in the intervention and control group reported prior knowledge of condition or problem; 21(25.6%) and 73(88.0%) of the participant in the intervention and control group reported cost effectiveness; 21(25.6%) and 64(77.1%) of the participant in Intervention and rheostat group reported part of self- care and 24(29.3%) and 68(81.9%) of the participant in Intervention and control group reported save time.

Table 4.16: Aggregate perceived control scores for self-antibiotics medication among the participants at post-intervention

Variable	Intervention Group		Control Group	
	Frequency(n)	Percent (%)	Frequency(n)	Percent (%)
Good control	61	74.4	57	30.1
Poor control	21	25.6	57	69.9
Total	82	100	83	100

From Table 4.16, it can be observed that about three quarter of the study participants in the intervention (74.4%) and slightly more than one quarter of the study participants in control (30.1%) group had good perceived control scores on antibiotic misuse at post-intervention. However, (25.6%) and (69.9%) in intervention and control group had poor perceived control scores on antibiotic misuse at post-intervention.

Table 4.17: Comparison of magnitude of self-antibiotics medication among the study respondents at post-intervention

Variable	Intervention group	Control	χ^2	P-value
	Frequency(n)	Frequency(n)		
Uses Antibiotics	20	56	30.8117	< 0.0001
Don't Use Antibiotics	62	27		
Total	82	83		

4.4 Post Intervention Bivariate Analysis

From table 4.17, it can be observed that only about one quarter of the intervention (24.2%) and nearly three quarter in the control (67.5%) group of the study participants uses antibiotics without prescription (self-medication) after intervention.

However, the finding shows a statistically significant between the intervention and control groups in terms of the magnitude of self-medication with antibiotics ($\chi^2 = 30.8117$, P – value $0.0001 < 0.05$).

Table 4.18: Evaluation of aggregate knowledge score between intervention and control group at post-intervention

Variable	Intervention group	Control	χ^2	P-value
	Frequency(n)	Frequency(n)		
Uses Antibiotics	20	56	30.8117	< 0.0001
Don't Use Antibiotics	62	27		
Total	82	83		

Table 4.18 presents the results of data analysis of comparison of aggregate knowledge score between intervention and control group at post-intervention. The results revealed that more than three quarter of the persons in the intervention (76.8%) group and less than half of the respondents in the control (47.0%) have good knowledge on antibiotic misuse and resistance at post-intervention. However, the ($\chi^2 = 15.5662$, P-value $0.0008 < 0.05$) implies that there was statistically significant difference between the intervention and control groups in terms of aggregate knowledge scores of antibiotics misuse and resistance.

Table 4.19: Comparison of aggregate attitude score between intervention and control group at post-intervention

Variable	Intervention group	Control	χ^2	P-value
	Frequency(n)	Frequency(n)		
Good attitude	21	64	43.7985	< 0.0001
Poor attitude	61	19		
Total	82	85		

The results of data analysis for comparison of aggregate attitude score between intervention and control group at post-intervention was presented in Table 4.19. About one quarter of the study participants in the intervention (25.6%) and more than three-quarter in the control (77.1%) group have good attitude on antibiotic misuse at post-intervention. However, there was a statistically significant difference between the Intervention and control groups in terms of attitude scores of antibiotics misuse and resistance ($P < 0.0001$ i.e $P < 0.05$).

Table 4.20: Comparison of aggregate perceived control score between intervention and control group at post-intervention

Variable	Intervention group	Control	χ^2	P-value
	Frequency(n)	Frequency(n)		
Good control	61	25	0.4174	0.5182
Poor control	21	58		
Total	82	83		

The results of data analysis for comparison of aggregate perceived control scores between intervention and control group at post-intervention was presented in Table

4.20. It can be observed that about three quarter of the study participants in the intervention (74.4%) and slightly more than one quarter of the study participants in control (27.1%) group had good perceived control scores on antibiotic misuse. However, no significant difference was found between the intervention and control groups in terms of perceived control scores of antibiotics misuse and resistance at post-intervention was found ($P = 0.5182$ i.e. $P > 0.05$).

Table 4.21: Comparison of magnitude of self-antibiotics treatment among the Intervention group of participants at baseline and post-intervention

Variable	Baseline	Post Intervention	χ^2	P-value
	Frequency(n)	Frequency(n)		
Uses Antibiotics	57	20	30.5796	< 0.0001
Don't Use Antibiotics	28	62		
Total	85	82		

Evaluation of the effect of health education intervention on knowledge, attitude, perceived control and prevalence of antibiotic misuse among the study personnel in the Intervention and control group

Table 4.21 presents the results of data analysis for comparison of the magnitude of self-antibiotics medication among the intervention group of participants at starting point and after intervention. The result of the analysis revealed that the incidence of self-treatment with antibiotics among the intervention group was 67.1% at baseline, which changed to 24.4% at post-intervention. However, the difference was statistically significant ($\chi^2 = 30.5796$, P – value $0.0001 < 0.05$).

Table 4.22: Comparison of cumulative knowledge scores for self-antibiotics medication among the intervention group of respondents at baseline and post-intervention

Variable	Baseline	Post Intervention	χ^2	P-value
	Frequency(n)	Frequency(n)		
Good knowledge	38	63	10.0118	0.00022
Poor knowledge	47	19		
Total	85	82		

The results of data analysis for aggregate knowledge scores for self-antibiotics medication among the Intervention group of participants at starting point and after-intervention was presented in Table 4.22. The aggregate knowledge scores on self-medication with antibiotic was 44.7% at baseline which changed to 76.8% at post-intervention. The χ^2 value of 10.0118 with P – value = 0.00022 < 0.05 implies there is statistically significant difference in the aggregate knowledge scores for self-antibiotic medication among the Intervention group of participants at starting point and after-intervention.

Table 4.23: Comparison of cumulative attitude scores for self-antibiotics medication among the Intervention group of respondents at baseline and post-intervention

Variable	Baseline	Post Intervention	χ^2	P-value
	Frequency(n)	Frequency(n)		
Good attitude	63	21	39.2841	< 0.0001
Poor attitude	22	61		
Total	85	82		

From Table 4.23, it can be observed that the aggregate attitude scores on self-medication with antibiotics was 74.1% at baseline which changed to 25.6% at after intervention. However, there was a significant difference ($P < 0.0001$). This change to poor attitude on self-medication will make participants to decrease self-medication with antibiotics.

Table 4.24: Comparison of aggregate perceived scores for self-antibiotics medication among the Intervention group of participants at baseline and after-intervention

Variable	Baseline	Post Intervention	χ^2	P-value
	Frequency(n)	Frequency(n)		
Good control	23	61	37.4017	0.00001
Poor control	62	21		
Total	85	82		

From Table 4.24, it can be observed that the aggregate perceived control scores on self-medication with antibiotics was 27.1% at baseline which changed to 74.3% at post-intervention. However, there was statistically significant difference comparing the baseline and post intervention scores ($P < 0.0001$). The findings implies good score of perceived control will make the study participants in the intervention control to decrease self-medication with antibiotics

Table 4.25: Comparison of the magnitude of self-antibiotics medication among the control group of respondents at baseline and post-intervention

Variable	Baseline	Post Intervention	χ^2	P-value
	Frequency(n)	Frequency(n)		
Uses Antibiotics	55	56	0.1431	0.7052
Don't Use Antibiotics	30	27		
Total	85	83		

From Table 4.25, it can be observed that the incidence of self-treatment with antibiotics among the intervention group was 64.7% at baseline, which changed to 67.5% at after-intervention. However, the slight change found was not statistically significant ($P = 0.7052$ i.e $P > 0.05$).

Table 4.26: Comparison of cumulative knowledge scores for self-antibiotics medication among the control group of respondents at baseline and post-intervention

Variable	Baseline	Post Intervention	χ^2	P-value
	Frequency(n)	Frequency(n)		
Good knowledge	40	39	0.0001	0.9927
Poor knowledge	45	44		
Total	85	83		

From Table 4.26, it can be observed that the aggregate knowledge scores on self-medication with antibiotics were 47.1% at baseline which changed to 47.0% after after-intervention. However, the difference found was not statistically significant ($P = 0.9927$ i.e $P > 0.05$).

Table 4.27: Comparison of aggregate attitude scores for self-antibiotics medication among the control group of participants at baseline and post-intervention

Variable	Baseline	Post Intervention	χ^2	P-value
	Frequency(n)	Frequency(n)		
Good attitude	65	64	0.0996	0.9220
Poor attitude	20	19		
Total	85	83		

Table 4.27 presents the results of data analysis use in comparing the aggregate attitude scores for self-antibiotics medication among the control group of participants at baseline and post-intervention. The aggregate attitude scores on self-medication with antibiotic were 76.5% at baseline which changed to 77.1% at after-intervention. However, the difference found was not statistically significant ($P = 0.9220$ i.e $P > 0.05$).

Table 4.28: Comparison of aggregate perceived control scores for self-antibiotics medication among the control group of participants at baseline and post-intervention

Variable	Baseline	Post Intervention	χ^2	P-value
	Frequency(n)	Frequency(n)		
Good control	26	25	0.0043	0.9474
Poor control	59	58		
Total	85	83		

From Table 4.28, it can be observed that the aggregate perceived control scores on self-medication with antibiotics was 30.6% at baseline which changed to 30.1% at after-intervention. However, this difference in the perceived control scores for self-antibiotics

medication among the control group of participants at baseline and after intervention was not found to have a statistical significance ($P = 0.9474$ i.e $P > 0.05$).

Table 4.29: Relationship between socio-demographic factors of participants and Prevalence of antibiotic misuse among the study participants in the intervention group

Variable	Uses Antibiotics	Don't Use Antibiotics	χ^2	P-value
	Frequency(n)	Frequency(n)		
Age (years)			0.6082	0.4355
≤ 30				
> 30	14	38		
Sex			0.8512	0.3562
Males	13	33		
Females	7	29		
Marital Status			2.5560	0.1099
others	15	34		
Married	5	28		
Occupation			2.3374	0.1263
Unemployed	8	14		
Employed	12	48		
Education			0.2932	0.5882
Primary and below	15	50		
Secondary and below	5	12		
Religion			0.4514	0.5017
Islam	14	48		
Christianity	6	14		
Tribe			0.0287	0.8656
Hausa	13	39		
Others	7	23		
Diagnosis(Years)			0.3759	0.5398
< 5	5	20		
≥ 5	15	42		
CD4 Count			0.0086	0.9262
< 500	14	41		
≥ 500	7	21		
ARV Years			1.1293	0.2879
< 5	8	17		
≥ 5	12	45		

The findings from table 4.29 summarizes the results of cross-tabulation for the relationship between the socio-demographic factors of the participants and the magnitude of antibiotic misuse among the study participants in the intervention group. The results of the analysis showed no relations between variables parameters in the socio-demographic profile and the magnitude of self-treatment with antibiotics (P-value >0.005).

Table 4.30: Association between individual factors of participants and knowledge of antibiotics misuse and self-medication among respondents

Variable	Good	Poor	χ^2	P-value
	Frequency(n)	Frequency(n)		
Age (years)			0.7236	0.3950
≤ 30				
> 30	40	10		
Sex			0.0324	0.8571
Males	35	11		
Females	28	8		
Marital Status			0.4077	0.5231
others	38	13		
Married	25	6		
Occupation			5.3143	0.0220*
Unemployed	13	9		
Employed	50	10		
Education			Fisher Test	0.09999
Primary and below	49	15	0.5943	
Secondary and below	14	4		
Religion			2.0792	0.4193
Islam	50	12		
Christianity	13	7		
Tribe			1.5586	0.2119
Hausa	43	10		
Others	20	9		
Diagnosis(Years)			0.0139	0.9067
< 5	19	6		
≥ 5	44	13		

CD4 Count			0.2031	0.6522
<500	43	14		
>= 500	20	5		
ARV Years			0.2031	0.6522
< 5	20	5		
>= 5	43	14		

* Statistically

Table 4.30 present the result of cross tabulation for evaluating the relationship between socio-demographics characteristics of respondents and knowledge of antibiotics misuse and resistance. Findings showed that there was an association between occupational status of the study participants and knowledge of antibiotic misuse ($\chi^2 = 5.3143$, P – value = 0.0220). The employed participants were more likely to have good knowledge on antibiotic misuse compared to unemployed participants. Other socio-demographic factors such as age in years, sex, marital status, education, religion, tribe, duration with disease, CD-4 and years ARV's had a p-value of > 0.05, implying that there was no relationship with knowledge of antibiotic misuse.

Table 4.31: Relationship between individual factors of respondents and attitude score on antibiotics misuse and self-medication among the intervention group respondents

Variable	Good	Poor	χ^2	P-value
	Frequency(n)	Frequency(n)		
Age (years)			0.2906	0.7198
≤ 30				
> 30	14	38		
Sex			2.3839	0.1226
Males	12	34		
Females	9	27		
Marital Status			2.5560	1.1099
others	13	36		
Married	8	25		
Occupation			0.1311	0.7173
Unemployed	5	17		
Employed	16	44		
Education			0.2920	0.5882
Primary and below	15	50		
Secondary and below	5	12		
Religion			8.2597	0.0041*
Islam	11	51		
Christianity	10	10		
Tribe			0.2920	0.7617
Hausa	13	40		
Others	8	21		
Diagnosis(Years)			0.2253	0.6350
< 5	7	17		
≥ 5	14	44		
CD4 Count			0.1958	0.6582
<500	13	41		
≥ 500	8	20		
ARV Years			3.9092	0.048*
< 5	10	15		
≥ 5	11	46		

* Statistically

Table 4.31 presents the result of data analysis used in assessing the relationship between socio-demographics characteristics of respondents and attitude score on antibiotics misuse and resistance among the intervention group. Findings revealed that there was an

association between religion, years ARV's started of the study participants with the poor attitude scores ($P - \text{value} < 0.05$) That is those who practice Christianity were more likely to have poor attitude scores on antibiotic misuse compared to those who practice Islam. And those who spent more than five years on ARV's were more likely to have poor attitude scores on antibiotic misuse compared to those who had less than five years on ARV's. Other socio-demographic factors such as age, gender, status of marriage, type of occupation, education, tribe, duration with disease (years), CD-4 count, remains not statistically associated with poor attitude scores on antibiotic misuse. Poor attitude to antibiotic misuse will discourage patients from practicing self-medication (antibiotic misuse) ($P - \text{value} > 0.05$).

Table 4.32: Relationship between socio-demographics characteristics of respondents and perceived control score on antibiotics misuse among the intervention group

Variable	Good	Poor	χ^2	P-value
	Frequency(n)	Frequency(n)		
Age (years)			0.0010	0.9746
≤ 30				
> 30	38	13		
Sex			0.0049	0.9440
Males	33	11		
Females	28	9		
Marital Status			1.0236	0.3117
others	36	15		
Married	25	6		
Occupation			0.0436	0.8345
Unemployed	16	6		
Employed	45	15		
Education			2.1346	0.1440
Primary and below	50	14		
Secondary and below	11	7		
Religion			2.0053	0.9418
Islam	47	15		
Christianity	15	5		
Tribe			8.9923	0.0027*
Hausa	46	8		
Others	16	13		
Diagnosis(Years)			1.0625	0.3027
< 5	16	8		
≥ 5	45	13		
CD4 Count			3.9093	0.0480*
<500	46	11		
≥ 500	15	10		
ARV Years			0.1079	0.7426
< 5	18	7		
≥ 5	43	14		

* Statistically significant

From Table 4.32, it can be observed that there was an association between tribe and

CD-4 Count ($P < 0.05$) of the study participants with the good perceived control scores i.e those who were from other tribes were more likely to good perceived control scores on antibiotic misuse compared to those who were Hausa by tribe. And those who have CD-4 count of more than 500 were more likely to have good perceived control scores on antibiotic misuse compared to those who had CD-4 count less than five hundred. However, other individual factors such as age, sex, marital status, occupation, level of education, religion, duration with disease (years), years ARV's started considered in this study remains not statistically associated with poor attitude scores on antibiotic misuse.

4.5 Multiple Logistic Regression

After adjusting for the confounding effects using multivariate analysis as presented in Table 4.33; it was observed that marital status of married (AOR = 2.01, 95%CI = 1.67 – 3.99), this implies that the odd for having knowledge of antibiotics misuse and resistance among the intervention group for married is 2.01 times higher than for others that are not married. Occupation of employed (AOR = 4.00, 95%CI = 1.17 – 10.27) implying that the odd for having knowledge of antibiotics misuse and resistance among the intervention group for participant who are employed is 4.00 times higher than for those that are not employed. In addition, educational status of secondary school and beyond had (AOR = 1.95, 95%CI = 1.45 – 4.18), implying that the odd for having knowledge of antibiotics misuse and resistance among the intervention group for participant with secondary and above is 1.95 times higher than for others that had primary and below level of education and years ARV's started (AOR = 2.12, 95%CI = 1.77 – 7.88) remain predictors of good knowledge on antibiotic misuse among the study participants in the intervention group. This implies that the odd for having knowledge of antibiotics misuse and resistance among the intervention group

for participant whose years of ARV's started greater than or equal to 5 years is 2.12 times higher than those who had less than 5 years.

Table 4.33: Logistic Regression analysis of predictors of knowledge of antibiotics misuse and self-medication among the intervention group respondents

Predictor	Crude OR(95% CI)	Adjusted OR (95% CI)	P-value
Marital Status			
Married	1.83(0.76-3.16)	2.01(1.67-3.99)	< 0.05
Occupation			
Employed	5.03(1.05-12.11)	4.00(1.17-10.27)	< 0.05
Education			
Secondary and below	1.76(0.23-3.17)	1.95(1.45-4.18)	< 0.05
Diagnosis(Years)			
>= 5	1.45(0.74-4.45)	3.10(1.32-5.66)	> 0.05
CD4 Count			
>= 500	0.75(0.23-0.98)	0.51(0.46-2.76)	> 0.05
ARV Years			
>= 5	1.86(1.11-5.78)	2.12(1.77-7.88)	< 0.05

Table 4.34: Logistic Regression analysis of predictors of poor attitude scores on antibiotics misuse among the intervention group

Predictor	Crude OR(95% CI)	Adjusted OR (95% CI)	P-value
Marital Status			
others			
Married	2.75(0.87-5.23)	3.11(1.23-4.56)	< 0.05
Occupation			
Unemployed	Referent		
Employed	3.02(1.05-8.25)	2.75(0.79-6.34)	> 0.05
Education			
Primary and below	Referent		
Secondary and below	4.23(0.98-7.71)	3.99(2.76-9.54)	< 0.05
Religion			
Islam	Referent		
Christianity	4.76(0.87-7.76)	4.15(0.67-9.33)	> 0.05
Diagnosis(Years)			
< 5	Referent		
>= 5	1.77(0.56-3.99)	2.12(1.88-4.18)	< 0.05
CD4 Count			
<500	Referent		
>= 500	1.35(0.87-2.88)	1.02(0.75-3.37)	> 0.05
ARV Years			
< 5	Referent		
>= 5	2.87(0.93-5.78)	3.00(2.11-6.44)	< 0.05

After adjusting for the confounding effects using logistic regression analysis as presented in table 4.34; marital status of married (AOR=3.11, 95% CI= 1.23 – 4.56), this implies that the odd for having poor attitude on anti-biotic misuse among the intervention group for married is 3.11 times higher than for others that are not married. The educational status of secondary school and beyond (AOR=3.99, 95%CI=2.76 – 9.54), implying that the odd for having poor attitude on anti-biotic misuse among the intervention group for participant with secondary and above is 3.99 times higher than for others that had primary and below level of education. The duration with the diseases (AOR=2.12, 95%CI= 1.88 – 4.18). This means that the odd for having poor attitude on anti-biotic misuse among the intervention group for

participant who had the disease above 5 years is 2.12 times higher than for the participant who had the disease below 5 years. Similarly, years ARV's started (AOR=3.00, 95%CI=2.11 – 6.44) implying that the odd for having poor attitude on anti-biotic misuse among the intervention group for participant whose years of ARV's started greater than or equal to 5 years is 3 times higher than those who had less than 5 years. This implies that marital status, education, duration with disease and years ARV's started remained significant predictors of poor attitude scores on antibiotic misuse among the study participants in the intervention group.

Table 4.35: Multivariate (Logistic Regression) analysis of predictors of good perceived control scores on antibiotics misuse among the intervention group

Predictor	Crude OR(95% CI)	Adjusted OR (95% CI)	P-value
Marital Status			
Married	1.88(0.65-4.66)	2.03(1.15-6.33)	< 0.05*
Occupation			
Employed	4.46(0.86-6.76)	4.03(1.28-9.13)	< 0.05*
Education			
Secondary and below	2.87(0.66-8.16)	2.51(1.24-11.34)	< 0.05*
Tribe			
Others	2.11(0.57-5.43)	2.75(0.89-7.76)	> 0.05
Diagnosis(Years)			
>= 5	3.57(0.77-6.88)	3.01(1.23-8.24)	< 0.05*
CD4 Count			
>= 500	1.25(0.46-3.79)	1.88(0.95-4.54)	> 0.05
ARV Years			
>= 5	2.23(0.65-9.12)	4.01(0.81-12.11)	> 0.05

* Statistically

After adjusting for the confounding effects using logistic regression analysis; marital

status of married (AOR=2.03, 95%CI= 1.15 – 6.33). This implies that the odd for having good perceived control on antibiotic misuse among the study participants in the intervention group for married respondents is 2.03 times higher than the odds for others that are not married. The occupation of employed (AOR=4.03, 95%CI= 1.28 – 9.13), this implies that the odd for having good perceived control scores on antibiotic mis- use among the study participants in the intervention group for employed respondents is 4.03 times higher than the odds for unemployed. Similarly, educational status of secondary school and beyond (AOR=2.51, 95%CI=1.24 – 11.34) implying that secondary school and beyond have higher odd of having good perceived control scores on antibiotic misuse among the study participants in the intervention group than those having primary and below. Duration with the diseases had (AOR=3.01, 95%CI= 1.23 – 8.24) implying that duration with the disease have higher odd of having good perceived control scores on antibiotic misuse among the study participants in the intervention group. This implies that marital status, occupation, education, duration with disease (years) re- main predictors of good perceived control scores on antibiotic misuse among the study participants in the intervention group.

4.6: Discussion

This study aimed to determine the effectiveness of health education as an intervention strategy in preventing antibiotics misuse and self-medication among HIV-positive adults in Bauchi state Nigeria. The profiles of demographic factors of study respondents revealed a total of 170 respondents were enrolled in the study. The sample size of this study presents a challenge as it appears low. However, this sample size was attributed to the ambitious effect size of 30 that was targeted in the computation of this study's sample size. Previous studies have shown that a study with high practical significance like ours are best done with large effect size (Serdar et al., 2021), and even a sample size like ours is capable of detecting effects of the intervention (Sullivan & Feinn, 2012). Looking at the age distributions of the respondents in this study, only 10(11.8%) and 8(9.4%) of the study participants in the intervention and controls group were between the age of 21–25years; while 22(25.9%) and 24(28.2%) of the respondents in the intervention and control group were between the age of 26–30 years; majority of the respondents 27(31.8%) and 25(29.4%) in the intervention and control group correspondingly were between the age of 31 – 35 years, signifying there are more HIV positive adults enrolled on antiretroviral therapy within the age group in both places where recruitment were done. This finding was similar to a previous evidence reported on the epidemiology of HIV in Nigeria which shows higher percentage of HIV seropositivity among people within the age brackets of 31–40 years (Awofala & Ogundele, 2018); while 15(17.6%) and 16(18.8%) of the participant in the intervention and control group were amongst the age bracket of 36–40 years and 11(12.9%) and 12(14.1%) of the participant in the intervention and controls group were above 40 years. This study further shows there were more females recruited with 48(56.5%) and 45(52.9%) recruited in the intervention and

controls groups respectively as compared to males' participants who are 37(43.5%) and 40(47.1%) recruited in the interventions and control groups respectively. Since the study participants were both recruited at a HIV treatment center, this sex distribution further shows more females HIV positive adults presenting for care at the antiretroviral therapy centers in the study compared to males HIV positive adults. Our findings are similar to figures from previous national surveys on HIV by sex distributions in Nigeria (Lo et al., 2021). A previous intervention study among study respondents living with HIV in Bauchi state Nigeria have also found more females than males among respondents (Babayo et al., 2020). This finding could also be due to the fact that more females than males seek for HIV care at hospitals in Nigeria, whereas males tends to seek for alternative treatment from traditional institutions (Oche et al., 2018). Another plausible explanation of why there are more females seeking for HIV care and treatment than males in our study sites could be due to issues to do with stigma. Previous studies have reported men having more stigma than females in Nigeria. In a study on impact of stigma on HIV treatment, Odimegwu et al shows Men have significantly higher levels of stigma than females (Odimegwu et al., 2017), this finding was similar two other previous research works(Augustine Bala et al., 2022)and (Ataro et al., 2020). Comparison of our findings based on marital status revealed that 15(17.6%) and 17(20.0%) of the participant in the interventions and controls groups were single; while 34(40.0%) and 35(41.2%) of the participant in the interventions and controls groups were married; 16(18.8%) and 14(16.5%) of the participant in the intervention and control group were divorced; 10(11.8%) and 12(14.1%) of the participant in the intervention and control group were separated and 10(11.8%) and 7(8.2%) of the participant in the interventions and controls groups were widowed. The findings revealed majority of married women and men were enrolled in

the study compared with single and divorced among both Intervention and control groups. This may be due to the fact that being married can reinforce the decision to enrolled for HIV care in Nigeria. Previous study have shown higher prevalence of HIV among singles compared with married women and me which is contrary to the findings of our study (Fagbamigbe et al., 2016). On analysis of the occupation status of our respondents, we found that 12(14.1%) and 15(17.6%) of the participant in the intervention and control group were students; 10(11.8%) and 12(14.1%) of the participant in the intervention and control group were unemployed; 25(29.4%) and 21(24.7%) of the participant in the intervention and controls group respectively were self-employed and 38(44.7%) and 37(43.7%) of the participant in the intervention and control group were employed. This showed, the majority of respondents enrolled for the HIV care and treatment at our study centers were either employed or self-employed. Hitherto, HIV infection has been associated with low socioeconomic status, being unemployed and illiterate and downtrodden members of the society (Aridoss et al., 2020). However, there are shifting trends in the socio-economic status of the population living with HIV globally and in areas worse hit by the pandemic. A previous study shows high prevalence of HIV among people who are gainfully employed (Burgos-Soto et al., 2020). This shifting socio-economic trends might be partly due to increased access to (HAART). Nigeria is one of such countries where a significant progress has been made in access to HAART in the last 3 decades since the introduction of HAART (Boyd et al., 2021)(Adeyinka et al., 2018). Such progress permits HIV-positive adults to live longer and be gainfully employed as being on HAART permits an improvement in the worth of life among individuals living with HIV (Kurniawati et al., 2021)(Pimentel et al., 2020). These research findings further show 25(29.4%) and 27(31.8%) of the participant in the intervention and control

group had no educational background at all; 15(17.6%) and 14(16.5%) of the participant in the intervention and control group had informal education; 27(31.8%) and 22(25.9%) of the participant in the intervention and control group had primary education; 11(12.9%) and 10(11.8%) of the participant in the Intervention and control group had secondary education; 7(8.2%) and 12(14.1%) of the participant in the intervention and controls group respectively had post-secondary education. Furthermore, our finds based on the results of the analysis of religious beliefs of the study participants revealed that 64(75.3%) and 66(77.6%) of the participant in the Intervention and resistor group were in Islam and 21(24.7%) and 19(22.4%) of the participant in the intervention and control group were in Christianity. These results could be attributed to the fact that the study was carried out in a Muslims dominated geographical part of Nigeria. Bauchi state is located in the northeast of Nigeria. The region is traditionally Muslims majority area even though there is no national statistics on people's faiths inclination in Nigeria because religion was removed from the official census register in Nigeria. However previous study conducted among individuals active with HIV in Bauchi state also found more Muslims enrolled than non-Muslims (Ibrahim et al., 2016). This study further shows that 55(64.7%) and 60(70.1%) of the participant in the Intervention and control group respectively were Hausa; 15(17.6%) and 12(14.1%) of the participant in the intervention and resistor group were Igbos; 9(10.6%) and 6(7.1%) of the participant in the intervention and resistor group respectively were Yorubas and 6(7.1%) and 7(8.2%) of the participant in the intervention and controls group belongs to other tribe. The three ethnic groups, Hausas, Yorubas and Igbos are the major ethnic groups in Nigeria. Of these, the Hausas are the most dominant ethnic groups in most parts of Northern states of Nigeria which includes Bauchi state. Also, our study shows the duration of individual's diagnosis with HIV

varies. The study reveals that 25(29.4%) and 20(23.5%) of the participant in the intervention and control group had their disease diagnosis within 1 -5 years; while 36(42.4%) and 31(36.5%) of the participant in the Intervention and control group respectively had their disease diagnosis between 6 – 10 years and, 24(28.2%) and 34(40.0%) of the participant in the intervention and control group had their disease diagnosis for more than 10 years. The findings therefore sub-categorized the respondents into 3 distinct categories. The majority of the study participants in the intervention group were diagnosed between 6-10years as at time of this study. While those diagnosed between 1-5 years and those more than 10 years as at time of this study were almost same in proportion, 29.4% and 28.2% respectively. Based on the CD-4 count assessment of the respondents, this study shows 15(17.6%) and 20(23.5%) in the intervention and controls group respectively had CD-4 count less than 200; while 41(48.2%) and 36(42.4%) in the intervention and rheostat group respectively had CD-4 count between 200 – 500 and 29(34.1%) each in the intervention and control group had CD-4 count more than 500. This study, therefore, shows about 80% of the respondents have a CD-4 cells count above 500 which portrays and improved quality of life among the respondents. This finding of remarkable CD-4 cells count was corroborated by the fact that only 26(30.6%) and 30(35.3%) of the participant in the intervention and control group reported that there ARV's started less than 5 years whereas 59(69.4%) and 55(64.7%) of the participant in the intervention and control group started their ARV's had been on antiretroviral therapy for more than a decade.

This study has established the magnitude of antibiotics misuse and self-treatment among people living with HIV for the first time in Bauchi state Nigeria. At baseline, our study found the magnitude of antibiotics misuse and self-treatment among the study

respondents to be 67.1% and 64.7% respectively. Although there was no similar studies assessing antibiotics misuse and self-medication in the same locality, previous study on antibiotics self-treatment among college students in Bauchi reveals a prevalence of 41% (Misau et al., 2019), our study found a higher prevalence compared with the prevalence among college students likely because our respondents were from a diseased population who are more likely to misuse antibiotics than college students. Another study of antibiotics self-treatment in a general population in Kano state which shares a contiguous geo- graphic border with Bauchi state found a prevalence range of 41%-45% (Yusuf et al., 2019).

This study further showed low level of knowledge about good appropriate use of antibiotics and self-medication among respondents at baseline. Only 47% of our respondents in intervention group had good knowledge of antibiotics use and self-medication at baseline. Also only about 40% of our respondents in control group had good knowledge of antibiotics use and self-medication at baseline. Likewise, there was evident good appetite for antibiotics misuse and self-medication among the study participants as it can be observed that about three quarter of the study participants in both the intervention (74.1%) and control (76.5%) group have good attitude on antibiotic misuse at baseline. While only about 25.9% in the Intervention group and 23.5% in the control group have poor attitude on antibiotic misuse at the baseline. A recent African study in 2020 by Sindato et al have found similar poor knowledge of antibiotics misuse and good attitude towards antibiotics misuse and self-treatment practice among study respondents (Sindato et al., 2020). Another study on risk factors and problems associated with antibiotics resistance in African countries identifies poor knowledge, high attitude and ease of access among most significant contributors to high burden of antibiotics misuse and self-treatment among

especially people with HIV/AIDS in Africa (Byarugaba, 2004). On analysis of the variables or statements on the perceived control of self-antibiotics medication among the study participants in both the intervention and control groups, we found varied responses ranging from cost-effectiveness to previous experience with friends or relatives as well as part of self-care. Specifically, 74(87.1%) of our respondents in the intervention group and a corresponding 82.4% of the respondents in the control group reported ease of availability; while 75(88.2%) in the intervention and control group reported cost-effectiveness; 63(74.1%) in the Intervention and 65(76.5%) in the rheostat group reported previous experience in friend or relative; 72(84.7%) in the intervention and 71(83.5%) in the control group reported ease of access; 63(74.1%) in the intervention and 62(72.9%) in the control group reported part of self-care and 73(85.9%) in the intervention and 70(82.4%) in the control group reported saves time. However, we found proportion of the frequency count for prior knowledge of condition or problem was below 50% in both intervention and control groups. Cumulatively, we found that only slightly about one quarter of the study participants in intervention 27.1% and a corresponding 30.6% of the respondents in control group have good perceived control on antibiotic misuse at baseline. Majority of the study participants in the intervention group (72.9%) and corresponding (69.4%) in the control group have poor perceived control on antibiotic misuse at baseline. We conducted a bivariate analysis of our baseline findings to enable us to compare our participants in the intervention and control groups to see if the two arms are similar or an association exists between the two groups. The steps taken to compare two groups of study participants is a necessary procedure aimed at ensuring quality and minimizing bias. This is applicable to both randomized or non-randomized groups provided an intervention is intended in the

study (Deeks et al., 2003).

The first bivariate analysis done was for the results of data analysis on the relationship between socio-demographics characteristics of participants in the interventions and controls group at baseline. The individual factor variables of age, sex, marital status, occupation, education, religion, tribe, duration of disease, duration on antiretroviral drugs and CD-Cells count were compared using χ^2 tests between intervention and control groups at starting point. The results of the analysis across all included socio-demographic variables between intervention and control groups reveals no statistically significant re-relationship in all the parameters related to individual factors and health status of the study participants in both the Intervention and control group. On comparing the age groups of the two groups shows a $\chi^2 = 0.9771$ and P-value = 0.4618 (P-value > 0.005) Hence there was no relationship with age groups of the two intervention and control groups. Also comparing the sex groups of the two groups shows a $\chi^2 = 0.2137$ and P – value = 0.6439 (P – value > 0.005) Hence there was no relationship in the sex distribution between the intervention and control groups. On comparing the marital status of the two groups shows a $\chi^2 = 0.9841$ and P – value = 0.9122 (P – value > 0.005) Hence there was no association in marital status distribution between the intervention and control groups. Also, On comparing the occupation status by categories of the two groups shows a $\chi^2 = 0.8763$ and P – value = 0.8311 (P – value > 0.005) Hence there was no association in the occupational status by categories distribution between the Intervention and control groups. Also On comparing the educational status by categories of the two groups shows a $\chi^2 = 1.98850$ and P – value = 0.7385 (P – value > 0.005) Hence there was association in the educational status by categories distribution between the

intervention and control groups. Also On comparing the religion by categories of the two groups showed a $\chi^2 = 0.1308$ and P – value = 0.7176 (P – value > 0.005) Hence there was no association in the distribution of religion by categories between the intervention and resistor groups. Also, On comparing the tribe by categories of the two groups shows a $\chi^2 = 1.2276$ and P – value = 0.7468 (P – value > 0.005) Hence there was no association in the distribution of tribes by categories between the Intervention and control groups. Furthermore, on comparing the duration of disease diagnosis by categories of the two groups shows a $\chi^2 = 2.6528$ and P – value = 0.2654 (P – value > 0.005) Hence there was no association in the distribution of duration of disease diagnosis by categories between the Intervention and control groups. This means that, the two groups were comparable at starting point. This means that, the two groups were comparable at baseline. This finding permits progression to further analyzed findings from the study participants. In addition, On comparing the respondents CD-4 cells count by categories of the two groups shows a $\chi^2 = 1.0390$ and P – value = 0.5948 (P – value > 0.005) Hence there was no association in the distribution of CD-4 Cells count by categories between the Intervention and control groups. Lastly, on comparing the respondent's duration on ARVs by categories of the two groups shows a $\chi^2 = 0.4261$ and P – value = 0.5139 (P – value > 0.005) Hence there was no association in the distribution of duration on ARVs by categories between the intervention and control groups. This means that, the two groups were comparable at baseline. This finding permits progression to further analyzed findings from the study participants. However, arguments do exist about the use of P-Value as a statistical measurement of comparison between the two groups in an intervention studies at baseline. Harvey for instance argue that P-Value in

baseline group comparison is un-necessary since it does not test any hypothesis (Harvey, 2018). However use of P-Value to compare groups in intervention studies at baseline remains one of the most acceptable measures of ensuring participants are similar and subsequent analysis are valid (Prieto-Gómez et al., 2022) Furthermore, a statistical test of significance shows the respondents in this study had no difference in their levels of magnitude of self-treatment and antibiotics misuse. The results of the analysis showed that about two third of the study participants in both the intervention (67.1%) and control (64.7%) group uses antibiotics without prescription (self-medication). However, there was no association between the intervention and control groups in terms of prevalence of self-treatment with antibiotics because $\chi^2 = 0.1047$, P-value = $0.7463 > 0.05$. On testing for differences in terms of knowledge of antibiotics misuse and self-treatment, our analysis of comparison of aggregate knowledge score between intervention and control group at baseline shows more than half of the study respondents in both the study (55.3%) and control (52.9%) group have poor knowledge on antibiotic misuse at base- line. However, the $\chi^2 = 0.0948$, P – value = $0.8582, > 0.05$ indicates that, there was no association between the intervention and control groups in terms of knowledge of antibiotics misuse and resistance at baseline. Similarly our analysis of attitude scores at baseline shows that about three quarter of the study participants in both the intervention (74.1%) and control (76.5%) group have good attitude on antibiotic misuse at baseline. However, the chi-square value of 0.1265 with P – value = 0.7221 which is > 0.05 indicates that there was no association between the intervention and control groups in terms of attitude scores of antibiotics misuse and self-medication. Our analysis of findings from this study further shows at base- line, only slightly about one quarter of the study participants in intervention (27.1%) and control (30.6%) group have good perceived control on antibiotic misuse.

As in the prevalence, knowledge and attitudinal comparisons, however, the chi-square value of 0.1161 with $P - \text{value} = 0.7333$ which is > 0.05 indicates that there was no relationship between the intervention and control groups in terms of perceived control scores of antibiotics misuse and self-medication at baseline. Cumulatively, we conclude that our subjects are similar in all variables studied (socio-demographic characteristics and components reflecting our study objectives) at baseline and hence we proceeded with post intervention analysis of findings from the study. We statistically compared prevalence of antibiotics misuse and self-medication between treatment and control groups post-intervention. We found that only about one quarter of the intervention (24.2%) and nearly three quarter in the control (67.5%) group of the study participants uses antibiotics without prescription (self-medication) after intervention. However, there was a relationship between the Intervention and control groups in terms of magnitude of self-treatment with antibiotics $\chi^2 = 30.8117$, $P - \text{value} 0.0001 < 0.05$. Many previous studies have scrutinized the effects of educational intervention in preventing antibiotics misuse and self-medication. However, unlike our studies, previous studies largely focused on the effectiveness of educational intervention in improving knowledge and attitudes towards antibiotics misuse and self-treatment. For instance, in a study in Saudi Arabia (Shehadeh, Suaifan, Darwish, Wazaify, Zaru, & Aljafari, 2012), shows a statistically significant impact of health education in improving knowledge on antibiotics misuse and self-medication with post-intervention knowledge score shifting from 59.4% (20.3) to 65.9% (17.9), $p < 0.001$ (t - test). This finding agrees with our results which shows that more than three quarter of the respondents in the Intervention (76.8%) group and less than half of the respondents in the control (47.0%) have good knowledge on antibiotic misuse and self-medication at post-intervention. However,

the $\chi^2 = 15.5662$, P – value $0.0008 < 0.05$ implies that there was a relationship between the intervention and control groups in terms of aggregate knowledge scores of antibiotics misuse and Self-treatment. Another previous study in Ecuador by Juan-Carlos Maldonado et al found a statistically significant benefit of educational intervention in increasing good knowledge on antibiotics misuse and self-treatment. The beneficial effects of educational intervention for treatment group was found in both long-term and short-term comparisons with control groups (Maldonado et al., 2007). Another previous quasi experimental study found a relationship in good knowledge of antibiotics misuse and self-medication in a study in Iran (Kouhpayeh et al., 2017). Similar findings were also reported by Nisha et al (Jha et al., 2018), and Bbosa et al (Kouhpayeh et al., 2017). We further analyzed the attitude of respondents towards antibiotics misuse and self-treatment across the treatment and control groups. The results of data analysis for the comparison of the aggregate attitude score between intervention and control group at post-intervention shows that one quarter of the study participants in the intervention (25.6%) and more than three- quarter in the control (77.1%) group have good attitude on antibiotic misuse at post- intervention. This finding contrasted the pre-intervention result which shows higher proportions of participants in both groups having good attitude for antibiotics misuse and self-medication. Interestingly, there was a relationship between the intervention and control groups in the aggregate attitude scores of antibiotics misuse and self-medication ($p < 0.0001$ i.e $p < 0.05$) A previous study, "Preferences based interventions to address the use of antibiotics without written prescription: A discrete choice experiment" agrees with our findings on the post-intervention effects of health education on antibiotics self-medication and misuse (Aponte-González et al., 2021), the study concludes educational interventions significantly reduces good attitude towards

antibiotics misuse and self-medication which in-turn drives motivation of the self-medication behavior. Similarly, a recent study conducted in 2021 shows significant impact of educational intervention in changing attitudes on antibiotics misuse and self-medication, shifting the respondents from good attitude to poor attitude (J. Chen et al., 2020)(Mallah et al., 2020) (Napolitano et al., 2013). Similar trend and consistency has been seen in most previous studies, relating health education with changes in attitude towards antibiotics misuse and self-medication (Aslam et al., 2021)(Shaamekhi et al., 2019)(Ambusaidi et al., 2022). However, we further analyzed the respondents' results on perceived control for beliefs for antibiotics misuse and self-medication. Specifically, we compared aggregate perceived control scores between intervention and control group at post-intervention. Even though we observed that about three quarter of the study participants in the intervention (74.4%) and slightly more than one quarter of the study participants in control (27.1%) group had good perceived control scores on antibiotic misuse. However, there was no association between the intervention and control groups in terms of perceived control scores of antibiotics misuse and self-treatment at post-intervention ($p=0.5182$ i.e $p>0.05$). Interestingly we do not find a previous literature with contrasting findings from what we obtained. We take further steps to test the effects of our intervention, after we compared all the variables we measured (prevalence, knowledge, attitude and control beliefs of antibiotics misuse and self-medication) between intervention and control groups, we then compared same variables within the intervention group only. Interestingly, our findings shows that the magnitude of self- treatment with antibiotics among the intervention group which was 67.1% at baseline, and which changed to 24.4% at post-intervention was found to be statistically significant $\chi^2 = 30.5796$, P – value $0.0001 < 0.05$. We found a similarly association difference in the aggregate

knowledge scores on self-medication with antibiotic which was 44.7% at baseline which changed to 76.8% at post-intervention. The chi-square value of 10.0118 with p-value = 0.00022 < 0.05 implies there is an association in the aggregate knowledge scores for self-antibiotic medication among the intervention group of participants at starting point and after-intervention. Also, the aggregate good attitude scores on self-medication with antibiotic among intervention group respondents was 74.1% at baseline which changed to 25.6% at post-intervention, was found to be statistically significant ($p < 0.0001$). This change to poor attitude on self-medication will make participants to decrease self-medication with antibiotics. Most previous studies only assessed comparison between intervention group and control group (Kandeel et al., 2014). But we test for association difference within the same intervention group to assess within group difference. Interestingly, despite lack of an association on comparison between intervention and control groups, however, aggregate perceived control scores within intervention group which was 27.1% at baseline which changed to 74.3% at post-intervention was then found to have an association ($p < 0.0001$). The significance difference in good score of perceived control implies that, the study participants in the intervention control are able to decrease self-medication with antibiotics. On assessment of the control group, we did not find a relationship across all the variables on comparison at baseline and post-intervention. Also, on test of predictors of antibiotics misuse and self-medication prevalence, no socio-demographic characteristic was found to be statistically significant. However, our analysis revealed that there was a relationship between occupational status of the study participants and knowledge of antibiotic misuse (chi-square = 5.3143, p-value = 0.0220). The employed participants were more likely to have good knowledge on antibiotic misuse compared to unemployed participants. Other individual factors such as age in years, gender, marital

status, education level, religion, tribe, duration with disease, CD-4 and years ARV's started had p-value greater than 0.05, implying that there was no statistically associated with knowledge of antibiotic misuse

Our analysis further revealed that there was an association between religion, years ARV's started of the study participants with the poor attitude scores (p-value < 0.05) That is those who practice Christianity were more likely to have poor attitude scores on antibiotic misuse compared to those who practice Islam. And those who spent more than five years on ARV's were highly likely to have poor attitude scores on antibiotic misuse compared to those who had less than five years on ARV's. Other individual factors such as age years, sex, marital status, occupation, education, tribe, duration with disease (years), CD-4 count, remains not statistically associated with poor attitude scores on antibiotic misuse. Poor attitude to antibiotic misuse will discourage patients from practicing self-medication (antibiotic misuse) (p-value > 0.05). There was also an association between tribe and CD-4 Count (p<0.05) of the study participants with the good perceived control scores i.e those who were from other tribes were more likely to good perceived control scores on antibiotic misuse compared to those who were Hausa by tribe. And those who have CD-4 count of more than 500 were more likely to have good perceived control scores on antibiotic misuse compared to those who had ICD-4 count less than five hundred. However, other socio-demographic variables such as age (years), sex, marital status, occupation, education, religion, duration with disease (years), years ARV's started considering in this study remains not statistically associated with poor attitude scores on antibiotic misuse.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

In summary, this study has provided robust scientific evidence on the efficiency of health education in reducing antibiotics misuse and self-treatment among HIV positive adults in Nigeria. Findings from this study have implications on HIV care and management not only in Nigeria but in most developing countries. The study employed short term health education intervention which by being a cost-effective intervention is more affordable for most middle and under-developed nations to implement.

Specific Objective one:

This study has for the first time found high magnitude of antibiotics misuse and self-medication among HIV positive adults in the study area.

Specific Objective two

Some socio-demographic factors remain statistically significant determinants of antibiotics misuse and self-medication after adjustment for confounders in a multiple logistics regression analysis. These socio-demographic characteristics include marital status, education, occupation, duration of diagnosis of HIV infection and duration of antiretroviral drugs use.

Specific Objective Three

There were no significant difference in the respondent's levels of knowledge, attitudinal beliefs and perceived control beliefs on antibiotics misuse and self-medication among respondents in intervention and control groups at baseline.

Specific Objective Four

Following this finding, an intervention of health education has led to a substantial decline in the magnitude of antibiotics misuse and self-medication post intervention

among experimental group participants compared with control groups.

5.2 Recommendations

Until the coming of this work, strategies for reducing antibiotics misuse and self-medication remains scarce, especially in sub-Saharan Africa, including Nigeria. Identifying cost-effective interventions to reduce and prevent antibiotics misuse and self-medication among PLHA will provide the possibility of improving quality of life and reduction in public health burden of morbidity and mortality.

5.2.1 Recommendations for health care providers:

1. Based on findings from this study, targeted health education by health care providers segregated by occupation of HIV positive adults' clients, their marital status, their educational status, disease stage and duration on antiretroviral drugs is recommended during clinic encounters.
2. Furthermore, behavior change communication messages can be delivered by health educators during home visits to such targeted groups aim at reinforcing message against antibiotics misuse and self-medication. Such health educators s can provide positive behavior change message during social gatherings in the communities.
3. Integration of health education against antibiotics misuse and self-medication during routine HIV care clinic days is also recommended. Such health education can be delivered before drug refills, by counselors who provide other health education and promotion sessions such as nutrition and drug adherence.
4. Use of Information, Education and Communication materials in clinics and public places will also enable HIV positive adults adopts and internalize positive behavior change towards antibiotics misuse and self-medication.

5.2.2 Recommendations for community advocacy

1. To encourage and motivate community participation and advocacy against antibiotics self-medication among HIV positive adults, formation of clubs against self-medication by HIV positive adults is recommended in the light of findings from this study which suggest high prevalence of antibiotics misuse and self-medication among the study participants.
2. Targeted distribution of Information, Education and Communication materials such as posters hand flyers by community volunteers conveying messages against harmful effects of antibiotics misuse and self-medication is further recommended.

5.2.3 Recommendations for The Policy Makers

1. Provide available and sustainable health education against antibiotics misuse and self-medication by HIV positive adults through media outlets and posters at public places.
2. Institutionalize measures to discourage easy access of antibiotics in patent medicine stores and pharmacies.

5.2.4 Recommendations for Researchers

1. To further establish evidence, a long-term study on the impact of health education is recommended.
2. An assessment of effect of health education intervention after one year, two and five years will provide more evidence on the impact of the intervention.

REFERENCES

- Abasiubong, F., Bassey, E. A., Udobang, J. A., Akinbami, O. S., Udoh, S. B., & Idung, A. U. (2012). Self-medication: Potential risks and hazards among pregnant women in Uyo, Nigeria. In *Pan African Medical Journal* (Vol. 13). <https://doi.org/10.11604/pamj.2012.13.15.1454>
- Abdi, A., Faraji, A., Dehghan, F., & Khatony, A. (2018a). *Prevalence of self-medication practice among health sciences students in*. 1–7.
- Abdi, A., Faraji, A., Dehghan, F., & Khatony, A. (2018b). Prevalence of self-medication practice among health sciences students in Kermanshah, Iran. *BMC Pharmacology and Toxicology*, *19*(1), 36. <https://doi.org/10.1186/s40360-018-0231-4>
- Abduelkarem, A. R., Othman, A. M., Abuelkhair, Z. M., Ghazal, M. M., Alzouobi, S. B., & El Zowalaty, M. E. (2019). Prevalence of self-medication with antibiotics among residents in United Arab Emirates. *Infection and Drug Resistance*, *12*. <https://doi.org/10.2147/IDR.S224720>
- ABELLANOSA, I., & NICHTER, M. (1996). Antibiotic Prophylaxis Among Commercial Sex Workers in Cebu City, Philippines: Patterns of Use and Perceptions of Efficacy. *Sexually Transmitted Diseases*, *23*(5). https://journals.lww.com/stdjournal/Fulltext/1996/09000/Antibiotic_Prophylaxis_Among_Commercial_Sex.11.aspx
- Adeyinka, D. A., Olakunde, B. O., Morka, M., Oladimeji, O., & Agogo, E. A. (2018). HIV treatment scale-up: a critical step to controlling HIV epidemic in a resource-limited country. *Public Health*, *164*. <https://doi.org/10.1016/j.puhe.2018.07.016>
- Ajibola, O., Omisakin, O., Eze, A., & Omoleke, S. (2018). Self-Medication with Antibiotics, Attitude and Knowledge of Antibiotic Resistance among Community Residents and Undergraduate Students in Northwest Nigeria. *Diseases*, *6*(2), 32. <https://doi.org/10.3390/diseases6020032>
- Ajuoga, E., Sansgiry, S. S., Ngo, C., & Yeh, R. F. (2008). Use/misuse of over-the-counter medications and associated adverse drug events among HIV-infected patients. *Research in Social and Administrative Pharmacy*, *4*(3), 292–301. <https://doi.org/10.1016/j.sapharm.2007.08.001>
- Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), *Action Control From Cognition to Behavior* (Vol. 2, Issue 1, pp. 11–39). Springer.
- Ajzen, I., Netemeyer, R., Ryn, M. Van, Ajzen, I., Netemeyer, R., Ryn, M. Van, Ajzen, I., Netemeyer, R., & Ryn, M. Van. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Al-Azzam, S. I., Al-Husein, B. A., Alzoubi, F., Masadeh, M. M., & Al-Horani, M. A. S. (2007). Self-medication with antibiotics in Jordanian population. *International Journal of Occupational Medicine and Environmental Health*. <https://doi.org/10.2478/v10001-007-0038-9>

- Al-Hussaini, M., Mustafa, S., & Ali, S. (2014). Self-medication among undergraduate medical students in Kuwait with reference to the role of the pharmacist. *Journal of Research in Pharmacy Practice*, 3(1), 23. <https://doi.org/10.4103/2279-042X.132706>
- Al-Qahtani, A. M., Shaikh, I. A., Shaikh, M. A. K., Mannasaheb, B. A., & Al-Qahtani, F. S. (2022). Prevalence, Perception, and Practice, and Attitudes Towards Self-Medication Among Undergraduate Medical Students of Najran University, Saudi Arabia: A Cross-Sectional Study. *Risk Management and Healthcare Policy*, 15, 257–276. <https://doi.org/10.2147/RMHP.S346998>
- Albatti, T. H., Alawwad, S., Aldueb, R., Alhoqail, R., & Almutairi, R. (2017a). The self medication use among adolescents aged between 13–18 years old; Prevalence and behavior, Riyadh – Kingdom of Saudi Arabia, from 2014–2015. *International Journal of Pediatrics and Adolescent Medicine*, 4(1), 19–25. <https://doi.org/10.1016/j.ijpam.2016.05.001>
- Albatti, T. H., Alawwad, S., Aldueb, R., Alhoqail, R., & Almutairi, R. (2017b). The self medication use among adolescents aged between 13–18 years old; Prevalence and behavior, Riyadh – Kingdom of Saudi Arabia, from 2014–2015. *International Journal of Pediatrics and Adolescent Medicine*, 4(1), 19–25. <https://doi.org/10.1016/j.ijpam.2016.05.001>
- Alboush, A., Noah, M., Alfageah, M., Albitar, J., Alsharif, M., Bardisi, M., Kassab, H., & qader., N. (2017). THE PREVALENCE OF ANTIBIOTICS MISUSE AMONG SENIOR MEDICAL STUDENT AT UMM AL-QURA UNIVERSITY FACULTY OF MEDICINE, MAKKAH. *International Journal of Advanced Research*, 5(2), 429–432. <https://doi.org/10.21474/IJAR01/3167>
- Alhomoud, F., Almahasnah, R., & Alhomoud, F. K. (2018). “You could lose when you misuse” – factors affecting over-the-counter sale of antibiotics in community pharmacies in Saudi Arabia: a qualitative study. *BMC Health Services Research*, 18(1). <https://doi.org/10.1186/s12913-018-3753-y>
- Ali, A. S., Jandani, R., Al-Qahtani, A. A., & Alenzi, A. A. S. (2021). Preliminary findings of a study on the practice of self-medication of antibiotics among the practicing nurses of a tertiary care hospital. *Journal of Taibah University Medical Sciences*, 16(5). <https://doi.org/10.1016/j.jtumed.2021.05.001>
- Alkhuzaei, A. M. J. B., Salama, R. E., Eljak, I. E. I., Chehab, M. A., & Selim, N. A. (2018). Perceptions and practice of physicians and pharmacists regarding antibiotic misuse at primary health centres in Qatar: A cross-sectional study. *Journal of Taibah University Medical Sciences*, 13(1). <https://doi.org/10.1016/j.jtumed.2017.09.001>
- Allam, A. T., & Amer, S. M. (2020). Prevalence and factors influencing self-medication in Medina Al-Munawara, Saudi Arabia. *ARCHIVES OF PHARMACY PRACTICE*, 11(4).
- Alnemri, A. R., Almaghrabi, R. H., Alonazi, N., & Alfrayh, A. R. (2016). Misuse of antibiotic: A systemic review of Saudi published studies. *Current Pediatric Research*, 20(1–2).
- Alotaibi, N. N., Almutairi, M. D., & Al-Namshan, Y. Z. (2018). Misuse of Antibiotics

- Therapy in General Population of Saudi Arabia. *The Egyptian Journal of Hospital Medicine*, 70(6). <https://doi.org/10.12816/0044362>
- Alsuwat, B., & Shiromwar, S. (2020). Understanding of the Antibiotic Misuse among the General Public of Rafha City of Saudi Arabia. *Journal of Pharmaceutical Research International*. <https://doi.org/10.9734/jpri/2020/v32i2130762>
- Ambusaidi, A., Taylor, N., Quinn, F., Rizk, N., & Taylor, S. (2022). Omani senior secondary school students' knowledge of and attitudes to antibiotic resistance. *PLOS ONE*, 17(2), e0264500. <https://doi.org/10.1371/JOURNAL.PONE.0264500>
- Anderson, P. L., & Rower, J. E. (2010). Zidovudine and Lamivudine for HIV Infection. *Clinical Medicine Reviews in Therapeutics*, 2, a2004. <https://doi.org/10.4137/cmrt.s4557>
- Andrade, C. (2017). Propensity Score Matching in Nonrandomized Studies: A Concept Simply Explained Using Antidepressant Treatment During Pregnancy as an Example. *The Journal of Clinical Psychiatry*, 78(2), 15759. <https://doi.org/10.4088/JCP.17F11446>
- Andrade, C. (2021). The Limitations of Quasi-Experimental Studies, and Methods for Data Analysis When a Quasi-Experimental Research Design Is Unavoidable. *Indian Journal of Psychological Medicine*, 43(5), 451. <https://doi.org/10.1177/02537176211034707>
- Aponte-González, J., Brown, P., & Eslava-Schmalbach, J. (2021). Preferences based interventions to address the use of antibiotics without prescription: A discrete choice experiment. *Pharmacy Practice*, 19(3). <https://doi.org/10.18549/PHARMRACT.2021.3.2401>
- Aridoss, S., Jaganathasamy, N., Kumar, A., Natesan, M., Adhikary, R., & Arumugam, E. (2020). Socio-demographic factors associated with HIV prevalence among pregnant women attending antenatal clinics in six Southern States of India: Evidences from the latest round of HIV sentinel surveillance. *Indian Journal of Public Health*, 64, S26–S31. https://doi.org/10.4103/ijph.IJPH_60_20
- Arikpo, G., Eja, M., Arikpo, G., Eja, M., Medication, K. E. S., The, A., Experience, N., & Internet, T. (2009). Self Medication in Rural Africa: The Nigerian Experience. *International Journal of Health*, 11(1), 1–7.
- Armitage, C. J., & Christian, J. (2003). From attitudes to behaviour: Basic and applied research on the theory of planned behaviour. In *Current Psychology* (Vol. 22, Issue 3, pp. 187–195). <https://doi.org/10.1007/s12144-003-1015-5>
- Armitage, C. J., & Conner, M. (2001). Efficacy of the Theory of Planned Behaviour: a meta-analytic review. *The British Journal of Social Psychology / the British Psychological Society*, 40(Pt 4), 471–499. <https://doi.org/10.1348/014466601164939>
- Armitage, C. J., Conner, M., Loach, J., & Willetts, D. (2010). Different Perceptions of Control: Applying an Extended Theory of Planned Behavior to Legal and Illegal Drug Use. [Http://Dx.Doi.Org/10.1207/S15324834BASP2104_4](http://Dx.Doi.Org/10.1207/S15324834BASP2104_4), 21(4), 301–316. https://doi.org/10.1207/S15324834BASP2104_4

- Ashok Kumar, C., & Revannasiddaiah, N. (2018). Assessment of self-medication patterns in a rural area of south India: a questionnaire based study. *International Journal of Community Medicine and Public Health Int J Community Med Public Health*, 55(1), 354–360. <https://doi.org/10.18203/2394-6040.ijcmph20175812>
- Ashraf, M. S., & Cook, P. P. (2016). Antibiotic Misuse in Hospital, Outpatient, and Long-Term Care Settings. *North Carolina Medical Journal*, 77(5). <https://doi.org/10.18043/ncm.77.5.346>
- Aslam, A., Zin, C. S., Ab Rahman, N. S., Gajdács, M., Ahmed, S. I., & Jamshed, S. (2021). Self-medication practices with antibiotics and associated factors among the public of malaysia: A cross-sectional study. *Drug, Healthcare and Patient Safety*, 13, 171–181. <https://doi.org/10.2147/DHPS.S331427>
- Ataro, Z., Mengesha, M. M., Abrham, A., & Digaffe, T. (2020). <p>Gender Differences in Perceived Stigma and Coping Strategies Among People Living with HIV/AIDS at Jugal Hospital, Harar, Ethiopia</p>. *Psychology Research and Behavior Management*, 13, 1191–1200. <https://doi.org/10.2147/PRBM.S283969>
- Ateshim, Y., Bereket, B., Major, F., Emun, Y., Woldai, B., Pasha, I., Habte, E., & Russom, M. (2019a). Prevalence of self-medication with antibiotics and associated factors in the community of Asmara, Eritrea: A descriptive cross sectional survey. In *BMC Public Health*. <https://doi.org/10.1186/s12889-019-7020-x>
- Ateshim, Y., Bereket, B., Major, F., Emun, Y., Woldai, B., Pasha, I., Habte, E., & Russom, M. (2019b). Prevalence of self-medication with antibiotics and associated factors in the community of Asmara, Eritrea: A descriptive cross sectional survey. *BMC Public Health*, 19(1), 1–7. <https://doi.org/10.1186/S12889-019-7020-X/TABLES/4>
- Augustine Bala, N., Azman, A., & Singh, P. S. J. (2022). *The impact of gender discrimination and HIV stigma on women living in North Central Nigeria*. <Http://Www.Editorialmanager.Com/Cogentsocsci>; Cogent. <https://doi.org/10.1080/23311886.2022.2027612>
- Awada, S., Diab, B., Khachman, D., Zeidan, R. K., Slim, H., Zein, S., Al-Hajje, A., Kresht, J., Ballout, S., & Rachidi, S. (2020). Self-medication Practices and Knowledge among Lebanese Population: A Cross-sectional Study. *Dr. Sulaiman Al Habib Medical Journal*, 2(2), 56. <https://doi.org/10.2991/DSAHMJ.K.200507.002>
- Awofala, A. A., & Ogundele, O. E. (2018). HIV epidemiology in Nigeria. *Saudi Journal of Biological Sciences*, 25(4), 697–703. <https://doi.org/10.1016/J.SJBS.2016.03.006>
- Ayanwale MB, Okafor IP, O. O. (2017). Self-medication among rural residents in Lagos , Nigeria. *J Med Tropics*, 19, 65–71. <https://doi.org/10.4103/jomt.jomt>
- Ayepola, O. O., Onile-Ere, O. A., Shodeko, O. E., Akinsiku, F. A., Ani, P. E., & Egwari, L. O. (2019). Knowledge, Attitude and Pattern of Antibiotic Usage among Students of a Nigerian University. *Journal of Microbiology and*

- Ayodele, J. O. (2020). Drug Promotion and Self-Medication Practices in Lagos, Nigeria. *International Journal of Public Sociology and Socioterapy*, 1(1). <https://doi.org/10.4018/ijpss.20210101.oa1>
- Babatunde, O. A., Fadare, J. O., Ojo, O. J., Durowade, K. A., Atoyebi, O. A., Ajayi, P. O., & Olaniyan, T. (2016). Self-medication among health workers in a tertiary institution in South-West Nigeria. *Pan African Medical Journal*, 24, 1–8. <https://doi.org/10.11604/pamj.2016.24.312.8146>
- Babatunde, O. A., Fadare, J. O., Ojo, O. J., Durowade, K. A., Atoyebi, O. A., & Olaniyan, P. O. A. T. (2016). Self-medication among health workers in a tertiary institution in South-West Nigeria. *PAMJ*. 2016; 24:312, 24(312). <https://doi.org/10.11604/PAMJ.2016.24.312.8146>
- Babayo, A., Abdullahi, I. N., Safiyanu, M. B., Adekola, H. A., & Usman, J. N. (2020). Assessment of risk factors associated with HTLV-1/-2 infection among people living with HIV/AIDS in Bauchi State, Nigeria. *Alexandria Journal of Medicine*, 56(1), 27–31. <https://doi.org/10.1080/20905068.2020.1720970>
- Bai, Y., Wang, S., Yin, X., Bai, J., Gong, Y., & Lu, Z. (2016). Factors associated with doctors' knowledge on antibiotic use in China. *Scientific Reports*, 6. <https://doi.org/10.1038/srep23429>
- Balhuena, F. R., Aranda, A. B., & Figueras, A. (2009). Self-Medication in Older Urban Mexicans, Observational, An Study, Cross-sectional. *Drugs Aging*, 26(1), 51–61.
- Banerjee, I., & Bhadury, T. (2012a). *medical students in a tertiary care medical college , West Bengal*. 58(2), 127–132. <https://doi.org/10.4103/0022-3859.97175>
- Banerjee, I., & Bhadury, T. (2012b). Self-medication practice among undergraduate medical students in a tertiary care medical college, West Bengal. *Journal of Postgraduate Medicine*, 58(2), 127–131. <https://doi.org/10.4103/0022-3859.97175>
- Barker, A. K., Brown, K., Ahsan, M., Sengupta, S., & Safdar, N. (2017). Social determinants of antibiotic misuse: a qualitative study of community members in Haryana, India. *BMC Public Health*, 17(1). <https://doi.org/10.1186/s12889-017-4261-4>
- Bärnighausen, T., Oldenburg, C., Tugwell, P., Bommer, C., Ebert, C., Barreto, M., Djimeu, E., Haber, N., Waddington, H., Rockers, P., Sianesi, B., Bor, J., Fink, G., Valentine, J., Tanner, J., Stanley, T., Sierra, E., Tchetgen, E. T., Atun, R., & Vollmer, S. (2017). Quasi-experimental study designs series—paper 7: assessing the assumptions. *Journal of Clinical Epidemiology*, 89. <https://doi.org/10.1016/j.jclinepi.2017.02.017>
- Bärnighausen, T., Røttingen, J. A., Rockers, P., Shemilt, I., & Tugwell, P. (2017). Quasi-experimental study designs series—paper 1: introduction: two historical lineages. *Journal of Clinical Epidemiology*, 89. <https://doi.org/10.1016/j.jclinepi.2017.02.020>

- Bärnighausen, T., Tugwell, P., Röttingen, J. A., Shemilt, I., Rockers, P., Geldsetzer, P., Lavis, J., Grimshaw, J., Daniels, K., Brown, A., Bor, J., Tanner, J., Rashidian, A., Barreto, M., Vollmer, S., & Atun, R. (2017). Quasi-experimental study designs series—paper 4: uses and value. *Journal of Clinical Epidemiology*, 89. <https://doi.org/10.1016/j.jclinepi.2017.03.012>
- BASG. (2020). *History of Bauchi State*. History of Bauchi State. <https://www.bauchistate.gov.ng/history/>
- Behzadifar, M., Behzadifar, M., Aryankhesal, A., Ravaghi, H., Baradaran, H. R., Sajadi, H. S., Khaksarian, M., & Bragazzi, N. L. (n.d.). Prevalence of self-medication in university students: systematic review and meta-analysis. *EMHJ*, 26(7), 2020. <https://doi.org/10.26719/emhj.20.052>
- Belachew, S. A., Hall, L., & Selvey, L. A. (2021). Non-prescription dispensing of antibiotic agents among community drug retail outlets in Sub-Saharan African countries: a systematic review and meta-analysis. In *Antimicrobial Resistance and Infection Control* (Vol. 10, Issue 1). <https://doi.org/10.1186/s13756-020-00880-w>
- Bello, R. H., Agbo, E. B., & Olabode, H. O. K. (2011). Antibigram of bacteria and fungal isolates associated with Otitis media amongst children in Bauchi state, Nigeria. *International Journal of Pharma and Bio Sciences*, 2(3).
- Benmerzouga, I., Al-Zammy, S. A., Al-Shammari, M. M., Alsaif, S. A., Alhaidan, T. M., & Aljofan, M. (2019). Practices of patients consuming antibiotics and knowledge about antibiotic resistance in Hail region - Saudi Arabia. *Future Science OA*, 5(10). <https://doi.org/10.2144/fsoa-2019-0054>
- Bennadi, D. (2014a). Self-medication: A current challenge. *Journal of Basic and Clinical Pharmacy*. <https://doi.org/10.4103/0976-0105.128253>
- Bennadi, D. (2014b). Self - medication : A current challenge. *Journal of Basic and Clinical Pharmacy*, 5(1), 19–23. <https://doi.org/10.4103/0976-0105.128253>
- Berzanskyte, A., Valinteliene, R., Haaijer-Ruskamp, F. M., Gurevicius, R., & Grigoryan, L. (2006). SELF-MEDICATION WITH ANTIBIOTICS IN LITHUANIA. *International Journal of Occupational Medicine and Environmental Health*, 19(4), 246–253. <https://doi.org/10.2479/v10001-006-0030-9>
- Bhandari, A., Upadhyay, R., Joshi, A., Bajeta, D., Maher, D., Joshi, J., & Singh, K. (2018). Self-Medication Practices in Nursing Students. *International Journal of Science and Healthcare Research*, 3(June), 35–39.
- Biswas, J. C. T. (2013). How to Calculate Sample Size for Different Study Designs in Medical Research? *Indian Journal of Psychological Medicine*, 35(2), 121–126.
- Biudes, M. F., & Galato, D. (2014). Self-medication in patients living with HIV/AIDS: Little measured reality. *International Journal of Pharmaceutical Sciences Review and Research*, 25(2), 115–119.
- Borzoe., F., & et al. (2022). Prevalence Rate and Factors Related to Self- medication in Preventing COVID-19 Disease in Pregnant Women. *Scientific Journal of Medical Sciences*, 1(4), 157–162.

- Boyd, A. T., Ogbanufe, O., Onyenuobi, C., Mgbakor, I., Bachanas, P., Olupitan, O., Umeh, C., Adegboye, A., Owhonda, G., Odafe, S., Jahun, I., Dakum, P., Mensah, C., Gwamna, J., Onotu, D., Dirlikov, E., Williams-Sherlock, M., Okolo, C., Verinumbe, T., ... Swaminathan, M. (2021). Scale-up of antiretroviral treatment access among people living with HIV in Rivers State, Nigeria, 2019--2020. *AIDS (London, England)*, 35(7). <https://doi.org/10.1097/QAD.0000000000002858>
- Brata, C., Fisher, C., Marjadi, B., Schneider, C. R., & Clifford, R. M. (2016). Factors influencing the current practice of self-medication consultations in Eastern Indonesian community pharmacies: a qualitative study. *BMC Health Service Research*, 16(179), 1–11. <https://doi.org/10.1186/s12913-016-1425-3>
- Bulario, J. S., Cruz, I. L. P., Pilapil, M. C., & Gutierrez, M. M. (2018). Factors Associated with Parental Self-medication of Antibiotics in Health Centers of Manila. In *4th International Research Conference on Higher Education, KnE Social Sciences*, 3(6), 891–910. <https://doi.org/10.18502/kss.v3i6.2427>
- Burgos-Soto, J., Ben Farhat, J., Alley, I., Ojuka, P., Mulogo, E., Kise-Sete, T., Bouhenia, M., Salumu, L., Mathela, R., Langendorf, C., Cohuet, S., & Huerga, H. (2020). HIV epidemic and cascade of care in 12 east African rural fishing communities: Results from a population-based survey in Uganda. *BMC Public Health*, 20(1). <https://doi.org/10.1186/s12889-020-09121-6>
- Byarugaba, D. K. (2004). Antimicrobial resistance in developing countries and responsible risk factors. *Int J Antimicrob Agents.*, 24(2), 105–110. <https://doi.org/10.1016/j.ijantimicag.2004.02.015>
- Byrne, M. K., Miellet, S., McGlenn, A., Fish, J., Meedya, S., Reynolds, N., & Van Oijen, A. M. (2019). The drivers of antibiotic use and misuse: The development and investigation of a theory driven community measure. *BMC Public Health*, 19(1), 1–11. <https://doi.org/10.1186/S12889-019-7796-8/FIGURES/2>
- C O Omolase, O E Adeleke, & O Afolabi. (2007). SELF MEDICATION AMONGST GENERAL OUTPATIENTS IN A NIGERIAN COMMUNITY HOSPITAL. *Annal of Ibadan Postgraduate Medicine*, 5, 64–67.
- Cambaco, O., Alonso Menendez, Y., Kinsman, J., Sigauque, B., Wertheim, H., Do, N., Gyapong, M., John-Langba, J., Sevene, E., & Munguambe, K. (2020). Community knowledge and practices regarding antibiotic use in rural Mozambique: where is the starting point for prevention of antibiotic resistance? *BMC Public Health*, 20(1), 1–15. <https://doi.org/10.1186/S12889-020-09243-X/TABLES/6>
- Chanchala, H., S, Godhi., B., Nandlal, B., Raghavendra, S., & Bs. Sunita. (2016). Knowledge , attitude and practice of dental products by the out patients of dental college and hospital - questionnaire survey. *J Dent Specialities.*, 4(2), 147–152. <https://doi.org/10.18231/2393-9834.2016.0010>
- Chang, Y., Chusri, S., Sangthong, R., McNeil, E., Hu, J., Du, W., Li, D., Fan, X., Zhou, H., Chongsuvivatwong, V., & Tang, L. (2018). Clinical pattern of antibiotic overuse and misuse in primary healthcare hospitals in the southwest of China. *PLoS ONE*, 14(6). <https://doi.org/10.1371/journal.pone.0214779>

- Chanvatik, S., Kosiyaporn, H., Lekagul, A., Kaewkhankhaeng, W., Vongmongkol, V., Thunyahan, A., & Tangcharoensathien, V. (2019). Knowledge and use of antibiotics in Thailand: A 2017 national household survey. *PloS One*, *14*(8). <https://doi.org/10.1371/JOURNAL.PONE.0220990>
- Chen, H. H., Stringer, A., Eguale, T., Rao, G. G., & Ozawa, S. (2019). Impact of antibiotic resistance on treatment of pneumococcal disease in Ethiopia: An agent-based modeling simulation. *American Journal of Tropical Medicine and Hygiene*, *101*(5). <https://doi.org/10.4269/ajtmh.18-0930>
- Chen, J., Sidibi, A. M., Shen, X., Dao, K., Maiga, A., Xie, Y., & Hesketh, T. (2020). Lack of antibiotic knowledge and misuse of antibiotics by medical students in Mali: a cross-sectional study. *Expert Review of Anti-Infective Therapy*. <https://doi.org/10.1080/14787210.2021.1857731>
- Choi, J. S., & Kim, K. Y. (2019). Factors associated with preventive behaviors in the overuse and misuse of antibiotics in Korean nursing students. *American Journal of Infection Control*, *47*(6). <https://doi.org/10.1016/j.ajic.2018.11.006>
- Coleman, J. J., & Pontefract, S. K. (2016). Adverse drug reactions. *Clinical Medicine*, *16*(5), 481. <https://doi.org/10.7861/CLINMEDICINE.16-5-481>
- Concato, J., Shah, N., & Horwitz, R. I. (2000). Randomized, Controlled Trials, Observational Studies, and the Hierarchy of Research Designs. *New England Journal of Medicine*, *342*(25), 1887–1892. <https://doi.org/10.1056/NEJM200006223422507>
- Conner, M., & Armitage, C. J. (1998). Extending the Theory of Planned Behavior: A Review and Avenues for Further Research. *Journal of Applied Social Psychology*, *28*, 1429–1464. <https://doi.org/10.1111/j.1559-1816.1998.tb01685.x>
- Daini, B. O., Okafor, E., Baruwa, S., Adeyanju, O., Diallo, R., & Anyanti, J. (2021). Characterization and distribution of medicine vendors in 2 states in Nigeria: implications for scaling health workforce and family planning services. *Human Resources for Health*, *19*(1), 1–12. <https://doi.org/10.1186/S12960-021-00602-2/TABLES/5>
- Deeks, J. J., Dinnes, J., D’Amico, R., Sowden, A. J., Sakarovitch, C., Song, F., Petticrew, M., & Altman, D. G. (2003). Evaluating non-randomised intervention studies. *Health Technology Assessment*, *7*(27). <https://doi.org/10.3310/HTA7270>
- Demoré, B., Mangin, L., Tebano, G., Pulcini, C., & Thilly, N. (2017). Public knowledge and behaviours concerning antibiotic use and resistance in France: a cross-sectional survey. *Infection*, *45*(4). <https://doi.org/10.1007/s15010-017-1015-2>
- Djima, M. M., Ekouevi, D. K., Gregoire, J. P., Tchounga, B., Coffie, P. A., Tran, V. T., Touré, F. Y., & Moisan, J. (2019). Use of non-HIV medication among people living with HIV and receiving antiretroviral treatment in Côte d’Ivoire, West Africa: A cross-sectional study. *PLOS ONE*, *14*(9), e0221335. <https://doi.org/10.1371/JOURNAL.PONE.0221335>
- Dollar, C. B., & Hendrix, J. A. (2018). “I’m Not a Traditional Woman”: Tranquilizer

- Misuse as Self-Medication Among Adult Women. *American Behavioral Scientist*, 1–24, 000276421878702. <https://doi.org/10.1177/0002764218787027>
- Donald, B., & et al. (2016). Perception and practice of self-medication among non-clinical students. *The Nigeria Health Journal*, 16(4).
- Ebu, N. I., Amissah-Essel, S., Asiedu, C., Akaba, S., & Pereko, K. A. (2019). Impact of health education intervention on knowledge and perception of cervical cancer and screening for women in Ghana. *BMC Public Health*, 19(1). <https://doi.org/10.1186/s12889-019-7867-x>
- El-Hawy, R. M., Ashmawy, M. I., Kamal, M. M., Khamis, H. A., Abo El-Hamed, N. M., Eladely, G. I., Abdo, M. H., Hashem, Y., Ramadan, M., & Hamdy, D. A. (2017). Studying the knowledge, attitude and practice of antibiotic misuse among Alexandria population. *European Journal of Hospital Pharmacy*, 24(6). <https://doi.org/10.1136/ejpharm-2016-001032>
- Eldin, S. H. N., & ELKhawad, A. O. (2014). Self-medication with Antibiotics among Patients Attending Community Pharmacies in Khartoum City. *Sudan Journal of Rational Use of Medicine*, 6, 14–15. <http://apps.who.int/medicinedocs/documents/s22205en/s22205en.pdf>
- Elsayed, A. A., Darwish, S. F., Zewail, M. B., Mohammed, M., Saeed, H., & Rabea, H. (2021). Antibiotic misuse and compliance with infection control measures during COVID-19 pandemic in community pharmacies in Egypt. *International Journal of Clinical Practice*. <https://doi.org/10.1111/ijcp.14081>
- Esan, D. T., Fasoro, A. A., Odesanya, O. E., Esan, T. O., Ojo, E. F., & Faeji, C. O. (2018). Assessment of Self-Medication Practices and Its Associated Factors among Undergraduates of a Private University in Nigeria. *Journal of Environmental and Public Health*, 2018. <https://doi.org/10.1155/2018/5439079>
- Eticha, T., & Mesfin, K. (2014). Self-Medication Practices in Mekelle, Ethiopia. *PLoS ONE*, 9(5), e97464. <https://doi.org/10.1371/journal.pone.0097464>
- Fagbamigbe, A. F., Adebayo, S. B., & Idemudia, E. (2016). Marital status and HIV prevalence among women in Nigeria: Ingredients for evidence-based programming. *International Journal of Infectious Diseases*, 48, 57–63. <https://doi.org/10.1016/J.IJID.2016.05.002>
- Fishbein, M., & Ajzen, I. (2010). *Predicting and changing behavior: The reasoned action approach*. New York: Psychology Press.
- Flaskerud, J. H., & Nyamathi, A. M. (2010). *AIDS Care : Psychological and Socio-medical Aspects of AIDS / HIV Home medication injection among Latina women in Los Angeles : Implications for health education and prevention Home medication injection among Latina women in Los Angeles : implications. February 2015*, 37–41. <https://doi.org/10.1080/09540129650126028>
- Floreskul, V., Žardeckaitė-Matulaitienė, K., Endriulaitienė, A., & Šeibokaitė, L. (2016). Effectiveness of pre-driver education programme for high school students: Application of Theory of Planned Behaviour on road risk taking behaviour. *Journal of Behavior, Health & Social Issues*, 8(1). <https://doi.org/10.1016/j.jbhsi.2017.08.003>

- Fogelman, I., Lim, L., Bassett, R., Volberding, P., Fischl, M. A., Stanley, K., & Cotton, D. J. (1994). Prevalence and patterns of use of concomitant medications among participants in three multicenter human immunodeficiency virus type I clinical trials. AIDS Clinical Trials Group (ACTG). *Journal of Acquired Immune Deficiency Syndromes*, 7(10), 1057–1063.
- Fulco, P. P., Vora, U. B., & Bearman, G. M. L. (2006). Acid suppressive therapy and the effects on protease inhibitors. *Annals of Pharmacotherapy*, 40(11), 1974–1983. <https://doi.org/10.1345/aph.1H022>
- Furler, M. D., & et al. (2004). Polypharmacy in HIV: Impact of Data Source and Gender on Reported Drug Utilization. *Aids Patient Care*, 18(10), 568–586.
- G Priyadarshini., B., & Ravikumar, P. (2016). Impact of Self-medication among Urban and Rural Literate Population. *Journal of International Medicine and Dentistry*, 3(2), 73–79.
- Gallucci, A., Martin, R., Beaujean, A., & Usdan, S. (2015). An examination of the misuse of prescription stimulants among college students using the theory of planned behavior. *Psychology, Health & Medicine*, 20. <https://doi.org/10.1080/13548506.2014.913800>
- Garofalo, L., Di Giuseppe, G., & Angelillo, I. F. (2015). Self-Medication Practices among Parents in Italy. *BioMed Research International*, 2015(April), 1–8. <https://doi.org/10.1155/2015/580650>
- Garofalo, L., Giuseppe, G. Di, & Angelillo, I. F. (2015). *Self-Medication Practices among Parents in Italy*. 2015.
- Gayathri, S., Selvaraj, K., Satyajith, P., & Mithunkumar, G. H. (2017). Estimation of self - medication practices among rural Kanchipuram , India. *IAIM*, 4(10), 87–92.
- Geldsetzer, P., & Fawzi, W. (2017). Quasi-experimental study designs series—paper 2: complementary approaches to advancing global health knowledge. *Journal of Clinical Epidemiology*, 89. <https://doi.org/10.1016/j.jclinepi.2017.03.015>
- Ghamba PE, Mangoro ZM, W. DE. (2012). Reoccurrence and distribution of methicillin- resistant Staphylococcus aureus (MRSA) in clinical specimens in Bauchi , North eastern Nigeria. *Journal of Medicine and Medical Sciences*, 3(August).
- Godin, G., Naccache, H., & Fortin, C. (1998). Understanding physicians' intention to use a simple infection control measure: wearing gloves. *American Journal of Infection Control*, 26(4), 413–417. [https://doi.org/10.1016/S0196-6553\(98\)70037-9](https://doi.org/10.1016/S0196-6553(98)70037-9)
- Grigoryan, L., Monnet, D. L., Haaijer-Ruskamp, F. M., Bonten, M. J. M., Lundborg, S., & Verheij, T. J. M. (2010). Self-medication with antibiotics in Europe: a case for action. *Current Drug Safety*, 5(4), 329–332. <https://doi.org/10.2174/157488610792246046>
- Grimshaw, J., Campbell, M., Eccles, M., & Steen, N. (2000). Experimental and quasi-experimental designs for evaluating guideline implementation strategies. *Family Practice*, 17(SUPPL. 1).

https://doi.org/10.1093/FAMPRA/17.SUPPL_1.S11

- Gupta, S. B., Imtiaz, D., Shrotriya, V. P., & Singh, A. K. (2016). A Comparative Study on the Reasons for Use and Non-Use of Self-Medication among Students of a Medical College in Western Uttar Pradesh. *National Journal of Community Medicine*, 7(1), 25–28.
- Hadadgar, A., Changiz, T., Masiello, I., Dehghani, Z., Mirshahzadeh, N., & Zary, N. (2016). Applicability of the theory of planned behavior in explaining the general practitioners eLearning use in continuing medical education. *BMC Medical Education*, 16(1), 1–8. <https://doi.org/10.1186/S12909-016-0738-6/FIGURES/3>
- Haliti, N., Krasniqi, S., Begzati, A., Gllareva, B., Krasniqi, L., Shabani, N., Mehmeti, B., & Haliti, F. (2017). Antibiotic prescription patterns in primary dental health care in Kosovo. *Family Medicine and Primary Care Review*, 19(2). <https://doi.org/10.5114/fmPCR.2017.67866>
- Hanumaiah, V., & Manjunath, H. (2018). Study of knowledge, attitude and practice of self medication among health care workers at MC Gann Teaching District hospital of Shivamogga, India. *International Journal of Basic & Clinical Pharmacology*, 7(6), 1174. <https://doi.org/10.18203/2319-2003.IJBCP20182102>
- Haque, M., Rahman, N. A. A., McKimm, J., Kibria, G. M., Majumder, M. A. A., Haque, S. Z., Islam, M. Z., Abdullah, S. L. B., Daher, A. M., Zulkifli, Z., Rahman, S., Kabir, R., Lutfi, S. N. N. B., & Othman, N. S. A. B. (2019a). Self-medication of antibiotics: Investigating practice among university students at the Malaysian national defence university. *Infection and Drug Resistance*, 12. <https://doi.org/10.2147/IDR.S203364>
- Haque, M., Rahman, N. A. A., McKimm, J., Kibria, G. M., Majumder, M. A. A., Haque, S. Z., Islam, M. Z., Abdullah, S. L. B., Daher, A. M., Zulkifli, Z., Rahman, S., Kabir, R., Lutfi, S. N. N. B., & Othman, N. S. A. B. (2019b). Self-medication of antibiotics: investigating practice among university students at the Malaysian National Defence University. *Infection and Drug Resistance*, 12, 1333–1351. <https://doi.org/10.2147/IDR.S203364>
- Hardcastle, S. J., Hancox, J., Hattar, A., Maxwell-Smith, C., Thøgersen-Ntoumani, C., & Hagger, M. S. (2015). Motivating the unmotivated: how can health behavior be changed in those unwilling to change? *Frontiers in Psychology*, 6. <https://doi.org/10.3389/fpsyg.2015.00835>
- Hardeman, W., Johnston, M., Johnston, D., Bonetti, D., Wareham, N., & Kinmonth, A. L. (2002). Application of the Theory of Planned Behaviour in Behaviour Change Interventions: A Systematic Review. In *Psychology & Health* (Vol. 17, Issue 2, pp. 123–158). <https://doi.org/10.1080/08870440290013644a>
- Harris, A. D., Lautenbach, E., & Perencevich, E. (2005). A systematic review of quasi-experimental study designs in the fields of infection control and antibiotic resistance. In *Clinical Infectious Diseases* (Vol. 41, Issue 1). <https://doi.org/10.1086/430713>
- Harris, A. D., McGregor, J. C., Perencevich, E. N., Furuno, J. P., Zhu, J., Peterson, D.

- E., & Finkelstein, J. (2006). The use and interpretation of quasi-experimental studies in medical informatics. *Journal of the American Medical Informatics Association*, 13(1). <https://doi.org/10.1197/jamia.M1749>
- Harvey, L. A. (2018). Statistical testing for baseline differences between randomised groups is not meaningful. *Spinal Cord* 2018 56:10, 56(10), 919–919. <https://doi.org/10.1038/s41393-018-0203-y>
- Helal, R. M., & Abou-ElWafa, H. S. (2017). Self-Medication in University Students from the City of Mansoura, Egypt. *Journal of Environmental and Public Health*, 2017, 1–7. <https://doi.org/10.1155/2017/9145193>
- Herval, Á. M., Oliveira, D. P. D., Gomes, V. E., & Vargas, A. M. D. (2019). Health education strategies targeting maternal and child health: A scoping review of educational methodologies. *Medicine*, 98(26), e16174. <https://doi.org/10.1097/MD.00000000000016174>
- Hill, E. M. (2017). Decision making about antibiotic use: examining the role of antibiotic resistance knowledge, concern, and previous inappropriate antibiotic use. *Journal of Communication in Healthcare*, 10(3). <https://doi.org/10.1080/17538068.2017.1373902>
- Hughes, L., & et al. (2002). Patients' knowledge and perceptions of the side-effects of OTC medication. *Journal of Clinical Pharmacy and Therapeutics*, 27, 243–248.
- Hung, C. C., Lee, B. O., Liang, H. F., & Chu, T. P. (2016). Factors influencing nurses' attitudes and intentions toward medication administration error reporting. *Japan Journal of Nursing Science*, 13(3). <https://doi.org/10.1111/jjns.12113>
- Husnain, S. Z., Bukhari, N. I., Hussain, K., Baber, Z. U. D., & Saleem, Z. (2018). Inappropriateness of medication use and associated health risks: A cross-sectional study from Pakistan. *Tropical Journal of Pharmaceutical Research*, 17(4), 715–721. <https://doi.org/10.4314/tjpr.v17i4.22>
- Ibrahim, U., Mohammed, M., & Farouk Umar, I. (2016). Assessment of PMTCT knowledge and utilization among pregnant mothers attending Abubakar Tafawa Balewa University Teaching Hospital (ATBUTH) Bauchi, Nigeria. *Sky Journal of Medicine and Medical Sciences*, 4(1), 1–6. <http://www.skyjournals.org/SJMMS>
- Iliyasu, M. Y., Uba, A., & Agbo, E. B. (2018). Phenotypic detection of multidrug resistant extended-spectrum beta-lactamase (ESBL) producing Escherichia coli from clinical samples. *African Journal of Cellular Pathology*, 10(2). <https://doi.org/10.5897/ajcpath2018.0004>
- Indermitte, J., D, D. R. P., Beutler, M., Mph, R. B., & Hersberger, K. E. (2007). Prevalence and patient awareness of selected potential drug interactions with self-medication. *Journal of Clinical Pharmacy and Therapeutics*, 32, 149–159.
- Ioannidis, J. P. A., Haidich, A. B., Pappa, M., Pantazis, N., Kokori, S. I., Tektonidou, M. G., Contopoulos-Ioannidis, D. G., & Lau, J. (2001). Comparison of evidence of treatment effects in randomized and nonrandomized studies. *Journal of the American Medical Association*, 286(7), 821–830. <https://doi.org/10.1001/JAMA.286.7.821>

- Ivanovska, V., Zdravkovska, M., Bosevska, G., & Angelovska, B. (2013). ANTIBIOTICS FOR UPPER RESPIRATORY INFECTIONS: PUBLIC KNOWLEDGE, BELIEFS AND SELF-MEDICATION IN THE REPUBLIC OF MACEDONIA Verica. *MAHY MASA*, XXXIV(2).
- Jain, S., Malvi, R., & Purviya, J. K. (2011). Concept of Self Medication: A Review. *International Journal of Pharmaceutical & Biological Archive*, 2(3), 831–836.
- Jamhour, A., El-Kheir, A., Salameh, P., Hanna, P. A., & Mansour, H. (2017). Antibiotic knowledge and self-medication practices in a developing country: A cross-sectional study. *American Journal of Infection Control*. <https://doi.org/10.1016/j.ajic.2016.11.026>
- Jamiu, M. O., Iyabode Fatima, A., & Onozare, A. F. (2020). Pattern of Self-Medication with Prescription Medicines Among Residents of Ilorin in North Central Nigeria. *RADS Journal of Pharmacy and Pharmaceutical Sciences*, 7(4), 191–198. <https://doi.org/10.37962/jpps.v7i4.353>
- Jha, N., Shankar, P. R., & Marasini, A. (2018). Effect of an Educational Intervention on Knowledge and Perception Regarding Rational Medicine Use and Self-medication. *Journal of Nepal Health Research Council*, 16(3), 313–320. <https://doi.org/10.3126/JNHRC.V16I3.21430>
- Johnson, C. J., Heckman, T. G., Hansen, N. B., Kochman, A., & Sikkema, K. J. (2009). Adherence to antiretroviral medication in older adults living with HIV/AIDS: a comparison of alternative models. *AIDS Care*, 21(5), 541–551. <https://doi.org/10.1080/09540120802385611>
- Kandeel, A., El-Shoubary, W., Hicks, L. A., Fattah, M. A., Dooling, K. L., Lohiniva, A. L., Ragab, O., Galal, R., & Talaat, M. (2014). Patient attitudes and beliefs and provider practices regarding antibiotic use for acute respiratory tract infections in Minya. *Egypt Antibiotics*, 3(4), 632–644. <https://doi.org/10.3390/antibiotics3040632>
- Karimy, M., Rezaee-Momtaz, M., Tavousi, M., Montazeri, A., & Araban, M. (2019). Risk factors associated with self-medication among women in Iran. *BMC Public Health*, 19(1). <https://doi.org/10.1186/s12889-019-7302-3>
- Karuniawati, H., Hassali, M. A. A., Suryawati, S., Ismail, W. I., Taufik, T., & Hossain, M. S. (2021). Assessment of knowledge, attitude, and practice of antibiotic use among the population of boyolali, indonesia: A cross-sectional study. *International Journal of Environmental Research and Public Health*, 18(16). <https://doi.org/10.3390/ijerph18168258>
- Kerr, T., Small, W., Buchner, C., Zhang, R., Li, K., Montaner, J., & Wood, E. (2010). Syringe Sharing and HIV Incidence Among Injection Drug Users and Increased Access to Sterile Syringes. *American Journal of Public Health*, 100(8), 1449. <https://doi.org/10.2105/AJPH.2009.178467>
- Khalid, S., Khan, A. A., & Sultana, M. (2019). A cross-sectional study to evaluate self-medication among medical students. *Pakistan Journal of Public Health*, 9(2). <https://doi.org/10.32413/pjph.v9i2.385>
- Khalifeh, M., Moore, N., & Salameh, P. (2018). Social Knowledge and Attitude toward Over-the-Counter Drug Use. *American Journal of Clinical Medicine*

- Khamboonruang, C., & et al. (1996). Human Immunodeficiency Virus Infection and Self-Treatment for Sexually Transmitted Diseases Among Northern Thai Men. *Sexually Transmitted Diseases*, 23(4), 264–269.
- Khazir, M., Nasar, A., Abdullah, S., Rajput, G., & Amina. (2022). Prevalence of Self-Medication for Oral Health Problems: A Cross Sectional Study. *International Journal Of Drug Research And Dental Science*, 4(1), 33–39. <https://doi.org/10.36437/IJDRD.2022.4.1.E>
- Kojom, L. P. F., Ntomba, A. A., Nyabeyeu, H., Wepnje, G. B., & Lehman, L. G. (2018). Prevalence, patterns and predictors of self-medication with anti-malarial drugs among Cameroonian mothers during a recent illness episode. *Journal of Medical and Biomedical Sciences*, 29–39.
- Kouhpayeh, A., Jeihooni, A. K., Kashfi, S. H., & Bahmandoust, M. (2017). Effect of an educational intervention based on the model of health beliefs in self-medication of Iranian mothers. *Investigacion y Educacion En Enfermeria*. <https://doi.org/10.17533/udea.iee.v35n1a07>
- Krishna, J., Babu, G. C., Goel, S., Singh, A., Gupta, A., Singh, A. K., Surana, A., & Rajesh, D. R. (2015). An evaluation of self medication among undergraduate medical students of a rural medical school from western Uttar Pradesh. *International Archives of Integrated Medicine*, 2(6), 116–123.
- Krishnan, P. (2019). A review of the non-equivalent control group post-test-only design. *Nurse Researcher*, 26(2), 37–40. <https://doi.org/10.7748/NR.2018.E1582>
- Kumar, C. A., & Revannasiddaiah, N. (2017). Assessment of self-medication patterns in a rural area of south India: a questionnaire based study. *International Journal Of Community Medicine And Public Health*, 5(1), 354. <https://doi.org/10.18203/2394-6040.ijcmph20175812>
- Kumar, N., Kanchan, T., Unnikrishnan, B., Rekha, T., & Mithra, P. (2013). Perceptions and Practices of Self-Medication among Medical Students in Coastal South India. *PLoS Neglected Tropical Diseases*, 8(8), 1–6. <https://doi.org/10.1371/journal.pone.0072247>
- Kumar, R., Goyal, A., Padhy, B., & Gupta, Y. (2016). Self-medication practice and factors influencing it among medical and paramedical students in India: A two-period comparative cross-sectional study. *Journal of Natural Science, Biology and Medicine*, 7(2), 143. <https://doi.org/10.4103/0976-9668.184700>
- Kumar, V., Mangal, A., Yadav, G., Raut, D., & Singh, S. (2015). Prevalence and pattern of self-medication practices in an urban area of Delhi, India. *Medical Journal of Dr. D.Y. Patil University*, 8(1), 16. <https://doi.org/10.4103/0975-2870.148828>
- Kurdi, S., Faran, A., Eareeni, E., Alhalal, N., Joseph, R., Wali, H., & Alshayban, D. (2020). Assessment of knowledge and attitude toward the new antibiotic dispensing law and its effect on antibiotic use in Saudi Arabia. *Saudi Pharmaceutical Journal*, 28(1). <https://doi.org/10.1016/j.jsps.2019.11.005>

- Kurniawati, L., Nursalam, N., Sinuraya, B., & Azizah, M. N. (2021). The Correlation of Antiretroviral Consumption Adherence on the Quality of Life of HIV Patients: A Systematic Review. *Indonesian Journal of Community Health Nursing*, 6(1). <https://doi.org/10.20473/ijchn.v6i1.27218>
- Larissa Grigoryn et al. (2006). Self-medication with Antimicrobial Drugs in Europe. *Emerging Infectious Disease*, 12(3), 452–459.
- Lawan, U. M., Abubakar, I. S., Jibo, A. M., & Rufai, A. (2013). Pattern, awareness and perceptions of health hazards associated with self medication among adult residents of kano metropolis, northwestern Nigeria. *Indian Journal of Community Medicine*, 38(3). <https://doi.org/10.4103/0970-0218.116350>
- Liddelow, C., Mullan, B., & Novoradovskaya, E. (2020). Exploring Medication Adherence Amongst Australian Adults Using an Extended Theory of Planned Behaviour. *International Journal of Behavioral Medicine*, 27(4). <https://doi.org/10.1007/s12529-020-09862-z>
- Limaye, D., Limaye, V., Fortwengel, G., & Krause, G. (2018). Self-medication practices in urban and rural areas of western India : a cross sectional study. *International Journal of Community Medicine and Public Health*, 5(7), 2672–2685.
- Lin, L., Sun, R., Yao, T., Zhou, X., & Harbarth, S. (2020). Factors influencing inappropriate use of antibiotics in outpatient and community settings in China: a mixed-methods systematic review Handling editor Seye Abimbola. *BMJ Global Health*, 5, 3599. <https://doi.org/10.1136/bmjgh-2020-003599>
- Liu, H., Li, X., Chen, Q., Li, Y., Xie, C., Ye, M., & Huang, J. (2020). Illness perception, mood state and disease-related knowledge level of COVID-19 family clusters, Hunan, China. *Brain, Behavior, and Immunity*, xxxx, 1–2. <https://doi.org/10.1016/j.bbi.2020.05.045>
- Liu, W., Zhang, Y., Liu, H. J., Song, T., & Wang, S. (2022). Influence of Health Education Based on IMB on Prognosis and Self-Management Behavior of Patients with Chronic Heart Failure. *Computational and Mathematical Methods in Medicine*, 2022. <https://doi.org/10.1155/2022/8517802>
- Llor, C., & Bjerrum, L. (2014). Antimicrobial resistance: risk associated with antibiotic overuse and initiatives to reduce the problem. *Therapeutic Advances in Drug Safety*, 5(6), 229. <https://doi.org/10.1177/2042098614554919>
- Lo, J., Nwafor, S. U., Schwitters, A. M., Mitchell, A., Sebastian, V., Stafford, K. A., Ezirim, I., Charurat, M., & McIntyre, A. F. (2021). Key Population Hotspots in Nigeria for Targeted HIV Program Planning: Mapping, Validation, and Reconciliation. *JMIR Public Health Surveill* 2021;7(2):E25623 <https://PublicHealth.Jmir.Org/2021/2/E25623>, 7(2), e25623. <https://doi.org/10.2196/25623>
- Lopez Bernal, J. A., Andrews, N., & Amirthalingam, G. (2019). The Use of Quasi-experimental Designs for Vaccine Evaluation. In *Clinical Infectious Diseases* (Vol. 68, Issue 10). <https://doi.org/10.1093/cid/ciy906>
- Lukovic, J. A., Miletic, V., & Pekmezovic, T. (2014). Self-Medication Practices and Risk Factors for Self-Medication among Medical Students in Belgrade , Serbia.

PLoS ONE, 9(12), 1–14. <https://doi.org/10.1371/journal.pone.0114644>

- Maciejewski Matthew L. (2020). Quasi-Experimental Design. *Biostatistics and Epidemiology*, 4(1), 38–47.
- Mahmoud, M., Syed, W., Al-Arifi, M., Al-Mana, F., & Naqvi, A. (2019). Reasons for self-medication with antibiotics among people with secondary education or higher in Hyderabad, India: a cross-sectional study. *Pharmacoepidemiology and Drug Safety*, 28.
- Mainous, A. G., Diaz, V. A., & Carnemolla, M. (2014). A community intervention to decrease antibiotics used for self-medication among latino adults. *Annals of Family Medicine*. <https://doi.org/10.1370/afm.1061>
- Malak, M. Z., & Moh'd AbuKamel, A. (2019). Self-medication Practices among University Students in Jordan. *Malaysian Journal of Medicine and Health Sciences*, 15(2).
- Maldonado, J. C., Meléndez, S. D., & Figueras, A. (2007). Long-term effects of an educational intervention on self-medication and appropriate drug use in single-sex secondary public schools, Quito, Ecuador. *British Journal of Clinical Pharmacology*, 63(1), 92. <https://doi.org/10.1111/J.1365-2125.2006.02749.X>
- Mallah, N., Badro, D. A., Figueiras, A., & Takkouche, B. (2020). Association of knowledge and beliefs with the misuse of antibiotics in parents: A study in Beirut (Lebanon). *PLoS ONE*, 15(7 July). <https://doi.org/10.1371/journal.pone.0232464>
- Mamo, S., Ayele, Y., & Dechasa, M. (n.d.). *Self-Medication Practices among community of Harar City and its surrounding , Eastern Ethiopia*. 1–15.
- Mamo, S., Ayele, Y., & Dechasa, M. (2018). Self-Medication Practices among Community of Harar City and Its Surroundings, Eastern Ethiopia. *Journal of Pharmaceutics*, 2018, 1–6. <https://doi.org/10.1155/2018/2757108>
- Maria, C., & Pratinidhi, S. A. (2018). A COMPARATIVE EVALUATION OF THE PRACTICE OF SELF MEDICATION IN A TOWN OF WESTERN MAHARASHTRA. *Journal of Medical Biomedical And Applied Sciences*, 6(4), 10–12.
- Matthias, A. T., Fernando, G. V. M. C., Somathilake, B. G. G. K., & Prathapan, S. (2021). Predictors and patterns of polypharmacy in chronic diseases in a middle-income country. *International Journal of Physiology, Pathophysiology and Pharmacology*, 13(6), 158. [/pmc/articles/PMC8784655/](https://pubmed.ncbi.nlm.nih.gov/348784655/)
- McEachan, R. R. C., Conner, M., Taylor, N. J., & Lawton, R. J. (2011). Prospective prediction of health-related behaviours with the Theory of Planned Behaviour: a meta-analysis. In *Health Psychology Review* (Vol. 5, Issue 2, pp. 97–144). <https://doi.org/10.1080/17437199.2010.521684>
- Médéa. Locquet., Charlotte, B., Larbuisson, R., Buckinx, F., & et. al. (2016). Self-Medication Practice among Amateur Runners: Prevalence and Associated Factors. *Journal of Sports Science & Medicine*, 15(2), 387. [/pmc/articles/PMC4879456/](https://pubmed.ncbi.nlm.nih.gov/274879456/)

- Mills, J., Wand, T., & Fraser, J. A. (2018). Exploring the meaning and practice of self-care among palliative care nurses and doctors: A qualitative study. *BMC Palliative Care*, 17(1), 1–12. <https://doi.org/10.1186/S12904-018-0318-0/TABLES/5>
- Misau, Y. A., Mohammed, A., Jibrin, Y. B., Gwalabe, S. A., Usman, S. U., Faruk, B. M., Mogere, D., & Mbaruk, S. A. (2019). Antibiotics self-medication among medical students in a new medical college at Abubakar Tafawa Balewa University Bauchi, Nigeria. *Pyramid Journal of Medicine*, 2(2), 25. <https://doi.org/10.4081/PJM.2019.25>
- Misau, Y. A., Mohammed, A., Jibrin, Y. B., Gwalabe, S. A., Usman, S. U., Faruk, B. M., Mogere, D., & Mbaruk, S. A. (2020). Antibiotics self-medication among medical students in a new medical college at Abubakar Tafawa Balewa University Bauchi, Nigeria. *Pyramid Journal of Medicine*, 2(2). <https://doi.org/10.4081/pjm.2019.25>
- Mlinar, S., & Raskovic-Malnarsic, R. (2015). Analysis of over-the-counter medicines use among nursing students. *Vojnosanitetski Pregled*, 72(9), 794–800. <https://doi.org/10.2298/VSP140606068M>
- Moienzadeh, A., Massoud, T., & Black, E. (2017). Evaluation of the general public's knowledge, views and practices relating to appropriate antibiotic use in Qatar. *International Journal of Pharmacy Practice*, 25(2). <https://doi.org/10.1111/ijpp.12233>
- Moshi, F. V., Kibusi, S. M., & Fabian, F. (2018). The effectiveness of community-based continuous training on promoting positive behaviors towards birth preparedness, male involvement, and maternal services utilization among expecting couples in rukwa, Tanzania: A theory of planned behavior quasi-experimental study. *Journal of Environmental and Public Health*, 2018. <https://doi.org/10.1155/2018/1293760>
- Mostafa-Hedeab, G. (2018). Knowledge, attitude, and behaviors toward antibiotics of non-medical students Jouf university, Saudi Arabia. *Asian Journal of Pharmaceutical and Clinical Research*, 11(8). <https://doi.org/10.22159/ajpcr.2018.v11i8.26308>
- Mostafa, S. A., & Ahmad, I. A. (2018). Recent developments in systematic sampling: A review. *Journal of Statistical Theory and Practice*, 12(2). <https://doi.org/10.1080/15598608.2017.1353456>
- Mousumi K, Gitanjan S, & Jutika O. (2018). A STUDY ON ASSESSMENT OF SELF MEDICATION PRACTICES AMONG UNDERGRADUATE MEDICAL STUDENTS OF GAUHATI MEDICAL COLLEGE. *International Journal of Scientific Research*, 7(8), 127–131. <https://doi.org/10.36106/ijsr>
- Mukokinya, M., Opanga, S., Oluka, M., & Godman, B. (2018a). Dispensing of antimicrobials in Kenya : a cross sectional pilot study and its implications . *Journal of Research in Pharmacy Practice*, 1–8.
- Mukokinya, M., Opanga, S., Oluka, M., & Godman, B. (2018b). Dispensing of Antimicrobials in Kenya: A Cross-sectional Pilot Study and Its Implications. *Journal of Research in Pharmacy Practice*, 7(2), 77.

- Murray, C. J., Ikuta, K. S., Sharara, F., Swetschinski, L., Robles Aguilar, G., Gray, A., Han, C., Bisignano, C., Rao, P., Wool, E., Johnson, S. C., Browne, A. J., Chipeta, M. G., Fell, F., Hackett, S., Haines-Woodhouse, G., Kashef Hamadani, B. H., Kumaran, E. A. P., McManigal, B., ... Naghavi, M. (2022). Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis. *The Lancet*, 399(10325), 629–655. [https://doi.org/10.1016/S0140-6736\(21\)02724-0/ATTACHMENT/B227DEB3-FF04-497F-82AC-637D8AB7F679/MMC1.PDF](https://doi.org/10.1016/S0140-6736(21)02724-0/ATTACHMENT/B227DEB3-FF04-497F-82AC-637D8AB7F679/MMC1.PDF)
- Mutagonda, R. F., Marealle, A. I., Nkinda, L., Kibwana, U., Maganda, B. A., Njiro, B. J., Ndumwa, H. P., Kilonzi, M., Mikomangwa, W. P., Mlyuka, H. J., Felix, F. F., Myemba, D. T., Mwakawanga, D. L., Sambayi, G., Kunambi, P. P., Ndayishimiye, P., Sirili, N., Mfaume, R., Nshau, A., ... Bwire, G. M. (2022). Determinants of misuse of antibiotics among parents of children attending clinics in regional referral hospitals in Tanzania. *Scientific Reports* 2022 12:1, 12(1), 1–11. <https://doi.org/10.1038/s41598-022-08895-6>
- Nabaweesi, I., Olum, R., Sekite, A. B., Suubi, W. T., Nakiwunga, P., Machali, A., Kiyumba, R., Kalyango, P., Natamba, A., Igumba, Y., Kyeyune, M., Mpairwe, H., & Katagirya, E. (2021). Antibiotic practices, perceptions and self-medication among patients at a national referral hospital in Uganda. *Infection and Drug Resistance*, 14, 2155–2164. <https://doi.org/10.2147/IDR.S303075>
- NACA. (2018). *Nigeria HIV Prevalence*. <http://naca.gov.ng/nigeria-prevalence-rate/>
- Nachega, J. B., Hsu, A. J., Uthman, O. A., Spinewine, A., & Pham, P. A. (2012). Antiretroviral therapy adherence and drug–drug interactions in the aging HIV population. *AIDS*, 26. https://journals.lww.com/aidsonline/Fulltext/2012/07311/Antiretroviral_therapy_adherence_and_drug_drug.6.aspx
- Napolitano, F., Izzo, M. T., Di Giuseppe, G., & Angelillo, I. F. (2013). Public knowledge, attitudes, and experience regarding the use of antibiotics in Italy. *PLoS One*, 8(12). <https://doi.org/10.1371/journal.pone.0084177>
- Navaro, M., Vezzosi, L., Santagati, G., Angelillo, I. F., & Group, C. W. (2018). Knowledge, attitudes, and practice regarding medication use in pregnant women in Southern Italy. *PLOS ONE*, 13(6), 1–14. <https://doi.org/10.1371/journal.pone.0198618>
- Nawafleh, H., Momani, M. Al, Hadid, L. Al, & Amarat, W. al. (2017). Misuse of Antibiotic Therapy among University Community in South Jordan. *Health Science Journal*, 10(6). <https://doi.org/10.21767/1791-809x.1000478>
- Nepal, G., & Bhatta, S. (2018a). Self-medication with Antibiotics in WHO Southeast Asian Region: A Systematic Review. *Cureus*, 10(4). <https://doi.org/10.7759/cureus.2428>
- Nepal, G., & Bhatta, S. (2018b). Self-medication with Antibiotics in WHO Southeast Asian Region: A Systematic Review. *Cureus*, 10(4). <https://doi.org/10.7759/cureus.2428>
- Nworie, K. M., & Ezech, C. C. (n.d.). *Assessment of Self-medication Practices for*

Treatment of Illnesses among School-children in Southeast Nigeria. 3(4), 15–25.

- Nyambega, J. O. (2017). Antibiotic Use and Misuse Among Adults in Magwagwa Ward, Nyamira County in Kenya. *IOSR Journal of Pharmacy and Biological Sciences*, 12(01). <https://doi.org/10.9790/3008-1201018792>
- Oberoi, S. S., Dhingra, C., Sharma, G., & Sardana, D. (2015). Antibiotics in dental practice: How justified are we. *International Dental Journal*, 65(1). <https://doi.org/10.1111/idj.12146>
- Oburota, C. S., & Olaniyan, O. (2020). Health care financing and income inequality in Nigeria. *International Journal of Social Economics*, 47(11). <https://doi.org/10.1108/IJSE-05-2020-0286>
- Ocan, M., Obuku, E. A., Bwanga, F., Akena, D., Richard, S., Ogwal-Okeng, J., & Obua, C. (2015). Household antimicrobial self-medication: A systematic review and meta-analysis of the burden, risk factors and outcomes in developing countries. In *BMC Public Health* (Vol. 15, Issue 1). BioMed Central Ltd. <https://doi.org/10.1186/s12889-015-2109-3>
- Oche, O. M., Sadiq, U. A., Oladigbolu, R. A., & Chinna, K. (2018). Prevalence and Factors Associated with the Use of Traditional Medicines among Human Immunodeficiency Virus and Acquired Immunodeficiency Syndrome Patients in Sokoto, Nigeria. *Annals of African Medicine*, 17(3), 125. https://doi.org/10.4103/AAM.AAM_39_17
- Odimegwu, C. O., Akinyemi, J. O., & Alabi, O. O. (2017). HIV-Stigma in Nigeria: Review of Research Studies, Policies, and Programmes. *AIDS Research and Treatment*, 2017. <https://doi.org/10.1155/2017/5812650>
- Okide, C. C., Grey-Ekejiuba, O., Ubaka, C. M., Schellack, N., & Okonta, M. (2020). Parents' knowledge, attitudes and use of antibiotics in upper respiratory infections in nigerian children. *African Journal of Biomedical Research*, 23(2).
- Olesen, S. W., Barnett, M. L., Macfadden, D. R., Brownstein, J. S., Hernández-Díaz, S., Lipsitch, M., & Grad, Y. H. (2018). The distribution of antibiotic use and its association with antibiotic resistance. *ELife*, 7. <https://doi.org/10.7554/ELIFE.39435>
- Oliveira, A., Theobaldo, F., & Rocha, R. (2014). Review Article Acute liver failure and self-medication. *Arq Bras Cir Dig*, 27(4), 294–297.
- Owusu-Ofori, A. K., Darko, E., Danquah, C. A., Agyarko-Poku, T., & Buabeng, K. O. (2021). Self-Medication and Antimicrobial Resistance: A Survey of Students Studying Healthcare Programmes at a Tertiary Institution in Ghana. *Frontiers in Public Health*, 9, 1445. <https://doi.org/10.3389/FPUBH.2021.706290/BIBTEX>
- Pan, H., Cui, B., Zhang, D., Farrar, J., Law, F., & Ba-Thein, W. (2012). Prior knowledge, older age, and higher allowance are risk factors for self-medication with antibiotics among University students in Southern China. *PLoS ONE*. <https://doi.org/10.1371/journal.pone.0041314>
- Pandya, P., & Pandya, I. (2018). Prevalence and patterns of self-medication for skin

- diseases among medical undergraduate students. *International Journal of Research in Dermatology*, 4(2), 162–167. <https://doi.org/10.18203>
- Parekh, A. N., Balasubramanian, K., Bhate, P., & Kalra, D. D. (2020). Antibiotics usage, how well we know it? KAP survey among the dentist population in Mumbai. *International Journal of Basic & Clinical Pharmacology*, 9(11). <https://doi.org/10.18203/2319-2003.ijbcp20204500>
- Penupothu, S. N., & Hanumanthu, L. (2018). IJBCP International Journal of Basic & Clinical Pharmacology Original Research Article A comparative study on self medication practices in ACSR Government medical college in Nellore , India. *International Journal of Basic & Clinical Pharmacology*, 7(5), 941–946.
- Pimentel, G. S., das Graças Braga Ceccato, M., de Oliveira Costa, J., Mendes, J. C., de Fátima Bonolo, P., & Silveira, M. R. (2020). Quality of life in individuals initiating antiretroviral therapy: a cohort study. *Revista de Saude Publica*, 54. <https://doi.org/10.11606/s1518-8787.2020054001920>
- Pineles, L. L., & Parente, R. (2013). Using the theory of planned behavior to predict self-medication with over-the-counter analgesics. *Journal of Health Psychology*, 18(12). <https://doi.org/10.1177/1359105312465912>
- Pirzadeh, A., & Mostafavi, F. (2014). Self-medication among students in Isfahan University of Medical Sciences based on Health Belief Model. *Journal of Education and Health Promotion*, 3(1), 112. <https://doi.org/10.4103/2277-9531.145904>
- Pons, S., & Knauth, D. R. (2017). Predisposing factors to the practice of self-medication in Brazil : Results from the National Survey on Access , Use and Promotion of Rational Use of Medicines (PNAUM). *PLoS ONE*, 12(12), 1–13.
- Pratama, A. N. W., Rohmawati, A., & Rachmawati, E. (2018). A SURVEY OF ANTIBIOTICS PURCHASED WITHOUT PRESCRIPTION AMONG NON-HEALTH SCIENCE STUDENTS IN JEMBER, INDONESIA. *Jurnal Farmasi Sains Dan Komunitas*, 15(2), 47–54.
- Prieto-Gómez, V., Yuste-Sánchez, M. J., Bailón-Cerezo, J., Romay-Barrero, H., de la Rosa-Díaz, I., Lirio-Romero, C., & Torres-Lacomba, M. (2022). Effectiveness of Therapeutic Exercise and Patient Education on Cancer-Related Fatigue in Breast Cancer Survivors: A Randomised, Single-Blind, Controlled Trial with a 6-Month Follow-Up. *Journal of Clinical Medicine* 2022, Vol. 11, Page 269, 11(1), 269. <https://doi.org/10.3390/JCM11010269>
- Qamar., F., Naveed, S., A. Ayub., & A. M. (2015). Prevalence and Consequences of Misuse of Antibiotics, Survey Based Study in Karachi. *Journal of Bioequivalence & Bioavailability*, 07(05). <https://doi.org/10.4172/jbb.1000240>
- Rägo, L. (2000). WHO Drug Information. *World Self Medication Industry*.
- Rameshkumar, M. R., NarasingamArunagirinathan, Rameshkumar, M. R., & NarasingamArunagirinathan. (2018). Drug-Resistant Bacterial Infections in HIV Patients. *Advances in HIV and AIDS Control*. <https://doi.org/10.5772/INTECHOPEN.78657>

- Rasheed, A. Al, Yagoub, U., Alkhashan, H., Abdelhay, O., Alawwad, A., Aboud, A. Al, & Battal, S. Al. (2016). Prevalence and Predictors of Self-Medication with Antibiotics in Al Wazarat Health Center , Riyadh City , KSA. *Biomed Research International*, 2016.
- Rather, I. A., Kim, B. C., Bajpai, V. K., & Park, Y. H. (2017). Self-medication and antibiotic resistance: Crisis, current challenges, and prevention. *Saudi Journal of Biological Sciences*, 24(4), 808. <https://doi.org/10.1016/J.SJBS.2017.01.004>
- Richmond, R. L., Kehoe, L., Hailstone, S., Wodak, A., & Uebel-yan, M. (1999). *Quantitative and qualitative evaluations of brief interventions to change excessive drinking , smoking and stress in the police force*. 94(September 1998), 1509–1521.
- Rockers, P. C., Tugwell, P., Grimshaw, J., Oliver, S., Atun, R., Røttingen, J. A., Fretheim, A., Ranson, M. K., Daniels, K., Luiza, V. L., & Bärnighausen, T. (2017). Quasi-experimental study designs series–paper 12: strengthening global capacity for evidence synthesis of quasi-experimental health systems research. *Journal of Clinical Epidemiology*, 89. <https://doi.org/10.1016/j.jclinepi.2016.03.034>
- Ruiz, M. (2010). Risks of self-medication practices. *Current Drug Safety*, 5(4), 315–323. <https://doi.org/10.2174/157488610792245966>
- Sadiq, Y., Khalid, K., Hafeez, A., Abdullah, M. M., Nazar, M., Hadayat, A., & Laique, T. (2021). Assessment of Self-Medication and Their Associated Risks in Medical and Non-Medical People of Sialkot: Cross-Sectional Study. *PJMHS*, 15(6), 1955–1959. <https://doi.org/10.53350/pjmhs211561955>
- Salihu Dadari, H. I. (2020). Antibiotics use, knowledge and practices on antibiotic resistance among breastfeeding mothers in Kaduna state (Nigeria). *Journal of Infection and Public Health*, 13(12). <https://doi.org/10.1016/j.jiph.2019.05.008>
- Sanaeinasab, H., Saffari, M., Taghavi, H., Karimi Zarchi, A., Rahmati, F., Al Zaben, F., & Koenig, H. G. (2022). An educational intervention using the health belief model for improvement of oral health behavior in grade-schoolers: a randomized controlled trial. *BMC Oral Health*, 22(1). <https://doi.org/10.1186/S12903-022-02132-2>
- Sansgiry, S. S., Ajuoga, E., Ngo, C., & Yeh, R. F. (2008). Impact of Over-the-Counter Medication Misuse and Adverse Drug Events on HIV Patients' Health-Related Quality of Life. *Journal of Pharmacy Technology*, 24(6), 323–329. <https://doi.org/10.1177/875512250802400602>
- Sanya, T. E., Fakeye, T. O., Adisa, R., & Segun, J. S. (2013). Use of antibiotics among non-medical students in a Nigerian University. *African Health Sciences*, 13(4). <https://doi.org/10.4314/ahs.v13i4.41>
- Schmiedl, S., Rottenkolber, M., Hasford, J., Rottenkolber, D., Farker, K., Drewelow, B., Hippus, M., Saljé, K., & Thürmann, P. (2014). Self-Medication with Over-the-Counter and Prescribed Drugs Causing Adverse-Drug-Reaction-Related Hospital Admissions: Results of a Prospective, Long-Term Multi-Centre Study. *Drug Safety*, 37(4), 225–235. <https://doi.org/10.1007/s40264-014-0141-3>
- Schulz, A. J., Mehdipanah, R., Chatters, L. M., Reyes, A. G., Neblett, E. W., & Israel,

- B. A. (2020). Moving Health Education and Behavior Upstream: Lessons From COVID-19 for Addressing Structural Drivers of Health Inequities. *Health Education and Behavior*, 47(4), 519–524. <https://doi.org/10.1177/1090198120929985>
- Selvaraj, N., Sekar, A., Gandhi, R., Jayabalan, N., Ganesan, S., & Mohammad, M. A. R. (2018). Drug utilization study in OPD of a tertiary care hospital in a rural area of Jalna , Maharashtra , India by using WHO prescribing indicators. *International Journal of Basic & Clinical Pharmacology*, 7(1), 55–58.
- Serdar, C. C., Cihan, M., Yücel, D., & Serdar, M. A. (2021). Sample size, power and effect size revisited: simplified and practical approaches in pre-clinical, clinical and laboratory studies. *Biochemia Medica*, 31(1), 1–27. <https://doi.org/10.11613/BM.2021.010502>
- Serwecińska, L. (2020). Antimicrobials and antibiotic-resistant bacteria: A risk to the environment and to public health. *Water (Switzerland)*, 12(12). <https://doi.org/10.3390/w12123313>
- Shaamekhi, H. R., Jafarabadi, M. A., & Alizadeh, M. (2019). Demographic determinants of self-medication in the population covered by health centers in Tabriz. *Health Promotion Perspectives*, 9(3), 181–190. https://doi.org/10.15171/HPP.2019.26/HPP_9_181_PDF.PDF
- Shankar, P. R., Partha, P., & Shenoy, N. (2002). Self-medication and non-doctor prescription practices in Pokhara valley, Western Nepal: A questionnaire-based study. *BMC Family Practice*, 3. <https://doi.org/10.1186/1471-2296-3-17>
- Shardell, M., Harris, A. D., El-Kamary, S. S., Furuno, J. P., Miller, R. R., & Perencevich, E. N. (2007). Statistical analysis and application of quasi experiments to antimicrobial resistance intervention studies. *Clinical Infectious Diseases*, 45(7). <https://doi.org/10.1086/521255>
- Shehadeh, M., Suaifan, G., Darwish, R. M., Wazaify, M., Zaru, L., & Alja'fari, S. (2012). Knowledge, attitudes and behavior regarding antibiotics use and misuse among adults in the community of Jordan. A pilot study. *Saudi Pharm J*, 20(2), 125–133. <https://doi.org/10.1016/j.jsps.2011.11.005>
- Shehadeh, M., Suaifan, G., Darwish, R. M., Wazaify, M., Zaru, L., & Alja'fari, S. (2012). Knowledge, attitudes and behavior regarding antibiotics use and misuse among adults in the community of Jordan. A pilot study. *Saudi Pharmaceutical Journal*, 20(2), 125–133. <https://doi.org/10.1016/j.jsps.2011.11.005>
- Silva, A. N., Cavalcante, C. E. B., Ferreira, A., Leite, D. S., Marabá-pa, A., & Cep, B. (2018). *Circumstances leading to self-diagnosis and self-medication in the Municipality of Marabá (State of. 9*, 159–170.
- Silva, G. C. da, Cristina, M., Soares, F., & Muccillo-baisch, A. L. (2012). Self-medication in university students from the city of Rio Grande, Brazil. *BMC Public Health*, 12(339).
- Silva, M. L., Cargnello, C., Aulois-Griot, M., & Dumartin, C. (2019). Antibiotic misuse: How to evaluate the costs? In *Medecine et Maladies Infectieuses*. <https://doi.org/10.1016/j.medmal.2019.03.012>

- Sindato, C., Mboera, L. E. G., Katale, B. Z., Frumence, G., Kimera, S., Clark, T. G., Legido-Quigley, H., Mshana, S. E., Rweyemamu, M. M., & Matee, M. (2020). Knowledge, attitudes and practices regarding antimicrobial use and resistance among communities of Ilala, Kilosa and Kibaha districts of Tanzania. *Antimicrobial Resistance and Infection Control*, 9(1), 1–17. <https://doi.org/10.1186/S13756-020-00862-Y/FIGURES/9>
- Skliros, E., Merkouris, P., Papazafiropoulou, A., Gikas, A., & Matzouranis, G. (2010). Self-medication with antibiotics in rural population in Greece: a cross-sectional multicenter study. *BMC Family Practice*, 11(58), 1471–2296.
- Sloand, E. D., & Vessey, J. A. (2001). SELF-MEDICATION WITH COMMON HOUSEHOLD MEDICINES BY YOUNG ADOLESCENTS. *Issues in Comprehensive Pediatric Nursing*, August 2000, 57–67.
- Smith, S. R., Boyd, E. L., & Kirking, D. M. (1999). Nonprescription and Alternative Medication Use by Individuals with HIV Disease. *Ann Pharmacother*, 33, 294–300.
- Sniehotta, F. F., Presseau, J., & Araújo-Soares, V. (2014). Time to retire the theory of planned behaviour. *Health Psychology Review*, 8(1), 1–7. <https://doi.org/10.1080/17437199.2013.869710>
- Ssonko, M., Stanaway, F., Mayanja, H. K., Namuleme, T., Cumming, R., Kyalimpa, J. L., Karamagi, Y., Mukasa, B., & Naganathan, V. (2018). Polypharmacy among HIV positive older adults on anti-retroviral therapy attending an urban clinic in Uganda. *BMC Geriatrics*, 18(125), 1–8. <https://doi.org/10.1186/s12877-018-0817-0>
- Strumpf G, Sharer G, W. M. (2003). Designing successful transitions: 20 years of trends and issues in orientation programmes. A guide for orienting students to college. In *The Freshman Year Experience Monograph Series*. (pp. 149–164). In J.A. Ward-Roof & C. Hatch (Eds.), South Carolina University, Columbia. National Resource Center for the Freshman Year Experience. National Orientation Directors Association.
- Suciu, M., Vlaia, L., Boujne, E., Suciu, L., Buda, V. O., Vlaia, V., & Cristescu, C. (2022). Self-Medication Practices from the Perspective of Tunisian Cardiovascular Patients – A Community Pharmacy-Based Survey. *American Heart Journal*, 254, 256–257. <https://doi.org/10.1016/J.AHJ.2022.10.060>
- Suleiman, B. A., Yahaya, M., Olaniyan, F. A., Sule, A. G., & Sufiyan, M. B. (2020). Determinants of health-related quality of life among human immunodeficiency virus positive (HIV-positive) patients at Ahmadu Bello University teaching hospital, Zaria, Nigeria- 2015. *BMC Public Health*, 20(1), 1–9. <https://doi.org/10.1186/S12889-020-08659-9/TABLES/4>
- Sullivan, G. M., & Feinn, R. (2012). Using Effect Size—or Why the P Value Is Not Enough. *Journal of Graduate Medical Education*, 4(3), 279. <https://doi.org/10.4300/JGME-D-12-00156.1>
- Sunny, T., Jacob, R., K, K., & Varghese, S. (2019). Self-medication: Is a serious challenge to control antibiotic resistance? *National Journal of Physiology, Pharmacy and Pharmacology*, 0.

<https://doi.org/10.5455/njppp.2019.9.0620508062019>

- Svensson, E., Haaijer-ruskamp, F. M., & Lundborg, C. S. (2004). Self-Medication with Antibiotics in a Swedish General Population. *Scandinavian Journal of Infectious Diseases*, 36(6–7), 450–452. <https://doi.org/10.1080/00365540410020721>
- Tadesse, B. T., Ashley, E. A., Ongarello, S., Havumaki, J., Wijegoonewardena, M., González, I. J., & Dittrich, S. (2017). Antimicrobial resistance in Africa: A systematic review. *BMC Infectious Diseases*, 17(1). <https://doi.org/10.1186/s12879-017-2713-1>
- Tobin, E. A., & Atulomah, N. O. (2020). Antibiotic Self-Medication among Adult Out-patient Clinic Attendees in Nigeria. *West African Journal of Medicine*, 37(5), 507–514.
- Tobin, E. A., Erhazele, J., Okonofua, M., Nnadi, C., Nmema, E. E., & Odigie, G. (2020). Self-medication among health care workers in a tertiary hospital in southern Nigeria: Knowledge, attitude, and practices. *Medical Journal of Indonesia*, 29(4). <https://doi.org/10.13181/mji.oa.204223>
- Tseng A, F. M. (2012). Important Drug-Drug Interactions in HIV-Infected Persons on Antiretroviral Therapy: An Update on New Interactions between HIV and Non-HIV Drugs. *Current Infectious Disease Reports*, 14(1), 67–82.
- UNAIDS. (2016). *Global Report of HIV/AIDS Epidemic*.
- UNAIDS. (2018). *UNAIDS Global Data*.
- UNAIDS. (2019a). 2019 Global HIV Statistics. In *UNAIDS*.
- UNAIDS. (2019b). Global HIV & AIDS statistics — 2019 fact sheet | UNAIDS. [Http://Www.Unaids.Org/En/Resources/Fact-Sheet](http://Www.Unaids.Org/En/Resources/Fact-Sheet). <https://doi.org/2018>
- Uzochukwu, B. S. C., Ughasoro, M., Etiaba, E., Okwuosa, C., Envuladu, E., & Onwujekwe, O. (2015). Health care financing in Nigeria: Implications for achieving universal health coverage. *Nigerian Journal of Clinical Practice*, 18(4), 437–444. <https://doi.org/10.4103/1119-3077.154196>
- Vazquez-Cancela, O., Souto-Lopez, L., Vazquez-Lago, J. M., Lopez, A., & Figueiras, A. (2021). Factors determining antibiotic use in the general population: A qualitative study in Spain. *PLOS ONE*, 16(2), e0246506. <https://doi.org/10.1371/journal.pone.0246506>
- Waddington, H., Aloe, A. M., Becker, B. J., Djimeu, E. W., Hombrados, J. G., Tugwell, P., Wells, G., & Reeves, B. (2017). Quasi-experimental study designs series—paper 6: risk of bias assessment. *Journal of Clinical Epidemiology*, 89. <https://doi.org/10.1016/j.jclinepi.2017.02.015>
- Wallis, D., Coatsworth, J. D., Mennis, J., Riggs, N. R., Zaharakis, N., Russell, M. A., Brown, A. R., Rayburn, S., Radford, A., Hale, C., & Mason, M. J. (2022). Predicting Self-Medication with Cannabis in Young Adults with Hazardous Cannabis Use. *International Journal of Environmental Research and Public Health*, 19(1850), 1–15.
- Wang, X., Peng, D., Wang, W., Xu, Y., Zhou, X., & Hesketh, T. (2017a). Massive

- misuse of antibiotics by university students in all regions of China: implications for national policy. *International Journal of Antimicrobial Agents*, 50(3). <https://doi.org/10.1016/j.ijantimicag.2017.04.009>
- Wang, X., Peng, D., Wang, W., Xu, Y., Zhou, X., & Hesketh, T. (2017b). Massive misuse of antibiotics by university students in all regions of China: implications for national policy. *Int J Antimicrob Agents*, 50(3), 441–446. <https://doi.org/10.1016/j.ijantimicag.2017.04.009>
- WHO. (2017). *Health Situation Analysis: Nigeria*.
- WHO. (2022). *Global Antimicrobial Resistance and Use Surveillance System (GLASS) report*. WHO Bulletin. <https://www.who.int/news/item/09-12-2022-report-signals-increasing-resistance-to-antibiotics-in-bacterial-infections-in-humans-and-need-for-better-data>
- World-Bank. (2018). *Nigeria GDP*.
- Worldmeters. (2021). *World Population*. Countries in the World by Population. <https://www.worldometers.info/world-population/population-by-country/>
- Y F Chen, Dewey, M. E., & A J Avery. (2001). Self-reported medication use for older people in England and Wales. *Journal of Clinical Pharmacy and Therapeutics*, 129–141.
- Yahya, M., Azba, S., & Al-Hayali, M. (2021). Effect of antibiotic misuse on the emergence of microbial resistance among urologic patients. *Iraqi Journal of Pharmacy*, 18(1). <https://doi.org/10.33899/iph.2021.168843>
- Yakubu, I., Garmaroudi, G., Sadeghi, R., Tol, A., Yekaninejad, M. S., & Yidana, A. (2019). Assessing the impact of an educational intervention program on sexual abstinence based on the health belief model amongst adolescent girls in Northern Ghana, a cluster randomised control trial. *Reproductive Health*, 16(1), 1–12. <https://doi.org/10.1186/S12978-019-0784-8/TABLES/4>
- Yezli, S., Yassin, Y., Mushi, A., Maashi, F., Aljabri, N., Mohamed, G., Bieh, K., Awam, A., & Alotaibi, B. (2019). Knowledge, attitude and practice (KAP) survey regarding antibiotic use among pilgrims attending the 2015 Hajj mass gathering. *Travel Medicine and Infectious Disease*, 28. <https://doi.org/10.1016/j.tmaid.2018.08.004>
- Yu, H., Zhang, P., Wang, X., Wang, Y., & Zhang, B. (2019). Effect of Health Education Based on Behavioral Change Theories on Self-Efficacy and Self-Management Behaviors in Patients with Chronic Heart Failure. *Iranian Journal of Public Health*, 48(3), 421. <https://doi.org/10.18502/ijph.v48i3.884>
- Yusuf, I., Jobbi, Y. D., Arzai, A. H., Shuaib, M., & Ahmad, A. S. (2019). Self-medicated broad spectrum antibiotics in rural communities in kano-nigeria: A cross-sectional survey. *African Journal of Biomedical Research*, 22(3), 249–256.
- Zeru, N., Fetene, D., Geberu, D. M., Melesse, A. W., & Atnafu, A. (2020). Self-Medication Practice and Associated Factors Among University of Gondar College of Medicine and Health Sciences Students: A Cross-Sectional Study. *Patient Preference and Adherence*, 14, 1779–1790.

<https://doi.org/10.2147/PPA.S274634>

Zhu, X., Pan, H., Yang, Z., Cui, B., Zhang, D., & Ba-thein, W. (2015). Self-medication practices with antibiotics among Chinese university students. *Public Health*, *130*, 78–83. <https://doi.org/10.1016/j.puhe.2015.04.005>



APPENDICES

Appendix A: Study Consent Form

Consent form for a study on the effectiveness of health education intervention to reduce antibiotics misuse and self-medication among adult PLHA in Bauchi state Nigeria

Greetings

My name is Yusuf Abdu Misau, and I am a postgraduate student at Mount Kenya University in Thika Kenya. I am a Nigerian citizen and hailed from Bauchi State. I am undertaking a research project that aims to document the extent of antibiotics misuse and self-medication practice among PLHA in Bauchi state. This study will compare the effectiveness of health education as an intervention to reduce antibiotics misuse and self-medication. You have been purposefully selected to participate in this study. If you accept, you will be asked some questions. Based on the findings of this research project we plan to provide information that can be used to reduce the high prevalence of antibiotics misuse and self-medication if found. You are free to participate in this research or vice-versa. By your agreeing to participate in this research, you can be assigned into one of two groups of the research. Either way an anonymous questionnaire will be administered to you and your responses will be treated as strictly confidential.

Procedure: Health education will be done in three sessions to the experiment group. Each session will last for an hour every month. The questionnaire will be administered before the first session and after the last session. Individuals in the control groups will have their health education sessions after the completion of the post intervention data collection. If any question is uncomfortable, then you may

choose to skip that question.

Name and affiliation of researcher: Yusuf Abdu Misau

Name of Organization: Mount Kenya University Thika Kenya

Sponsor of research: Self sponsored

Expected interview time: The questionnaire is about 25-30minutes while health education session is 1 hour.

Risks and Discomforts: There is no risk associated with participating in this research. You will not be affected in any way and in case of discomfort you may opt out of the interview.

Cost to participants: Participation in this research comes with no cost.

Benefits: You will not benefit directly but the information obtained from this study will help to provide clues on antibiotics misuse and self-medication which eventually will be use in implementing measures to address the problem.

Confidentiality: Confidentiality and anonymity will be maintained all through the research. The information you provide is confidential.

1. The study tool is anonymous. There will be not any form of identifier link to you as a respondent. The questioning will take place in a private place, where no one else will hear what you discuss with the interviewer.
2. The information that we collect from this research will be kept confidential. The interviewers are very unlikely to know you personally. Only one woman/man per family will be interviewed
3. Information collected from you will be stored in a file that will not have your name on it, but a number assigned to it instead.
4. The name associated with the number assigned to each file will be kept under lock and key and will not be disclosed to anyone except the investigators.
5. You may talk to the researcher in case you have any concern or questions. All research team members have been carefully selected and received

specialized training

6. The questionnaire will be destroyed after the research is completed. Voluntariness: Your participation in this research is entirely voluntary. Alternatives to Participation: If you choose not to participate this will not affect you in any way. Incentives: You will not be provided any incentive to take part in the research Right to refuse or withdraw: You do not have to take part in this research if you do not wish to do so or refuse to participate this will not affect you in any way. You may stop participating answering the questions at any time that you wish, and there will be no negative consequences for you in any way. Conflict of Interest: The researcher declares no conflict of interest. Statement of person obtaining informed consent: I have fully explained this research to _____ and have sufficient information, including about the risk and benefits, to make an informed decision.

Signature: _____

Interviewer (Name): Address:

Date:

Statement of consent: I have read the research description and I understand that my participation is voluntary. I know the purpose, methods, risks and benefits accrued from the research. I understand that I can stop the interview at any time in case any question is uncomfortable. I have a copy of this consent that I have signed.

Signature: _____

Respondent(Name): Address:

Date:

WITNESS SIGNATURE (IF APPLICABLE): WITNESS NAME (IF APPLICABLE):

This study has been approved by the Mount Kenya Health Research Ethics Committee which is a committee whose task it is to make sure that research participants are

protected from harm. If you have questions about your participation in the research,
you can contact:

Name: Yusuf Abdu Misau

Address: Mount Kenya University Thika Kenya

Telephone: 08035796880 Email: yusufmisau@gmail.com



Appendix B: Study Questionnaire

Demographics

Antibiotics Misuse and Self-Medication among PLHA in Bauchi State Nigeria Study Questionnaire

Study arm	Interviewer Initials	Date of Interview	Unique ID
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Age	Marital Status	Participant's Group	
<input type="text"/>	<input type="text"/>	<input type="text"/>	
Weight(Kg)	Sex		
<input type="text"/>	<input type="text"/>		
Education	Ethnicity Group		
<input type="text"/>	<input type="text"/>		
Previous Hospitalization	Previous Disease		
<input type="text"/>	<input type="text"/>		
Height	Place of Residence		
<input type="text"/>	<input type="text"/>		
Family Size	ARV Years		
<input type="text"/>	<input type="text"/>		
Last Viral load	Occupation		
<input type="text"/>	<input type="text"/>		
CD4 Count	Diagnosis Years		
<input type="text"/>	<input type="text"/>		
Care Access	Hepatitis B Coinfection		
<input type="text"/>	<input type="text"/>		
	Cell Phone		
	<input type="text"/>		
Income			
<input type="radio"/> Less than N10000 <input type="radio"/> N10000-N50000 <input type="radio"/> N50000-N100000 <input type="radio"/> More tha N100000			

Antibiotics Misuse and Self-Medication among PLHA in Bauchi State Nigeria

Antibiotics Misuse and Self-Medication Habits

1. As HIV positive adult, when last did you had self-prescribed antibiotics?

- < 3 months 3-6 months 7-9 months 10-12 months Unsure Never

2. What was the purpose for using self-prescribed antibiotics?

- | | | |
|-----------------------------------|---|---|
| <input type="radio"/> Fever | <input type="radio"/> Stomach ache | <input type="radio"/> Painful urination |
| <input type="radio"/> Cough | <input type="radio"/> Skin rashes | <input type="radio"/> oral rashes or tooth ache |
| <input type="radio"/> Sore throat | <input type="radio"/> Catarrh | <input type="radio"/> Not able to remember |
| <input type="radio"/> Diarrhea | <input type="radio"/> Vaginal discharge | |

3. What are the common antibiotics you self-prescribed?

- Amoxicillins Ampiclox Penicillins Ciproxin Septrin Flagyl Others:

4. Your self-prescribed antibiotic was obtained at:

- | | | |
|--|---|--------------------------------|
| <input type="radio"/> Home(Parent or Spouce) | <input type="radio"/> From a friend | <input type="radio"/> Pharmacy |
| <input type="radio"/> Patent vendor | <input type="radio"/> Previous prescription | |

Mount Kenya

Knowledge of Antibiotics Misuse and Antibiotics Resistance

5. How long should an antibiotics be taking to be effective?

- Once only Until condition cures Until all drugs finished As Doctor's specified
 Unsure

6. Left over antibiotics from friend or relative can be used if the condition is the same

- Disagree Strongly disagree Unsure Agreed Strongly agreed

7. If antibiotics has worked before, same can be purchased if condition is similar

- Disagree Strongly disagree Unsure Agreed Strongly agreed

8. With antibiotics resistance, the drugs stops working in you

- Disagree Strongly disagree Unsure Agreed Strongly Agreed

9. There is now widespread resistance of common antibiotics all over

- Disagree Strongly disagree Unsure Agreed Strongly agreed

10. Antibiotics resistance affects me, my family and the society

- Disagree Strongly disagree Unsure Agreed Strongly agreed

Behavioral Beliefs; (On scale of 1-5 (most agreed, select your best response))

11. Using antibiotics without prescription is cost effective

- 1 2 3 4 5

12. Using antibiotics without prescription saves time

- 1 2 3 4 5

13. By using unprescribed antibiotics, I can develop resistance to the drug

- 1 2 3 4 5

14. By using unprescribed antibiotics I can develop side effects or adverse reaction

- 1 2 3 4 5

15. My condition could get worse by using self-prescribed antibiotics

- 1 2 3 4 5

16. Antibiotics self-medication could leads to error in my diagnosis by health workers

- 1 2 3 4 5

Normative Beliefs; (On scale of 1-5(most agreed, select your best response))

17. My friends can provide me with information for self-medication

1 2 3 4 5

18. My family members can provide me with antibiotics I need for self-medication

1 2 3 4 5

19. I have health worker in my family or friends who advice me on self-medication

1 2 3 4 5

20. The health workers would not be happy if they know I self-medicate with antibiotics

1 2 3 4 5

Control Beliefs; (On scale of 1-5(most agreed, select your best response))

21. Its easier to obtain antibiotics at patent medicine stores

1 2 3 4 5

22. When I used my previously prescribed antibiotic it always works.

1 2 3 4 5

23. The Doctors always prescribed the same drug

1 2 3 4 5

24. Even when I request, the Doctors will not necessarily prescribe antibiotics

1 2 3 4 5

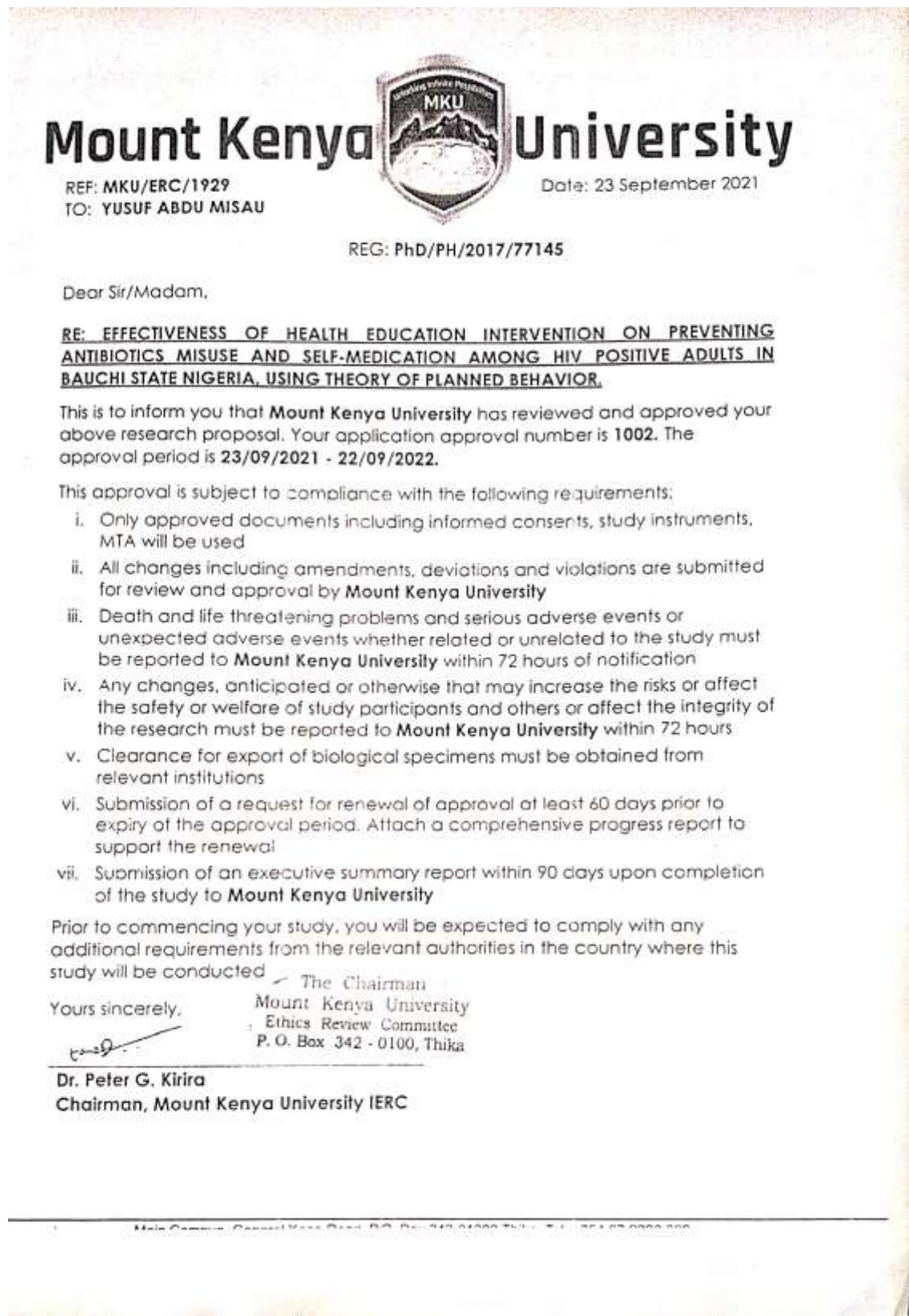
25. Doctors should only prescribed antibiotics when its necessary

1 2 3 4 5


26. Government should have a policy for controlling antibiotics prescriptions

1 2 3 4 5

Appendix C: Ethical Approval



Appendix D: Introduction Letter


Mount Kenya University

DIRECTORATE OF GRADUATE STUDIES

PHD/PH/2017/77145

30th September, 2021

To Whom It May Concern

Dear Sir/Madam,

RE: YUSUF ABDU MISAU - REGISTRATION NO. PHD/PH/2017/77145


The purpose of this letter is to introduce the above named student who is pursuing **Doctor of Philosophy in Public Health** in the Department of **Epidemiology & Biostatistics** in the School of **Public Health**.


The title of his research is *"Effectiveness of Health Education Intervention on Preventing Antibiotics Misuse and Self-Medication Among HIV Positive Adults in Bauch State Nigeria, Using Theory of Planned Behaviour."*

He has been cleared by the University's Ethics Review Committee (Certificate attached) and now has to proceed to the field to collect data for his research between **October and March, 2022**.

Any assistance accorded to him will be highly appreciated.

Thank you.


Dr. Samuel M. Karenga, PhD
Director, Graduate Studies
Enc.


Mount Kenya University
P.O. Box 342 - 01000, THIKA
Office of the Director
Graduate Studies

Main Campus, General Kago Road, P.O. Box 342-01000 Thika. Tel: +254 67 2820 000,
Cell: +254 720 790 796, 0709 153 000
Email: info@mku.ac.ke, Web: www.mku.ac.ke
Chartered and ISO 9001 : 2015 Certified Institution.
Unlocking Infinite Possibilities

Appendix E: Bauchi State Govt Ethical Permit



GOVERNMENT OF BAUCHI STATE

MINISTRY OF HEALTH

Bello Kirfi Road, Off Murtala Mohammed Way,
P.M.B. 065, Bauchi

E-mail: bauchismoh@gmail.com

Reference.....MOH/GEN/S/1409/I.....

Date.....8th October, 2021.....

PROTOCOL REG. NO: BSMOH/REC/051/2021
PROTOCOL APPROVAL NO: NREC/03/11/19B/2021/51
PROTOCOL APPROVAL DATE NO: OCTOBER 2021 TO SEPTEMBER 2022

Dr Yusuf Abdu Misau,
Department of Epidemiology and Biostatistics,
School of Public Health,
Mount Kenya University,
Thika-Kenya.

ETHICAL CLEARANCE FOR SUBMITTED PROTOCOL:

"Effecteness of Health Educational Intervention on Preventing Antibiotics Misuse and Self-medication among HIV Positive Adults in Bauchi State Nigeria"

The Bauchi State Health Research Ethics Committee (HREC) under the State Ministry of Health has received the above named protocol for Ethical Clearance and approval in line with the guidelines set by the Committee. The protocol was reviewed and the Committee noted that the research falls under the Low Risk Category which does not entails clinical trials or any invasive procedures.

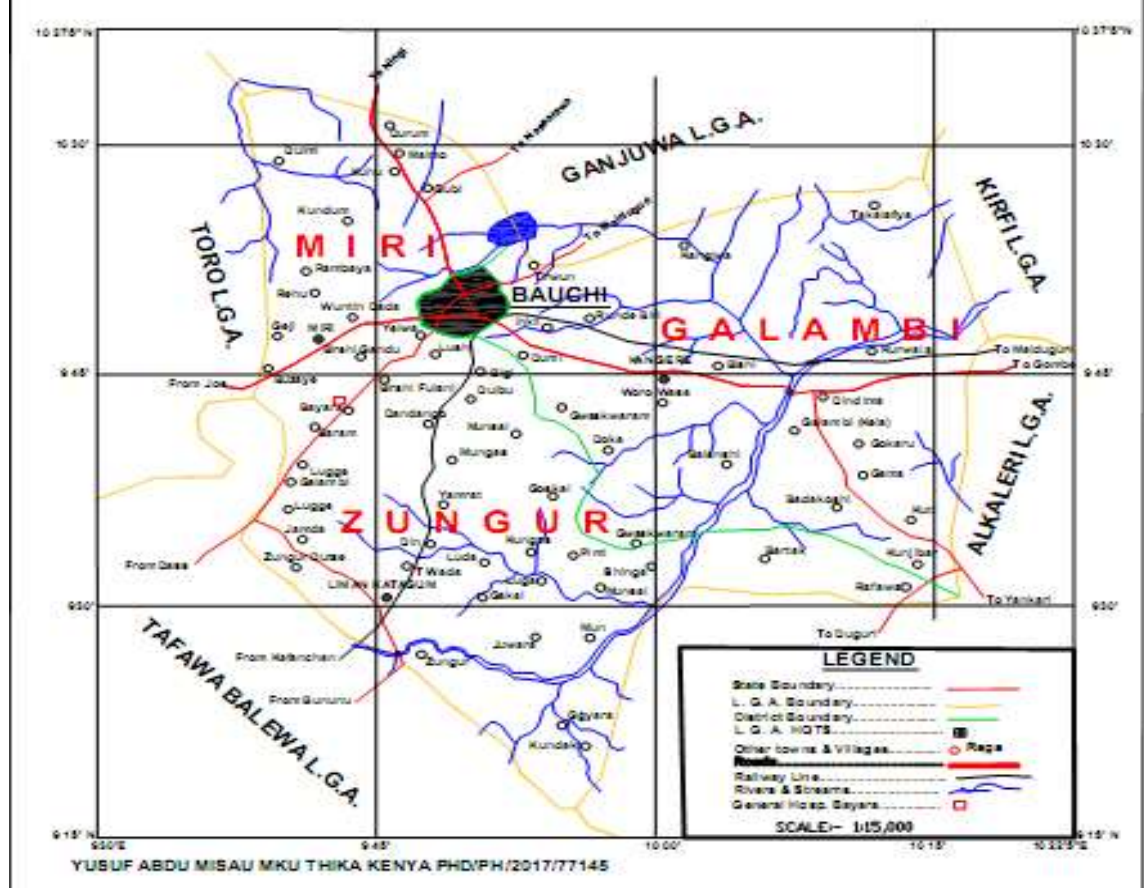
2. Consequently, the Committee has granted approval for the research to be conducted within the stipulated timeframe above. However, you should share with us your workplan clearly indicating the start date, where and when to visit the research site(s) and **also the final results of your findings**

3. The Committee requires you to comply with all Institutional Guidelines, Rules and Regulations and with the Tenets and Code of the National Health Research Ethics Committee including that all adverse events are reported promptly to the Committee. **No changes are permitted in the research without prior approval by the Committee** except in circumstances outlined in the Code. The Committee reserves the right to conduct compliance visit to your research site at short notice.


(Usman U. Muhammad)
For: Hon. Commissioner.


Appendix F: Study Location Map

**Map of Bauchi Municipal Area
Bauchi-Nigeria
SHOWING GENERAL HOSPITAL BAYARA (STUDY AREA)**



IEC MATERIAL - I
***BENEFITS OF USING ANTIBIOTICS
BY WORKER'S PRESCRIPTION ONLY***

- Saves Cost
- Proper diagnosis
- No fear of interaction with ARVs
- Immediate Cure of Minor bacterial Infections
- Better Quality of Life




Courtesy: Yusuf Abdu Misau PhD Thesis MKU Kenya 2022

IEC MATERIAL - 2

AVOID SELF-MEDICATION WITH ANTIBIOTICS

Antibiotics self-medication
can leads to early
DEATH
Among people living with
HIV/AIDS




Courtesy: Yusuf Abdu Misau PhD Thesis MKU Kenya 2022

IEC MATERIAL - 3

DANGER OF SELF-MEDICATION

- Delay in appropriate diagnosis
- Interaction with HIV drugs
- Progression of HIV disease
- Worsening of other diseases



Courtesy: Yusuf Abdu Misau PhD Thesis MKU Kenya 2022

Appendix J: Similarity Index

EFFECTIVENESS OF HEALTH EDUCATION ON PREVENTION OF ANTIBIOTIC MISUSE AND SELF-MEDICATION AMONG HIV-POSITIVE ADULTS IN BAUCHI STATE NIGERIA

ORIGINALITY REPORT

19%

SIMILARITY INDEX

15%

INTERNET SOURCES

11%

PUBLICATIONS

3%

STUDENT PAPERS

PRIMARY SOURCES

1	researchspace.ukzn.ac.za Internet Source	1%
2	www.texilajournal.com Internet Source	1%
3	www.dissertation.npmcn.edu.ng Internet Source	1%
4	journals.plos.org Internet Source	1%
5	worldwidescience.org Internet Source	1%
6	Amy R. Sapkota. "Self-medication with antibiotics for the treatment of menstrual symptoms in southwest Nigeria: a cross-sectional study", BMC Public Health, 2010 Publication	<1%
7	Submitted to Universiti Sains Malaysia Student Paper	<1%