COLLEGE OF MEDICINE

DETERMINANTS OF DECISIONS BETWEEN CLINICIAN AND PATIENT TO PRESCRIBE ANTIMICROBIALS: A CLINICIAN'S PERSPECTIVE

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(BSc in Clinical Medicine)

A Dissertation Submitted in Partial Fulfillment of the Requirements for the Master of Science Degree in Health Sciences (Antimicrobial Stewardship) in the Pathology Department, Faculty of Biomedical Sciences and Health Profession

19th October, 2021

DECLARATION

I, Morris Chalusa, hereby declare that this proposal is my own original work. Reference to, quotation from and discussion of the work of any other person has been correctly acknowledged within this proposal. It is being submitted to College of Medicine Research Committee for my Master's Sciences Degree in Health Sciences (Antimicrobial Stewardship). It has never been submitted before anywhere for any purpose, by anyone.

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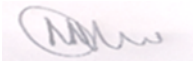
Signature : 

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CERTIFICATE OF APPROVAL

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ABSTRACT

Background: Antimicrobial resistance is a great public health challenge which has been accelerated by the inappropriate use of antimicrobials. The inappropriate use of antimicrobials is associated with the increased risks of prolonged hospital stay, self-medication of self-limiting conditions and more admissions to hospitals. Some of the factors that increase antimicrobial resistance appear to be modifiable and are determine by clinician-patient communication. Increased antimicrobial resistance was the cause of severe infections in the year 2012 in Malawi. Out of a total of 100,000 recorded deaths, 70,200 (70.1%) were attributable to infectious diseases.

Methods: A qualitative study was used to find out what factors determine the decision between clinician and patient to prescribe antimicrobials when not necessitated in Mulanje, Malawi, through the use of unstructured questionnaires, semi-structured interviews and focus group discussions. Clinicians' knowledge of antimicrobial resistance as well as their communication skills was also sought. Interview and open ended survey responses were translated, transcribed and coded for themes.

Findings: Participants pointed out that patient preferences, patient belief and clinician lack of education were among the factors that contribute to the decisions to prescribe antimicrobials. Most clinicians showed lack of knowledge on the definition of antibiotic and antimicrobial resistance.

Conclusion: Inappropriate use of antimicrobials is facilitated by prescribing decisions made by clinicians who are greatly influenced by their patients. Improving antimicrobial prescription requires educational interventions for both clinicians and patients.

Key words: antibiotics, antimicrobial, resistance, Clinicians, inappropriate prescription

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ACRONYMS

AMR	Antimicrobial resistant
ABR	Antibiotic resistant
DHO	District Health Office
MOH	Ministry of Health
HIV	Human Immunodeficiency Virus
AIDS	Acquired Immunodeficiency Syndrome
WHO	World Health Organization
QECH	Queen Elizabeth Central Hospital
LMICs	Low Middle Income Countries
GLASS	Global antimicrobial resistance surveillance system
COMREC	College of Medicine Research Ethics Committee
BRICS	Brazil, Russia, India, China and South Africa
SDM	Shared Decision Making

CHAPTER 1: INTRODUCTION

1.1 Background

Antimicrobial resistance is a great public health challenge which has been accelerated by inappropriate use of antimicrobials [1]. Overprescribing of antimicrobials is associated with increased risks of prolonged hospital stay, self-medication of self-limiting conditions and amplified admission to hospital. Increased antimicrobials resistance is the cause of severe infections [2]. The goal of medicine as a profession is dedication to caring for and healing of the sick in a dignified manner depending on a stable and trusting clinician-patient relationship. Inappropriate use of antibiotics by medical professionals is a global concern and examining clinicians' knowledge of antimicrobials will be important in developing strategies to improve antibiotic use [3].

Clinicians communication skills are the core clinical skills in the practice of medicine. The doctor-patient relationship is the interaction between the two parties and a central process in the practice of medicine [3]. Antimicrobial misuse is linked to inappropriate prescribing behaviour amongst physicians. There are many factors which could influence doctors' decisions leading them to breach the principles of a good clinical practice [4].

1.2 Global Trends in Antimicrobial Resistance

Globally, at least 700,000 people die each year because of drug resistance illnesses such as bacterial infections, Malaria, Tuberculosis and HIV / AIDS [5]. Clinicians cite patient's pressure and customer satisfaction as major reasons for inappropriate antibiotic prescriptions. Clinicians

are more likely to prescribe antibiotics if they perceive that parents who have brought sick children to the hospital want antimicrobials [6].

Antimicrobial Resistance occurs naturally and over time when microorganisms such as bacteria, fungi, viruses, and parasites are exposed to antimicrobial substances. As a result, treatments become ineffective and infections persist in the body.

Much of the global overuse of antimicrobials occurs in low - and middle-income countries (LMICs), topped by the BRICS nations (Brazil, Russia, India, China and South Africa) driving consumption in both animal and human sectors [7].

In sub Saharan Africa, one factor contributing to AMR is misuse of antibiotics. However improved malaria diagnostics and the recognition that malaria transmission is decreasing globally have highlighted the lack of tests for other infections and many patients who test negative for malaria are treated with antibiotics indiscriminately [8].

1.3 Local Trends in Antimicrobial Resistance

Infectious diseases remain the leading cause of death in African countries and are responsible for the majority of years of life lost including the majority of deaths of children under 5 years old. In the year 2012 in Malawi, out of a total of 100,000 recorded deaths, 70,200 (70.1%) were attributable to infectious diseases. The high burden of communicable diseases, particularly the HIV/AIDS burden intimates extensive antimicrobial use and subsequent resistance but the burden, nature, extent and sequelae of AMR in Malawi are yet to be quantified [9].

There is an increasing proportion of E. coli and Klebsiella blood-stream infections among patients at Queen Elizabeth Central Hospital (QECH) in Blantyre, which are resistant to ceftriaxone and Fluoroquinolones. Resistance to ceftriaxone and Fluoroquinolones in Salmonellae represents a significant threat to the success of antibiotic treatment in Malawi that has resulted from widespread usage of antibiotics [10].

Antimicrobial resistance in Malawi may also be occasioned by uncontrolled medical and veterinary use of antibiotics by the private sector and the community [11].

CHAPTER 2: LITERATURE REVIEW

2.1 Determinants of Decision Making in the Clinician-Patient Relationship During Antimicrobial Prescription

Some of the barriers to prudent prescribing of antibiotics by general practitioners (GPs) are known, and these are: patients demanding antibiotics; prescribing antibiotics to save time due to the perception that it takes longer to explain why antibiotics are not needed; concerns that the patient may not return for follow up; uncertainty in the diagnosis where antibiotics may be warranted; concerns about possible complications; preservation of the doctor-patient relationship, and knowledge and attitudes towards AMR [12]. Szymczak explains that clinicians identify patient pressure and demand for antibiotics as a major barrier to more judicious prescribing [13]. Brookes-Howell, et al. observes that clinicians speak of familiarity with the patient, which help clinicians in their decision on whether or not to prescribe antibiotics [14].

Patient pressure and expectation were cited among the reasons for prescribing antibiotics 'unnecessarily', in particular where a shortage of consulting time meant that the doctor felt unable to adequately explain why antibiotics were inappropriate [15]. Physicians reported that the problem of diagnostic uncertainty is the basis for antibiotic misuse and explaining why antibiotics are not necessary is too time-consuming and unrewarding [16].

Providers often intend to prescribe antibiotics appropriately yet barriers can influence practice. Potential interventions should provide tailored audit feedback, address perceived patient demand, and support clinic structure to provide feedback. Strategies should consider time and resources

available to address barriers. Patient's lack of knowledge also drives their demands for antimicrobials [17].

Shehadeh et al. [18] reported that confusion among adults regarding whether antibiotics are effective against bacteria and viruses was clear. Actually, it was argued that many people do not understand the differences between bacteria and viruses and believe that antibiotics work against both. There is excessive use of antibiotics which must be checked by giving priority to knowledge-based education programs for the younger generation in the Jordanian community.

Psychological theories illustrate that clinicians' knowledge and beliefs are influenced by clinician prescribing behaviour process specifically: disease knowledge, beliefs about the consequences of their prescribing decisions and perceived patients' expectations at clinical consultations [19]. Coenen et al. [20] illustrate that perceived patient demand for antibiotics is significantly associated with the prescription of antibiotics to adult acute cough patients and antibiotics were prescribed more often when a patient was perceived to demand an antibiotic even when the lung auscultation was normal or revealed only one abnormal finding.

2.2 Clinicians' Communication Skills When Prescribing Antimicrobials

Doctor's communication skills are the core clinical skills in the practice of medicine, with the ultimate goal of achieving the best outcome and patient's satisfaction which are essential for the effective delivery of health care [3]. Moreover, improving clinician's communication skills helps to bridge the gap between physician's and patient's expectations.

In a pragmatic clinical trial carried out in the Netherlands, the authors observed that General Physicians (GPs) assigned to rapid antigen detection testing for the diagnosis of streptococcal pharyngitis, C-reactive protein (CRP) devices, CRP testing group, prescribed fewer antibiotics than those in the control group (30.7% versus 35.7%) and those trained in communication skills treated 26.3% of all episodes of respiratory tract infection with antibiotics compared with 39.1% treated by family physicians without communication skills [1].

Lack of communication skills and diagnostic uncertainty rank among the principal indirect factors influencing antibiotic prescription [16]. Mangione observed that effective communication is a tool where antibiotics were prescribed in 26% of visits for respiratory infections to family physicians who had communications training compared with 39% of visits to general physicians in the control group. In the same study, another intervention, public commitments to use antibiotics appropriately, resulted in 20% reduction in inappropriate antibiotic prescribing for adults with acute respiratory tract infections compared with the control group [6].

In the same study, there is also an emphasis on the use of communication strategies such as use of explanations on why antibiotics are not needed, for example: “You have a chest cold, and antibiotics won’t help”, and positive treatment recommendations such as: “Taking ibuprofen and drinking plenty of fluids will help you feel better” [6].

It also emphasizes the use of contingency plan, such as: “If you are not better in three or four days, call or come back and we can reassess the need for antibiotics then” [6].

Antimicrobial prescription can also be reduced in settings where there is one-on-one patient-directed education and in the workplace [21].

2.3 Clinicians' Knowledge On Availability of Antimicrobials Guidelines and Resistance

The role of antibiotic policies is to guide physicians to prescribe all-appropriate antibiotics, avoid unjustified prescription, reduce the emergence of antibiotic-resistant bacteria, support high-quality clinical practice and minimize unnecessary expenses [22]. Fleming and Bradley reported that many participants, from all professions, were not aware of the Guidelines for Antimicrobial Prescribing in Primary Care 2011 or of the Health Protection Surveillance Centre (HPSC) in Ireland [22].

In a study done in Malta by Fsadn and Galizia, guidelines assessment done reported that, 81 assessable antibiotic prescriptions were evaluated as follows: fully adherent (compliant) was 6 (7%) and non-adherent (non-compliant) was 76 (94%) [23].

2.3.1 Knowledge on Factors That Contribute to Resistance

In a study conducted in Malaysia, the majority of the respondents agreed that "too many antibiotic prescriptions" (55%, 78), "too many broad spectrum antibiotics used" (50%, 71), and "excessive use of antibiotics in livestock" (43%, 61) were leading contributors to AR. Another group felt that "too long durations of antibiotic treatment" (42%, 59), "dosing of antibiotics are too low" (36%, 51), "poor hand hygiene" (27%, 38), "not removing the focus of infection" (41%, 58) and "paying too much attention to pharmaceutical representatives / advertising" (37%, 53) were moderately important factors contributing to AR [24].

2.4 Clinician Patient Relationships

It is argued that Clinicians' skills at communicating their emotions and feelings to patients and at understanding patients' verbal and nonverbal communication are crucial to positive relationships [25]. The patient-clinician relationship has both emotional and informational components – what Di Blasi and colleagues have termed emotional care and cognitive care. Emotional care includes mutual trust, empathy, respect, genuineness, acceptance and warmth. Cognitive care includes information gathering, sharing medical information, patient education, and expectation management [26].

It is foretell that there is growing agreement among physicians that the quality of the relationship with the patient is critical in high-quality health care and can influence outcomes [25]. Jennifer argued that a doctor's communication and interpersonal skills encompass the ability to gather information in order to facilitate accurate diagnosis, counsel appropriately, give therapeutic instructions, and establish caring relationships with patients [27]. It is also reported that patient trust has an impact on patient satisfaction, adherence, and continued enrollment [28].

Evidence support that trust and communication with patients has contributed to improve patient outcome and patients being satisfied with the services they were offered at the health facility [29] It is also argued that doctor–patient relationship has been a keystone of care to patients and the medium in which data is gathered, diagnoses and plans are made, compliance is accomplished, and healing, patient activation, and support are provided [30].

2.5 Justification for the Research Project

The present study is an effort to identify determinants of decisions that would assist in appropriate antimicrobial prescriptions. The findings will shed more light on factors that promote overprescribing of antimicrobials and factors that influence clinicians to give over decision making to patients. Utilization of national antimicrobials guidelines and policies will help in propagating appropriate prescriptions of antimicrobials by clinicians. The study findings will help clinicians and policy makers to improve on antimicrobial prescriptions in health care settings.

2.6 Theoretical Framework

2.6.1 Introduction

A theoretical framework or model is a set of highly abstract, related constructs that broadly explains phenomena of interest, express assumptions, and reflects a philosophical stance. A theoretical framework is used to guide the researcher and help in understanding the variables when conducting a study. This study will use Shared Decision Model (SDM) to explain clinicians' factors and influences towards antimicrobial prescriptions to patients, in the case where patients demand antimicrobials from clinicians [31].

2.6.2 The Informative Model

The informative model is sometimes called the scientific, engineering or consumer model. In this model, the objective of the physician-patient interaction is for the physician to provide the patient with all relevant information, for the patient to select the medical interventions he or she wants, and for the physician to execute the selected interventions. This model explains and emphasizes

that a patient must be fully informed about and understand the potential benefits and risks of their choice of treatment [32].

2.6.3 Shared Decision Making

In contrast to the paternalist and informative model where information flows from doctor to patients, shared decision model information exchange is a two-way communication set up. On the one hand, clinicians provide relevant information about treatment options and on the other, patients provide relevant information about life experience, illness, values, preferences, life styles and knowledge about treatment.

It is 'an approach where clinicians and patients share the best available evidence when faced with the task of making decisions, and where patients are supported to consider options, to achieve informed preferences' [31]. SDM recognizes the need to support autonomy by building good relationships, respecting both individual competence and interdependence on others [31]. Coxeter reports that Shared decision making is an effective strategy for reducing antibiotic prescribing in primary health care but widespread implementation is limited [33]. In a study conducted in Quebecit it was reported that shared decision making helps in reduction on the use of antibiotics for acute respiratory infections [34].

2.7 Study Objectives

2.7.1 Main Objectives

a. To find out what factors determine the decision between clinician and patient to prescribe antimicrobials when not necessitated.

2.7.2 Specific Objectives

a. Establish the determinants of decision making in the clinician – patient relationship in the Malawian context.

b. Explore clinicians' communication skills when prescribing antimicrobials.

c. Assess clinicians' knowledge on availability of antimicrobials guidelines and antimicrobial resistance.

CHAPTER 3: METHODOLOGY

3.1 Study Design

This is a cross-section qualitative study using in-depth interviews and focus group discussions. The qualitative method was chosen because of its usefulness in exploring people's views and experiences. This study design was used because it is relatively inexpensive and the study was conducted within a short period of time [35]. Focus group were also used to facilitate an exchange of ideas and information thereby stimulating individual group members thinking and allowing group members to build on each other's ideas than in-depth individual interview alone where exchange of ideas cannot be done [36].

3.2 Study Place

This study was conducted in Mulanje District which is located in the Southern Region of Malawi. It has two hospitals and 21 health centers and more than 60 clinicians. It is a border district in Malawi bordering Mozambique and has also registered high prevalence rate of HIV which is currently 20.6 % [37]. The high burden of communicable diseases, particularly the HIV/AIDS burden intimates extensive antimicrobial use and subsequent resistance [9]. This is also attributed to frequent admission to hospitals and high rate of antimicrobial use which, in turn, increases rate of antimicrobial resistance. Mulanje District Hospital and Mulanje Mission Hospital are also teaching hospitals for both clinicians and nurses.

The current population of Mulanje is estimated at 587,553[37]. Mulanje continues to have a high burden of diseases, with 65% of all admissions in the district being as a result of communicable

disease conditions. The leading causes of morbidity are HIV and AIDS: 34. 9 %, Lower Respiratory Tract: 9.1 %, Malaria: 7.7 % and Diarrhoea: 6.4 % [37].

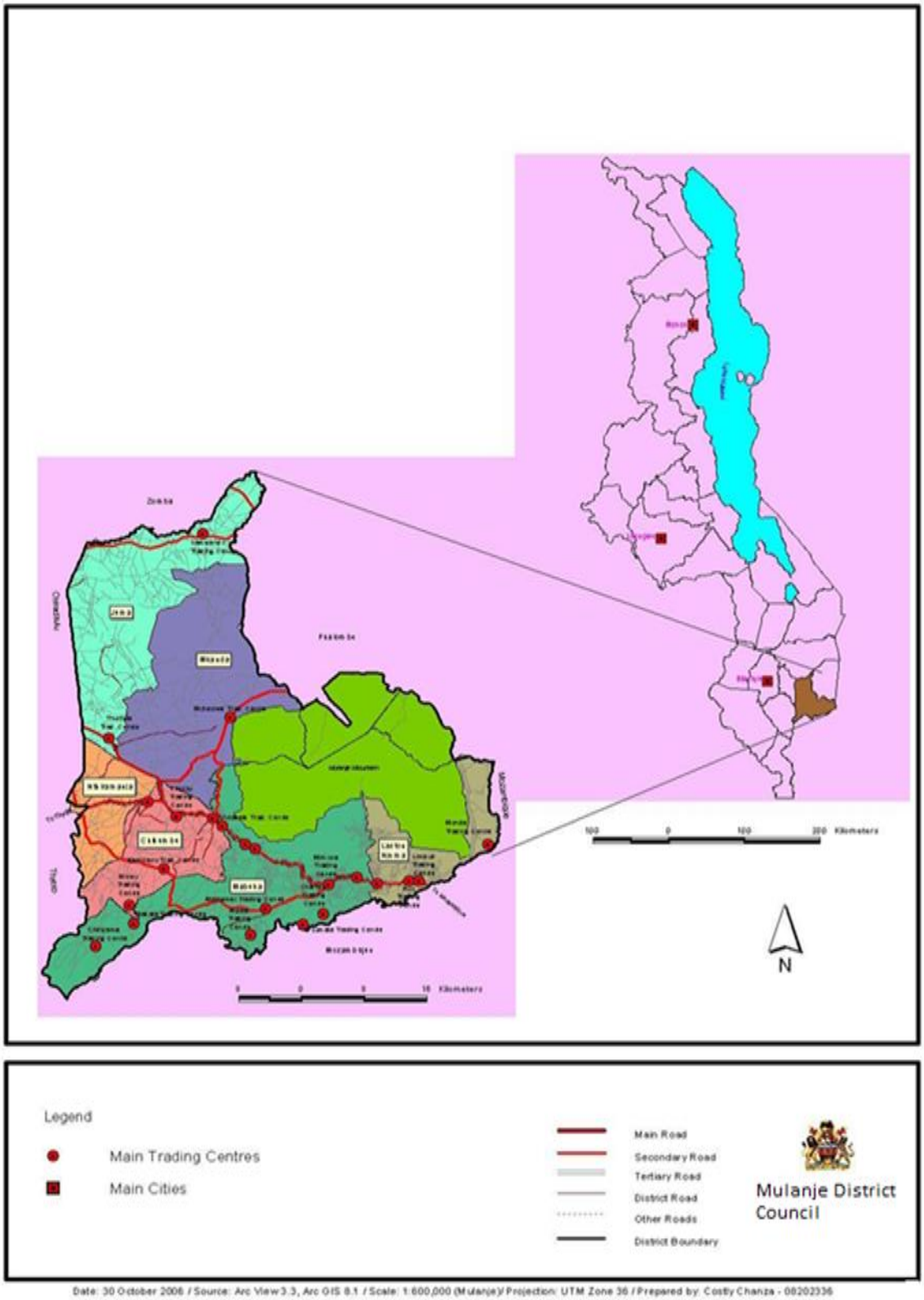

Figure 1: Study Location (Source: Mulanje Social Economic Profile)

3.3 Study Population

The study's population comprised clinicians (both qualified and interns) at the district hospital, Christian Health Association of Malawi CHAM health facilities and health centers.

3.4 Sample Size

We interviewed a total of 30 participants so as to capture as much information as possible until repetitive and redundancy has occurred [38]. Both qualified clinicians and interns from Mulanje district Hospital, Mulanje Mission Hospital, Chonde Health Center and Chambe health Centers were interviewed.

3.5 Selection of Study Participants

Purposive sampling was used to select study participants, from health facilities that have a high rate of antimicrobial consumption and were selected based on the hospital pharmacy electronic data base. The logic and power of purposeful sampling lies in selecting information rich cases for in-depth study. In research, information rich cases are those from which one can learn a great deal about issues of central importance and hence the need to use purposive sampling.

3.5.1 Inclusion Criteria

All clinicians, both intern and qualified, who consented were included in the study.

3.5.2 Exclusion Criteria

Clinical students and those who were not willing to take part in the study were excluded.

3.5 Preparation for the Study

3.5.3.1 Enrolment of Study Participants

Prior permission before interviewing clinicians and interns was sought from the District Hospital Officer (DHO) and Mulanje Mission Hospital Medical Director and Clinical In-charge officers of Chonde and Chambe health Centers where data was collected were briefed and consent was sought. Once permission was granted from the authorities, there was a briefing of clinician team leaders from the two hospitals where they were introduced to study objectives and methodology. Study participants were given permission to withdraw from the study without any negative repercussions if they refused to continue.

3.5.3.2 Data Collection

Data was collected using unstructured questionnaires which were made up of questions that elicit free responses. These are guided conversations rather than structured interviews and would often be referred to as a "topic guide". A topic guide is made up of a list of questions with an apparent order which is not so rigid as it allows for flexibility [39]. A voice recorder was also used during focus group discussions. To ensure credibility of the findings of this study, stakeholder checking by summarizing key points at the end of the interview was done by asking the participants on what we have agreed upon in the interview [40]. The data collection tools were used in both in-depth interviews and focus group discussion, in order to have a comparison in terms of results and in this case there was no difference. Data collection was for two weeks from 24th May, 2019 to 11th June 2019.

The researcher was conducting the interviews at the health facilities. Two Focus group discussions of 6 participants each, one at Mulanje District Hospital and the other at Mulanje Mission Hospital, were conducted and in-depth interviews of 18 clinicians were done. Both focus group discussions covered all the questions in the question guides. Stakeholder checks enhance the credibility of findings by allowing participants and other people who may have specific interests in the evaluation to comment on and assess the research findings.

Face to face validation of data collected was done by supervisors to check whether the questions in the interview guides were indeed addressing the objectives of the study. Direct quotes from participants were also presented.

3.6 Data Management

Verbatim English transcriptions of the interview recordings were made to avoid loss of information. Unique identification numbers were assigned to each recorded interview to ensure privacy. The recorder used during the interviews both, in-depth interviews and focus group discussions and the written transcripts were kept in a lockable cabinet which was accessed only by the researcher and the supervisor. A laptop password was used to ensure that the audios were safe.

3.7 Data Analysis

Thematic analysis using step by step guide was used in this study. The researcher transcribed the audio data. The researcher familiarized himself with the data by repeatedly reading the transcript at least 3 times. This helped the researcher to understand the depth and breadth of the content and

also to get meaningful segments and the essence of the data. During this process, notes and markings were made within the transcript for coding [41].

Two other independent people were identified (CB and FK) to proofread and code the transcript as well. Together, they agreed on the codes to be used and a list of codes was generated. Once the list of codes was made, the researcher reread the transcript to identify similar codes that could be organized into a theme. A set of similar codes that form a coherent pattern formed a theme.

The transcripts were then reread to identify additional themes that might have been initially missed. Themes were reviewed to assess if they were indeed relevant. When all the themes and subthemes were organized, the researcher then defined and named each theme accordingly, ready for analysis [42].

3.8 Dissemination

It is expected that the study will provide information on factors that affect clinician-patient relationship when prescribing antimicrobials. Results of this study will be presented at both district and national level through review meetings coordinated by Ministry of Health (MOH) and other stakeholders and also at College of Medicine research dissemination conference. Printed hard copies will be made available to College of Medicine Library and College of Medicine Research Ethics Committee.

3.9 Ethical Consideration

To ensure autonomy, participants were told about the study, its significance, benefits and risks (if any) to study respondents. This ensured the right for them to make an informed decision and voluntarily participate. Upon explanation of what was involved in the study, full consent was obtained from the participants prior to the study [see appendix 1]. All participants were assured of privacy and confidentiality, thus, only the team that was involved in data collection had access to the information.

Codes were used instead of names. As for welfare, participants were provided with lunch. Finally, an approval was sought from College of Medicine Research Ethics Committee [see appendix 5].

3.10 Limitations of the Study

The non-random sample clinicians who were interested in the topic were more likely to volunteer. Results cannot be generalized since data was collected in one district, there is need to do a similar study in other district with the same population.

3.11 Study Period

The study period was 12 months, from November 2018 to December 2019, beginning with preparation and presentation of a five-page proposal. Data collection was conducted for a period of two weeks after approval from COMREC.

CHAPTER 4: RESULTS

4.1 Introduction

This chapter presents the findings of the study according to the perceptions of clinicians as to the determinants of decision making of antimicrobial prescription. In line with its objectives, the findings of the study will be reported under the following headings: 1) Social demographic factors; 2) Themes, establishing the determinants of decision making; 3) Clinicians' communication skills and 4) Clinicians' knowledge on guidelines and antimicrobial resistance. A total of 30 clinicians participated in the study. These clinicians were from Mulanje District Hospital and Mulanje Mission hospital.

4.2 Social Demographic Characteristics

Table 1: Social Demographic Characteristics

		Medical assistant (n=11)	Clinical Technicians (n=16)	Clinical Officer (=3)	Overal total (n=30)
	Male	4	12	1	17
Sex	Female	7	4	2	13
Type of facility	MMH		7	2	9
	MJDH	10	10	1	21
Professional qualification		10	16	4	30
Professional experience (years)	< 1	5	2		7
	> 1	6	13	4	23

The table above shows that experienced clinicians who had worked for over 1 year were 23, while 7 had worked for less than I year. On professional qualifications, 4 were degree level clinical officers, 16 were diploma level clinical technicians and 10 were medical assistants with certificates level. On sex, 17 were males while 13 were female clinicians.

Finally, on the place of work, 20 clinicians were from Mulanje District Hospital while 10 were from Mulanje Mission Hospital.

4.3 Themes

Following Thematic analysis, the major themes that emerged from the results in this study can be listed as follows: 1) Preferences; 2) Beliefs in efficacy; 3) Negative attitude of patients towards clinicians; 4) Educating the patients; 5) Limited time /Clinician being overwhelmed; 6) Hindrance / Obstacle to antimicrobial prescription and 7) Clinician's incompetence / Lack of Knowledge. The findings are presented in the following sections and quotations are used to support the themes that emerged. Identity codes are used rather than names for confidentiality.

4.3.1 Preferences

Most clinicians stated that they prescribe antimicrobials because patients demand them as they have high expectations as regards antimicrobials. Some patients force clinicians to prescribe antimicrobials while others come with their own diagnosis to the hospital. The clinicians added that a patient's signs and symptoms and a patient's preference for antimicrobials are significant determinants of antimicrobial prescriptions. Results indicate that clinicians prescribe antimicrobials based on the patients' preferences and signs and symptoms without proper investigations. Most of this occurs in outpatient departments because of long queues. This is better illustrated by the following quotes:

> *Some patients you may find that maybe they are used to some medications in preference of the other so they might say "I do well with this kind of medication*

and these other medications, I don't find them comfortable to use, I find that I vomit after taking them".

And also maybe in their mind, they have the belief that when they come to the hospital, whenever they are going back home for them to feel that they have been helped they have at least some medications. So maybe those are the kind of things that prompt some to prescribe antimicrobial
(Clinicians # 12).

Okay, it's about the patient preferences, okay, it's just like there are a lot of antibiotics but patients may choose that "I like this antibiotic when I take it I feel good, I recover from my complaints and my disease", could be just patient expectation according to clinical condition of her disease (Clinician # 5).

Clinicians reported that they prescribe antimicrobials based on symptoms and what the patients say are the best antimicrobials for them. Clinicians prescribe antimicrobials in the absence of other tests and, even if other tests are done and the results are negative or are found to be normal, they proceed to prescribe antimicrobials. Clinicians are forced to prescribe antimicrobials based on the patient's preference.

4.3.2 Belief in Efficacy

The belief in efficacy emerged as another theme that influences antimicrobial prescription. Under this theme, clinicians reported that patients demand antimicrobials even in the presence of negative

blood tests, such as negative Malaria diagnostic tests or normal full blood count. Patients may also prefer injectable to oral antimicrobials. This emerged in an in-depth interview and focus group discussion. Most clinicians indicated that many patients believe in injectable as the best medication over oral antimicrobials.

> *Most patients believe that IM [intramuscular and IV [intravenous]. antibiotics work better than PO [per os] so you give the PO [per os] antibiotics they believe that you have not helped them. The belief that if you give them antibiotics they will dramatically change within two days if they have a fever they want it to go away within two days*
> *(Focus group discussion #2).*

> *Patients' understanding of antimicrobials is that the belief that antimicrobials, especially injectable heal any form of severe illness. Even if it is not a bacterial infection, they still think that if you give them IV [Intravenous] antimicrobials, they are going to recover*
> *(Clinician # 7).*

> *And also maybe in their mind, they have the belief that when they come to the hospital, whenever they are going back home for them to feel that they have been helped they at least have some medications. So maybe those are the kind of things that prompt some to prescribe antimicrobials. (Clinicians# 12).*

Clinicians also reported that other determinants of prescribing antibiotics are even in suspected cases of viral infections or mere cough because patients and guardians believe the condition will improve only after taking antibiotics and that any form of illness can be cured with antibiotics. As such, patients show a lack of knowledge on antimicrobials that can be used to treat a bacterial infection or a viral infection.

Clinicians reported that patients believe that having a cough means one needs antibiotics. This belief prevents proper antimicrobial prescription in a health care setting.

> *Many patients believe that whenever they are given antimicrobials they are going to be cured from what they are suffering from*
> *(Clinician #4).*

4.3.3 Negative Attitude of Patients Towards Clinicians

A major concern from clinicians was the negative attitude of patients when clinicians refuse to prescribe antimicrobials. Clinicians are considered incompetent when they refuse to prescribe antimicrobials in the presence of normal full blood count test and negative malaria diagnostic test. Clinicians explained that patients feel like they have not been assisted and in such cases, they go to another clinician and or hospital in order to have what they want.

> *They are angry. They feel like you haven't assisted them. I think the last thing they go to another Clinician (Clinician # 2).*

When we refuse to prescribe antimicrobials, they think us as those who do not know their work, we are not called good doctors because we are refusing them what they want so their attitude towards us is always bad. Sometimes they even think of switching clinicians and whatever they get from you, they can even throw away (Clinician # 8).

4.3.4 Educating the Patients

Lack of education on prescription drugs is cited as one of the determinants of inappropriate prescription of antibiotics. Clinicians mentioned that, to improve antimicrobial prescription, they need to spend enough time with patients. They further reported that patients should be properly informed of what they are suffering from so that they should understand other conditions that present the same symptoms and signs and that it is necessary to tell them the diagnosis.

I think you need to communicate on the dosage; how to take it and for how long and if there are side effects. Those things need to be communicated and when to return to the hospital if there is no improvement
(Clinician #9).

First, we need to explain why we are giving those drugs, frequency, root, and duration. And they should not share with someone else because it's only for him or them that have attended the service and the drug is prescribed only for him. I think about the problems people still share drugs somewhere behind. You should build a

good relationship between you and the patient and make sure when you have given the drug they should come back for feedback

(Clinician #11).

Patient education is a factor that can lead to a reduction in unnecessary antimicrobial prescriptions. This important theme of educating the patients is however restricted by the reality on the ground as shown in the next theme.

4.3.5 Limited Time /Clinicians Being Overwhelmed

It emerged that there is limited time a clinician can spend with an individual patient because of large numbers of patients visiting a health care setting which is a big challenge that affects clinicians. There is a lack of comprehensive history taking on patients because of having to spend the least time with each one of them.

The other factors are handling a long queue of patients in outpatient departments and workload. This results in unnecessary antimicrobials prescription in health care settings in order to relieve pressure in the outpatient department.

It depends on the number of patients you have. When we have like 50 per day we'll take time; 5, 7, minutes but when we have so many less than 3 minutes per patient. (Focus G #1).

2 minutes because we have long lines in outpatient departments and sometimes there is one clinician or two, so if you take many times with patients, they start

complaining that you are wasting their time. It affects a lot because we need to have more time with our patient and they should talk more of their complaints but with the complaints that I said that we are few Clinicians, we spend aah not enough time with the patient, so the patient do they not share more of their complaints that they have come with on that particular day

(Clinician #1).

Lack of enough time is a barrier for proper history taking, physical examinations, investigations and counseling to patients. Furthermore, because of having fewer clinicians, antimicrobials are being prescribed in order to see more patients within a short period of time and this results in no explanation to patients on what they are suffering from and the importance of adhering to medications.

4.3.6 Hindrance / Obstacle to Antimicrobial Prescription

The study also investigated problems of antimicrobial prescription in cases where this is the appropriate decision. Clinicians stated that they do face problems and challenges in prescribing the same antimicrobials because of their unavailability in the health care settings.

The findings revealed that frequent unavailability, shortage and antibiotics being sold on the open market are problems since people can go and buy without a prescription from a clinician.

Your choices may be out of stock in a particular pharmacy and that can affect your prescription as well. And the other thing is, you are not quite sure what you are

treating. So you just prescribe but then you are not really sure like blinded and treating blindly

(Clinician # 12).

One of the challenges mostly (silence) its aah repetitive usage of single antimicrobial, even in the same patients or in most outpatients seen or even inpatients, so it's mostly certain antibiotic dominate over other antibiotics, so that's one of the challenges simply because it has developed some resistance simply because of overuse and it has caused most of the unfavorable side effects and which are most difficult to treat so are some of the challenges we have met so far

(Clinician # 7).

Clinicians reported that a shortage of certain antimicrobials makes them prescribe the same antibiotics, even in cases where they believe it is not the best option, not indicated or not the strongest one.

4.3.7 Clinician Lack of Knowledge on Antibiotic and Antimicrobial Resistance

Overall, participants had minimal understanding of antibiotics and antibiotic resistance. Four clinicians correctly defined what antibiotic and antimicrobial resistance is, which represent 16 %. 6.5 % correctly defined antibiotic resistance whilst only 3% correctly defined antimicrobial resistance. Clinicians are also using antibiotics and antimicrobial resistance interchangeably. In this study, clinicians did not define properly what antibiotics are and what antimicrobials are. Below is an illustration.

Definition of antibiotic resistance: It is the situation whereby antimicrobials, the microbes now they do overpower the drugs, yah, whenever the patient takes drugs they don't work.

Definition of Antimicrobial resistance: Antimicrobial resistance means the causative organisms; the bacteria have developed a mechanism or a resistance to that antimicrobial which means you might give antimicrobial which previously could work or the bacteria could respond or could be sensitive to that antimicrobial but now in the later stage or after a certain period of time the bacteria will develop another mechanism against that antimicrobial
(Clinician # 7).

Despite having inadequate knowledge on antimicrobial resistance, clinicians were largely aware of factors that contribute to antimicrobial resistance, mainly from a human health perspective. There were no responses citing animal health as the other cause of antimicrobial resistance. The following were the major reasons the clinicians cited as leading to antimicrobial resistance: under prescription, lack of sanitation and also over-prescription.

Can say if the patient has not finished the drugs can also build the resistance and using the antibiotics not necessarily to be used as maybe patient condition is not about bacterial infection and if you are giving antibiotics it can also build resistance
(Clinician # 6).

CHAPTER 5: DISCUSSION

This chapter discusses the findings in chapter four. It starts with presenting the major themes of the study findings on factors that determine antimicrobial prescription in Mulanje District, Malawi. This chapter ends with study implications, conclusions, and recommendations. The study findings have been analyzed in relation to the conceptual framework, Shared Decision Model (SDM). The study has identified factors that clinicians perceive as determinants of antimicrobial prescriptions in health care settings.

5.1 Preferences for Antimicrobials

Preferences for antimicrobials by patients emerged as a significant determinant of antimicrobial prescription in health care settings which also prevents proper antimicrobial prescription. The findings revealed that clinicians prescribe antimicrobials based on patient preferences and expectations concerning antimicrobials. These findings are supported by several studies in developed countries [43–47]. In the USA, a similar study to the current one found out that parental pressure was influencing clinicians to prescribe antibiotics [13]. This is also reflected in a similar study, in which, one of the reasons for the prescription of antimicrobials is patient demands or attitude [48]. Patients' preferences can be improved by training in communication and education initiatives along with dialogue between patients and clinicians.

A study done in Egypt also reported that preferences of caregivers and patients were among of the factors that contribute to antibiotics prescriptions [47]. According to Shared Decision Model, providing quality information will help patients to participate in decision making and there is need to elicit what patients already know and whether it is correct.

In this current study, clinicians do not perceive that patients' preference, despite being common, is a determinant of inappropriate prescription of antimicrobials in health care setting.

Using SDM will enable clinicians and patients to discuss perceived needs and belief about antimicrobial use [31].

This theme is directly related to, and actually emanates from, the next theme, namely, Belief in Efficacy.

5.2 Belief in Efficacy

The belief in Efficacy was also identified as one of the contributing factors to the inappropriate and poor prescription of antimicrobials. The belief in antimicrobials is attributed to inappropriate prescriptions in health care settings by clinicians. These findings corroborate the findings from other studies. It is reported that patients have a belief in certain antimicrobials over the others when they visit health care settings. Clinicians in this study cited that patients' demands and preferences for injectable or intravenous antimicrobials over oral ones contribute to inappropriate prescription. Similar findings from developed countries also reported that patients believe in antimicrobials when they visit health care settings even when they have a viral infection and they will demand antibiotics to avoid repeated consultations [49,50].

The current findings are further supported by another study which cited that patients come to a hospital with common cold and then demand intravenous antibiotics [51]. The current study findings also corroborate other studies that there is belief that intravascular antibiotics are better

than oral antibiotics and that, both doctors and patients encourage prescription of intravenous antibiotics [47–49,51,52].

Shared Decision Model ensures that patients are not making decisions when they are insufficiently informed about key issues concerning their health and treatment options [31]. It also touches on the one whose duty it is to prescribe and even administer such medications, and that is the next theme to be discussed.

5.3 The Negative Attitude of Patients Towards Clinicians

Negative attitude of patients towards clinicians who refuse to prescribe antimicrobials also emerged as a factor that contributes to inappropriate antimicrobial prescription. The current study finds out that those patients feel like they have not been properly assisted by the clinicians who refuse to prescribe antibiotics and, in such cases, they go to another clinician and or hospital to have what they want.

In addition, the results of this study are supported by other findings that reported that clinicians were prescribing antibiotics out of fear of losing patients [53]. The results also show that participants (patients) would change physicians when antibiotics are not prescribed and the risk of prescribing antibiotics more than doubles. This is also reflected in similar studies that reported that even when patients do not need medication, doctors prescribe antibiotics to maintain a good patient-doctor relationship [54–56].

A study done in Malaysia found out that a few participants indicated that they would make their expectations explicit and request antibiotics from their physician even when they had viral infections, as they believe the medicine promotes rapid recovery. They also said they would consult another physician if their request was not granted [38]. Parent's pressure for antibiotics meant that a patient would go to another hospital because they knew they would get antibiotics [13].

The above themes can be traced to the level of knowledge that patients have about medications. This is a crucial factor as can be seen from the theme that follows.

5.4 Educating the Patients

Lack of education to patients on medications contributes to unnecessary antimicrobials prescription. In general, the health systems in Malawi are considered inadequate to meet the ever increasing health demanding population in health care settings as health care and clinician-patient ratios still need to improve.

Clinicians cited that they do not have enough time to counsel and educate patients during consultations because of demands on their time as related to large patient numbers. In a review conducted by Ayukekbong et al. [57], it was found that because of high patient-doctor ratio in most developing countries, doctors are overwhelmed and, as a result, there is often inadequate time for meaningful education and communication with the patient on drug adherence guidelines and consequences of poor or non-adherence to the guidelines.

The current results corroborate a study done in North Carolina that revealed that clinicians should provide information in a manner that is easy for patients to understand as to why an antibiotic is not needed to treat a particular illness as well as how to appropriately use antibiotics in their treatment as and when they are prescribed [58].

Shared Decision Model argues that patients have their preferences but in order to make informed decision they need to be educated [59]. Providing education at all levels (community, Healthcare, and individual) is essential to ensuring rational use of antibiotics and to suppress inappropriate use. Public education campaigns are effective in changing attitudes and knowledge regarding antibiotic use and resistance.

Fletcher et al. and Machowska [56,60] found out that consumer education, such as discussion and explanation, was the common strategy reported by participants to manage patients' expectations and demand for antibiotics.

Studies done in Belgium, England and France reported that mass media interventions such as national TV campaigns and those involving other mass media outlets have been shown to reduce antibiotic prescribing for Acute Respiratory Tract Infection but argued that this strategy works best when targeting both healthcare professionals and the public in mass media campaigns [61]. It is recommended that care providers, dispensers and patients need to be educated on how the use and misuse of antimicrobials may contribute to the development of resistance [57]. It is cited that lack of communication skills is a factor that promotes unnecessary antimicrobial prescription [62]. Barriers to Shared Decision Model include low health literacy, time and low numeracy and it is

also argued that some patients come from backgrounds that do not promote individual decision making skills [31].

This theme above is, to a considerable extent, a result of the subsequent theme to be discussed, namely, Limited Time.

5.5 Limited -Time /Clinician being Overwhelmed

Findings of this study are supported by the Shared Decision Model, which argues that information exchange is in two ways between clinicians and patients. This is evidenced by the current theme where limited time encourages inappropriate antimicrobial prescription. The findings thus reveal that limited time act as a barrier to proper antimicrobial prescriptions. Clinicians reported that they prescribe antimicrobials in order to handle long queues in the outpatient department. Several studies support the fact that clinicians spend less time with patients because of work overload.

It is reported that clinicians prescribe medications in order to end the consultation and the clinicians themselves also reported that they prescribe under pressure when factors other than clinical presentation (parents, employers, drug companies, time for consultation) pushed them into prescribing even when they believe antibiotics are not needed [63].

In a systematic review done by Teng [62], several factors were cited for antibiotics prescription, one being patient overload and misconceptions about antibiotics. Additionally, it is reported that time was a significant contribution to unnecessary antibiotics prescription and, in the same studies,

it is reported that physicians often say workload, time pressure, and a busy schedule make a clinician prescribe more antibiotics and antimicrobials to patients [6,46,64].

It is cited that clinicians were more likely to prescribe an antibiotic as clinic session time increases which supports the argument that fatigue impairs clinicians, in addition to work pressure and timing of consultations [48,65]. In a study conducted in Karnataka state in South India, physicians agreed that they have too much work because of staff shortages and nearly half of them said that their patients ask them to prescribe antibiotics [66].

According to the Shared Decision Model, limited time poses a great challenge for clinician-patient relationship to share information during consultation and this results in patients getting too little information. It is cited that time pressure is a constraint to the Shared Model Decision in health care settings [31].

In this current study, clinicians do not perceive that limited time and inadequate number of clinicians are facilitators for inappropriate prescription of antimicrobials even when this is a common occurrence.

Compounding the above themes is one related to socio-economics. It is a crucial theme as can be seen in the discussions that follow.

5.6 Hindrance / Obstacle to Antimicrobial Prescription

The current findings also reveal that unavailability, shortages, and antibiotics being sold on the open markets are barriers to proper antimicrobial prescriptions since people can go and buy antimicrobials from pharmacies and open markets without a prescription from a clinician.

One of the barriers to appropriate antibiotic prescriptions is inappropriate antibiotic use which has resulted from lack of access and affordability of antibiotics due to inadequate government funding in developing countries [67].

The current results are supported by a study conducted in Indonesia that cited that doctors skip supporting diagnosis to confirm bacterial infection but rather go straight and prescribe an antibiotic because of patients not having insurance and therefore could not afford to pay [68]. Sometimes patients tend to duplicate the previous prescription and buy antibiotics on the open market [68]. In another study, it is also reported that those who were on medical aid were more likely to receive an antibiotic than those not on medical aid [69]. A study done by Baubie, et al. [70] also reported that high physician workload and high antibiotic use in the community were major barriers to antimicrobial stewardship implementation and lack of patient or client understanding of antibiotics, and difficulty in making diagnoses were barriers to proper antimicrobial prescription [71].

The current study is further supported by another study done in India which shows that selection of antibiotics also depends on availability at the public health center, which is a barrier to prescribers [66]. The above study findings also corroborate other results, which report that

clinicians felt that some antibiotics available in their hospital are of poor quality and less effective or that the required ones are not available and the patient gets antibiotics directly from shopkeepers without prescriptions [72].

Similarly, in south Asian countries, common challenges on antimicrobials prescription were poor dispensing, insufficient history taking and sale of antibiotics that have no proper dosage or are clinically inappropriate [73]. A study done in India found out that one of the obstacles to the appropriate use of antibiotics is poor quality of antibiotics and less effective ones in hospitals [72]. The above themes have, by and large, skirted around a very important factor in antimicrobials prescription, that is, the clinician. This, then, is the focus of the next theme.

5.7 Clinician's Lack of Knowledge on Antibiotic and Antimicrobial Resistance

Clinicians have shown a lack of knowledge on the definition of antibiotic and antimicrobial resistance. Overall, participants had minimal understanding of antibiotics and antimicrobials resistance. In this study, clinicians pointed out that overuse, poor adherence, and self-medication were causes of antibiotic resistance. In a study done in France and Scotland, the clinicians had knowledge of antibiotics resistance [74].

But, overall, in the current study, clinicians knew the causes of antimicrobial-resistance, clinicians had knowledge which is similar to the findings of a study done in Saudi Arabia on rural and urban physicians which pointed out that inadequate prescription, use of antimicrobials without prescription and noncompliance of patients are the most important factors contributing to the development of bacterial resistance to antibiotics [74,75].

Studies done in Sudan and Ghana also found that a number of factors were mostly perceived by the majority of physicians as very important causes of antibiotic resistance such as overuse in the population and hospitals, self-medication, uncompleted antibiotics therapy, inappropriate empiric choice and low antibiotics dosage use in animals as well [76,77].

In a study done in Jamaica by Nicholson et al. [78], physicians reported that factors contributing to antibiotic resistance are: wide spread use of antibiotics, overuse of a broad-spectrum of antibiotics, inappropriate use, inadequate hand washing and use of antibiotics in animals.

In a study done in Ghana among prescribers, causes of antibiotics resistance identified include antibiotics over-prescription, irrational prescription of antibiotics and patients' noncompliance to medications [79]. The above theme is supported by SDM in the way that for a clinician to implement shared decision model, he/she has to be trained and should have regular continuing professional development [59].

5.8 Study Conclusions and Recommendations

5.8.1 Study Conclusion

This study sought to assess determinants of antimicrobial prescription among clinicians in Mulanje, Malawi. Based on the findings in this thesis, the following are key conclusions that contribute to the evidence of determinants of antimicrobial prescription. The study found out that Preference, Beliefs in Efficacy, Negative attitude of patients towards clinicians, Educating the patients, Limited Time / Clinician being Overwhelmed, Hindrance / Obstacle to antimicrobial

prescription and Clinician's lack of Knowledge on antimicrobials were associated with inappropriate antimicrobial prescription.

This is one of the first few studies in southern Malawi and will contribute to evidence based targeted interventions to address the problem of inappropriate antimicrobial prescription in health care settings. Although clinicians were aware of the causes of antimicrobial resistance, they showed lack of knowledge on antimicrobial resistance. Lack of patient education and limited time and work overload are among the factors that promote inappropriate prescription of antimicrobials.

5.8.2 Study Limitations

The study finds that SDM meets challenges to be implemented in the Malawian setting because of lack of time to spend with patients and lack of proper decision making among patients because of inadequate knowledge on diseases and treatment options.

Additionally, this study was only done in one district, Mulanje, in the Southern part of Malawi, so it is a snapshot of the district, as such its results cannot be generalized. Another limitation is non-random sampling. And finally private clinicians were not interviewed which is also one of the limitations of the study.

5.8.3 Study Recommendations

5.8.3.1 Policy

Given the results in the current study, it is clear that allocation of more health workers and providing patient education during antimicrobial prescription is crucial and paramount to improve

antimicrobial prescription. Clinicians can improve antimicrobial prescription if they have relevant and adequate knowledge on antimicrobials and resistance. Prescribers need to be motivated and trained on issues regarding antimicrobial resistance.

5.8.3.2 Education

It is recommended that the Ministry of Health provide updates to clinicians on the trends on antimicrobials and resistance. It is, therefore, recommended that the Ministry of Health improve human resource capacity especially the clinicians who prescribe antimicrobials. Efforts to improve antimicrobial prescriptions through clinicians should be given much emphasis. Education and trainings such as workshops and seminars should be introduced for primary to tertiary level clinicians.

5.8.3.3 Further Research

It is important to consider a nationwide study on the determinants of antimicrobial prescription among clinicians. Another area of study is on community engagement which can help to find and test interventions that will improve doctor-patient relationship on antimicrobial prescription in low to middle income countries like Malawi.

5.8.3.4 Clinical Practice

Community involvement on antimicrobial stewardship programme can improve appropriate antimicrobial prescription in health care settings. Patient education on antimicrobial resistance can reduce unnecessary prescription and use of antimicrobials.

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APPENDICES

Appendix 1: Consent Form

STUDY TITLE: DETERMINANTS OF DECISIONS BETWEEN CLINICIAN AND PATIENT TO PRESCRIBE ANTIMICROBIALS – A CLINICIAN'S PERSPECTIVE

Principal Investigator: Morris Chalusa, BSc in Clinical Medicine, MSc in Health Science

(Antimicrobials Stewardship) Student.

Primary Supervisor: Associate Professor Chiwoza Bandawe, PhD

Secondary Supervisor: Dr. Felix Khuluza, PhD

About this study

You are being requested to participate in the research study. This consent form explains everything that will be involved in this study please read carefully. Please note that your participation in this study is entirely voluntary and you may decide not to take part or to withdraw from this study at any time. There will be no penalty if you decide to withdraw from this study.

This study is being done in partial fulfillment of my Master's Degree at College of Medicine in Blantyre. The principal Investigator of this study is Morris Chalusa, student of Master of Science in Health Sciences (Antimicrobial Stewardship) at University of Malawi, College of Medicine. Before you decide if you want to be a part of this study, we want you to understand the study.

Before you decide whether to take part in this research study, you need to know the purpose, the possible risks and benefits to you, and what will be expected of you during the study. After the study has been fully explained, you can decide whether or not to participate in the study. Once you understand and if you agree to take part, you will be asked to sign this consent form. You are free to ask questions about this study at any time.

Purpose of the Study

The purpose of this study is to explore factors that affect clinicians to give over decision prescribing power to patients in health care settings. To explore these factors we will ask you questions regarding your knowledge of antimicrobials resistance and patient beliefs. We will also learn from you what you think would be factors that contribute to clinicians to give over decision power to patient.

The study also seeks to establish the determinants of decision making in the clinician-patient relationship in the Malawian context. In addition the study shall explore clinicians' communication skills when prescribing antimicrobials and assess clinicians' knowledge on availability of antimicrobials guidelines.

Study procedures

In depth interviews will be conducted to about 30 participants. Interviews will take not more than 30 minutes each and will be done just once. The interview will also collect some demographic information. If you are interested in this, you need to sign this consent form.

Risks and or discomforts

There are no risks associated with participating in this study. Some questions may be sensitive and you are free not to answer, but we encourage you to answer all questions because it will help us to understand some of the underlying factors in clinician patient dynamic relationship on antimicrobial prescription. The discussion will take place in private and everything you say will be confidential and will be used for the purpose of this research.

Potential Benefits

There may be no direct benefits to you from this study. Knowledge and evidence gained from this study may help us to understand how to improve antimicrobial prescription in Mulanje district.

Reasons you will be withdrawn from the study without your consent

You may be removed from the study without your consent for the following reasons; if the study is stopped or cancelled by college of Medicine Research Ethics Committee and if staying in the study would be harmful to you.

Costs and Compensation

There is no cost associated with this study and you will receive no payment for participation. However, lunch allowances will be provided for those that are travelling from health centers that are far away from the district hospital. They will be provided with Lunch allowance of K4:000.00 and transport refund. You are free not to participate in this study.

Confidentiality

We will make efforts to ensure that recordings of the interviews are kept confidential. However, we cannot guarantee absolute confidentiality. Codes will be used to mask your real identity.

The recordings made from the interview will only be used for research purposes and will afterwards be erased. The study records will be kept in a locked cabinet at our office and audio recordings will be kept with password from protected computer in Mulanje. Apart from me, my supervisor will have access to my records.

Problems or Questions

If there any questions as in regards to this study. Contact;

The Student investigator: Morris Chalusa. Mulanje District Hospital, Box 227 Mulanje

Phone Number: 0995182002, Email morrischalusa@yahoo.com

Primary supervisor: Associate Professor Chiwoza Bandawe, PhD

Phone: 0999841093

Email:cbandawe@gmail.com

Secondary supervisor: Dr. Felix Khuluza, PhD

Phone: 0999289874

Email:fkhuluza@medcol.mw

For questions about your rights as a research subject, contact:

The Secretariat, College of Medicine Research Ethics Committee, Malawi College of Medicine, phone 01-874-377

If you have read and understood the above informed consent, and you voluntarily agree to take part in this study, please sign your name or make your mark below.

……..	……..	……..
Name of participant	Signature	Date
……..	……	……..
Name of Investigator	Signature of Investigator	Date
……	……	…….
Witness Name	Signature of Witness	Date

Appendix 2: Interview Guide: Questions Relevant To Antimicrobial Resistance

QUESTIONNIRE FOR DETERMINANTS OF DECISIONS BETWEEN CLINICIAN AND PATIENT TO PRESCRIBE ANTIMICROBIALS – A CLINICIAN'S PERSPECTIVE

We need your to help to evaluate antimicrobials use and knowledge in Mulanje District. This involves the optimal use of antibiotics to improve patient outcomes and minimize resistant.

1. What is your role at this hospital?

a) Medical Assistant
b) Clinical Officer
c) Dental technician
d) Ophthalmic Clinical technician

Ear Nose throat technician

2. Where do you conduct the majority of your clinical works?

a) Outpatient
b) Pediatrics ward
c) Medical ward
d) Maternity ward
e) Surgical ward

3. Do you prescribe antimicrobials (antibiotics and Antimalarial)

a) Yes
b) No

4. In an average day, how many times do you prescribe antimicrobials (antibiotics and antimalarial?) times/day

a) 2-4 times/day
b) >4 times

5. Determinants of decision making in the clinician, patient relationship in the Malawi context

a) Share with me what you know about patient's factors that influences antimicrobials prescription.
b) When did you start prescribing antimicrobial?

c) What problems do you face during this period when you started prescribing antimicrobials?
d) Explain to me your thought regard patients factors and belief about antimicrobials
e) What challenges do you encountered when you prescribe antimicrobials? Such as antibiotics and antimalarial (the investigator will star with a story)
f) In your view how do you describe the attitude of your patients when you refuse to prescribe antimicrobials?

6. Assessing clinician's communication skills

a) What communication skills are needed when prescribing antimicrobials to patients?
b) How much time do you spend with each patient?

7. Assessing clinicians knowledge on availability of antimicrobials guidelines

a) Describe some of the guideline that are used during prescription of antimicrobial (antibiotics and antimalarial) by clinicians.

8. Knowledge on antimicrobials resistance

a) Have you heard of bacterial resistance
b) What is meant by antimicrobial resistance?
c) Describe factors that lead to antimicrobials (antibiotics and antimalarial) resistant
d) Whose responsibility is it to resolve the problem?

INTERVIEW GUIDE: Adopted and modified from Hawkings .J.N. Wood. F., and Butler. C.C. (2007) Public attitudes towards bacterial resistance: a qualitative study Journal of Antimicrobial Chemotherapy (2007) 59, 1155–1160 doi:10.1093/jac/dkm103

Appendix 3: Letter of Approval from Mulanje District Health Officer

Telephone: + 265 01 466 211
Facsimile: + 265 01 466 295
E-mail:mulanjedistricthospital@ymail.com
All Communications should be addressed to:

In reply please quote No. .....
MULANJE DISTRICT HOSPITAL
P.O. Box 227
Mulanje
MALAWI

11th March, 2019

To : College of Medicine Research and Ethics Committee,
Private Bag 360,
Chichiri,
Blantyre 3,
Malawi.

Dear Sir/ Madame

APPROVAL TO CONDUCT RESEARCH AT MULANJE DISTRICT HOSPITAL

I hereby write to authorize Mr. Morris Chalusa to conduct research on ***"Determinant of decisions between clinicians and patient to prescribe antimicrobials – a clinicians perspectives"***, he is a student of Master of Science in Health Sciences (Antimicrobials) at UNIMA College of Medicine. Mr. Morris Chalusa is our employee. I certify that he is our employee, employed on 14th April, 2009 as a Clinical Officer and is working with Ministry of Health, Mulanje District Hospital. He has Bachelor of Science Degree in Clinical Medicine.

If more information is required, you are always welcome and you can contact.

Yours Faithfully

DISTRICT HEALTH OFFICER
MULANJE DISTRICT HOSPITAL
11 MAR 2019
P.O. BOX 227
MULANJE

Dr Alinafe Kalanga
Acting Director of Health and Social Services

Phone:0881 902 795
Email:alinafekalangamjojo@gmail.com

Appendix 4: Letter of Approval from Mulanje Mission Hospital

Church of Central Africa Presbyterian Blantyre Synod

Mulanje Mission Hospital

P.O. Box 45, Mulanje, Malawi, Tel.: +265 (0) 992 261 569 / 999 286 503 / 884 480 222
E-mail: info@mmh.mw

To : College of Medicine Research and Ethics Committee,
Private Bag 360,
Chichiri,
Blantyre 3,
Malawi.

Dear Sir/ Madame

APPROVAL TO CONDUCT RESEARCH AT MULANJE MISSION HOSPITAL

I hereby to authorize Mr.Morris Chalusa to conduct research on DETERMINANTS OF DECISIONS BETWEEN CLINICIANS AND PATIENT TO PRESCRIBE ANTIMICROBIALS – A CLINICIANS PERSPECTIVE. Mr Chalusa is a student of Master of Science in Health Sciences (Antimicrobials) at UNIMA College of Medicine.

This research will entail focus group discussion and interviews with health care workers. No direct patient contact is involved.

If more information is required, you are always welcome and you can contact.

Yours Faithfully,

Dr A. Glas

Medical Officer in charge

Mulanje Mission Hospital

Appendix 5: COMREC Certificate of Approval

UNIVERSITY OF MALAWI

CERTIFICATE OF ETHICS APPROVAL

This is to certify that the College of Medicine Research and Ethics Committee (COMREC) has reviewed and approved a study entitled:

P.04/19/2656 - DETERMINANTS OF DECISIONS BETWEEN CLINICIAN AND PATIENT TO PRESCRIBE ANTIMICROBIALS – A CLINICIAN'S PERSPECTIVE by Morris Chalusa

On 18-May-19

As you proceed with the implementation of your study, we would like you to adhere to international ethical guidelines, national guidelines and all requirements by COMREC some of which are indicated on the next page for your study

Approved by College of Medicine

21-May-2019

18-May-19

(COMREC) Research and Ethics Committee

Dr. YB. Mlombe - Chairperson (COMREC)