ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF MANAGEMENT

MASTERS OF BUSINESS ADMINISTRATION (MBA)

FACTORS AFFECTING ATTITUDE OF COMMUNITY PHARMACISTS TOWARDS LOCALLY MANUFACTURED PHARMACEUTICAL PRODUCTS IN ADDIS ABABA

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A THESIS SUBMITTED TO THE DEPARTMENT OF MANAGEMENT, COLLEGE OF BUSINESS AND ECONOMICS, ADDIS ABABA UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR MASTER OF BUSINESS ADMINISTRATION (MBA).

By: Gelila Tamyalew (B. Pharm)

Under the Supervision of Dr. Asres Abitie (DOM Chairperson)

Addis Ababa, Ethiopia

This is to certify Miss Gelila Tamyalew that she has researched the topic "***Factors affecting attitude of community pharmacists towards locally manufactured pharmaceutical products in Addis Ababa.***" This research is of her original work and all the sources of material used for the study had been dully acknowledged.

Advisors Name:- Asres Abitie (Ph.D.)

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Addis Ababa University

College of business economics

Masters of business administration (MBA)

Thesis on Factors affecting attitude of community pharmacists towards locally manufactured pharmaceutical products in Addis Ababa.

By:-

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Declaration

I, Gelila Tamyalew, declare that this thesis is my original work, that complies with the regulation of the university, fulfills the accepted standard of thesis quality and all the material resources I use during the thesis had been duly acknowledged.

By: Gelila Tamyalew

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Abstract

Locally manufactured pharmaceutical products are a type of product that contains the same active pharmaceutical ingredients as the brand product, with similar pharmacodynamics and pharmacokinetic properties. This indicates that generic products have the same as the brand product in dosage, safety, effectiveness, strength, stability, and ways of administration to patients. Therefore, the current study aimed to determine factors affecting the attitude of community pharmacists towards locally manufactured pharmaceutical products in Addis Ababa, Ethiopia. There are several research designs in use based on the nature and type of the research being done. In this study, a cross-sectional study design with a quantitative approach was used. A semi-structured questionnaire was utilized to collect data from community pharmacists working in community pharmacies in Addis Ababa, Ethiopia. In the regression analysis of variables, three variables were associated with community pharmacists attitude towards locally manufactured pharmaceutical products. These are; maximum educational status, professional status, and year of experience in community pharmacy practice. Those community pharmacists having masters in pharmacy and other fields had a better attitude towards locally manufactured pharmaceutical products with AOR = 2.49, CI (1.213 – 4.343) and AOR = 2.13, CI (1.203 – 4.123), respectively when computed relative to a bachelor pharmacy degree. When compared to owners of the community pharmacy, community pharmacists and managers at community pharmacies had 2.1 [AOR = 2.10 (1.439 – 6.435)] and 1.9 [AOR = 1.50 (1.010 – 2.830)] times higher attitude, respectively. In conclusion, the attitude of community pharmacists was inadequate that requires an intervention to optimize locally manufactured pharmaceutical products utilization. Educational qualification, employment position, and work experience were shown to be the determinants of participants' attitudes. Lack of belief in locally manufactured pharmaceutical products, substitution agreement with the prescriber, cost-effectiveness of locally manufactured pharmaceutical products, and consumer preference/demand were the most influencing reasons for the selection of locally manufactured pharmaceutical products.

Key Words: Locally Manufactured Pharmaceutical Products, Attitude, Community Pharmacist, Ethiopia

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Abbreviations and acronyms

AAHB	Addis Ababa Health Bureau
ARV	Anti-retroviral
CPs	Community Pharmacists
DROs	Drug Retail Outlets
EFDA	Ethiopian Food and Drug Authority
ETB	Ethiopian Birr
FDA	Food and Drug Administration
HAI	Health Action International
LMPPs	Locally Manufactured Pharmaceutical Products
PI	Primary Investigator
SPSS	Statistical Package for Social Sciences
U.S.	United States
WHO	World Health Organization

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Chapter one:

1. Introduction

1.1. Background

Locally Manufactured Pharmaceutical Products (LMPPs) (Generic medicines) are a type of product that contains the same active pharmaceutical ingredients as the brand product, with similar pharmacodynamics and pharmacokinetic properties. This indicates that LMPPs have the same as the brand product in dosage, safety, effectiveness, strength, stability, and ways of administration to patients. For the LMPPs to be produced the Food and Drug Administration (FDA) needs the companies that want to produce the product to check their LMPPs can substitute the brand product effectively. (FDA, 2019)

Over the years, various definitions have been given for LMPPs. The generic product is defined by the World Health Organization (WHO) as ‘‘a pharmaceutical product, usually intended to be interchangeable with an innovator product, that is manufactured without a license from the innovator company and marketed after the expiry date of the patent or other exclusive rights’’. In addition, it is defined by the FDA as, ‘‘a generic drug is identical or bioequivalent to a brand name drug in dosage form, safety, strength, route of administration, quality, performance characteristics, and intended use’’. (FDA, 2018)

Interestingly, LMPPs are only produced after the expiration of the patent of the originated brand product. These products are only marketed after they are assured to be bioequivalent with the brand product. (Shraim et al., 2017a) LMPPs usually use nonproprietary names for marketing. However, sometimes uses brand names and is called brand generics and marketed along with the original brand products in many countries. Sometimes the LMPPs may be named multi-source pharmaceutical products. (Choi & Ametepi, 2013)

LMPPs cost much less than brand products. The main reason for this major cost difference is LMPPs do not need repeated clinical and preclinical trials as the brand product undergoes drug development. In addition, the price of LMPPs decreases as many companies produce the product at the same time and the competition in the market makes the lower pricing. When many companies start to produce LMPPs it is estimated that the LMPPs are marketed at 85% or less

price than that of the brand product. In the United States (U.S.), it is estimated that $1.67 trillion was saved in the health system due to generic products from 2007 to 2016. This reduction in the cost of medicines due to LMPPs benefits both the government and patients. The best example could be generic products' impact on anti-retroviral (ARV) drugs. The median price per patient of first-line ARV drugs drops from U.S. $10,000 to $100 and this increases the number of patients that use ARV drugs from 0.5 million in 2003 to 15.8 million patients in 2015 across the globe. (Y. B. Belay et al., 2017; Mohammed et al., 2020a)

LMPPs use increases over time throughout the world especially due to financial problems for drug utilization. The use of generic products is encouraged in many countries' health systems. Many countries use obligatory rules in their health care system to promote generic prescribing and generic substitution. Ethiopian clinical practice guidelines enforce the use of generic product names in their prescription. In addition, the national drug policy of Ethiopia also gives pharmacists to give generic products in substitution of prescribed brand products while dispensing. Studies in Ethiopia suggest that pharmacists are the decision-makers in the choice of medicines to be dispensed which makes them the main role in the rational use of medicines. In a study conducted, about 51.1% of physicians have believed that generic and brand medicines are very similar in their benefit for the patients. In addition, 59.2% of the respondents believed that generic products do not have any additional side effects than brand products. (Y. B. Belay et al., 2017)

The Cambridge English Dictionary defines attitude as a feeling or opinion about something or someone, or a way of behaving that is caused by surrounding factors. (Cambridge English Dictionary, 2022) In this regard, a professional attitude is a manner in which you conduct yourself in a professional setting. In this context, the term attitude often describes both how you appear and how you act. A professional attitude is often more formal than a personal attitude, in terms of appearance, comportment, and interaction. (Al-Sudani et al., 2013) Moreover, the Cambridge English Dictionary defines perception as a belief or opinion, often held by many people and based on how things seem. (Cambridge English Dictionary, 2022)

The above definitions indicate how perception is inter-related with an attitude of a person. One is a state of mind and the other is an act due to the state of mind held. Perception of a person towards a person, a thing, or practice will lead him/her to act on it accordingly. (Rummel, 1976)

Factors that affect the perception of pharmacists towards the use of LMPPs studied in New Zealand and it mainly states the problem related from both the consumers' experience and pharmacists' judgment. In this study, only thirty percent of pharmacists have correct knowledge towards the safety, effectiveness, quality, and cost of generic products compared to the brand products. Most of the CPs believed that the use of generic products affects their profitability and the main reason is related to the time loss related to convincing the patients to change the brand product by generic drugs. The factors that affect the pharmacists' perception of generic medicines in this study are the reputation of the manufacturer, consumers' experiences, professional judgment, problem reports in media/journals, information available on brand substitution, personal experience, and appearance of product and packaging gaps. (Babar et al., 2011)

1.2. Statement of the problem

The pharmacy practice system is the responsible provision of drug therapy to achieve a definitive outcome that improves patients' quality of life. The role of the pharmacist has evolved substantially in recent decades from traditional roles of compounding and dispensing of medication to providing direct patient care to ensure the rational and cost-effective use of medicines, including the promotion of equally effective and less expensive generic medicines utilization.

Generic versions of the drug are a very interesting component of the pharmaceutical market. The use of generic pharmaceutical products represents over half of the total volume of pharmaceutical products used worldwide but only 18% of the total value of the pharmaceutical market. The price differential between generic and innovator medicines could range from 10% to 90%. (King & Kanavos, 2002) In the USA, generic medications cost less than one-third of their branded counterparts. The reduced price allows providers to treat more patients effectively with the same amount of overall dollars. However, these concepts are conditional on bioequivalent generics being substituted. While numerous cost-savings analyses have been conducted suggesting significant reductions in drug expenditure, these analyses have been conducted in settings where bioequivalent generics were regulated and prevalent. In developing countries, we are currently limited to conjecturing possible cost savings from appropriate generic substitution.

Generic substitution is considered as a major cost-minimizing strategy meant to contain pharmaceutical expenditure without compromising healthcare quality. Several studies reported that substituting a branded drug for a generic drug can save money; such that, the use of generic medicines contributes to providing an economical alternative to more expensive branded medicine and in reducing monetary expenditures. According to WHO reports in several developing countries including African countries, there was an estimated average saving up to 90% through generic substitution. (Cameron & Laing, 2010) However, the safety and quality issues of generic products are of top concern to general practitioners and health work professionals. Misinformation or inadequate knowledge of healthcare professionals regarding generics causes' hesitation on the utilization of generics and it has been the central challenge against wider use of these products.

The increase in healthcare costs is a global concern, in which drug expenditures represent a considerable percentage of this cost. Due to the current marketing practices, 30% of the world population lacks proper access to essential medicines and more than 50% of the population of developing countries in Asia and Africa lack access to basic essential medicines (King & Kanavos, 2002) Thus, highlighting the generic substitution policy as a cost-containment strategy will lead to saving in the healthcare budget. Pharmacists are the main determinants in consumer choice to the rational use of LMPPs, according to a study on consumers' perception. (Y. B. Belay et al., 2017) Pharmacists' views on branded and generic medicines can provide insight into the prospective hurdles that may need to be overcome to promote the use of generic medicines. A previous study in Ethiopia that employed pharmacists has revealed that more than half (52.9%) of participants had known that generic medicine is bioequivalent to branded medicine and 34.4% of respondents have believed generic medicines are less effective. The current research can provide evidence on factors that affect community pharmacists' attitude toward LMPPs in Ethiopia. The findings may assist policymakers regarding generic substitution in the future.

1.3. Research questions

The current study addressed the following questions:

- What factors affected CPs attitude towards LMPPs from a consumer perspective in Addis Ababa, Ethiopia?
- What factors affected CPs attitude towards LMPPs from a professional perspective in Addis Ababa, Ethiopia?
- What relationship existed between predictor factors and CPs' attitudes?

1.4. Objectives

1.4.1. General objective

- To determine factors that affect the attitude of CPs towards LMPPs in Addis Ababa, Ethiopia.

1.4.2. Specific objectives

- To determine factors from the consumer side that affect the attitude of CPs towards LMPPs in Addis Ababa, Ethiopia.
- To identify factors from the professional side that affect the attitude of CPs towards LMPPs in Addis Ababa, Ethiopia.

1.5. Scope of the study

The scope of the present study is confined to the capital city of Ethiopia, Addis Ababa due to budget and time factors. And again from the city, specifically we focus on healthcare providers at a dispensary pharmacy (community pharmacy). Because to identify factors affecting attitudes of CPs towards LMPPs, we have to have a comparable amount of both the brand products and LMPPs so that we can see how CPs respond to the relative effectiveness, quality, side effects, and other drug factors from their experiences. The current study focused on LMPPs because these products are highly recommended by WHO in a low-income country like Ethiopia. Without them, brand products can't top up and serve developing countries. So that advocating for these products, LMPPs is a very serious concern. From the total ten sub-cities within Addis Ababa, six sub-cities were selected by simple random method and community pharmacies within these sub-cities were candidates for the study.

1.6. Significance of the study

With the potential cost of providing the full range of treatments for prevalent diseases, medicine prices and financing are inescapable factors especially in developing countries where the price of medicine is considered to be one of the most important obstacles to access essential medicines. But rational use of generic drugs can provide substantial savings for patients, healthcare budgets, and insurance funds without affecting the quality or therapeutic effect of the prescribed medicines.

The WHO encourages LMPPs trade as a possible alternative for increasing accessibility of medicines for the poor population. Consumers can save up to 90% of the cost of their medication by using LMPPs. Although domestic medicines are assumed to be similar in safety, efficacy, and quality with branded alternatives, previous researches had shown that some consumers believe that generic medicines are inferior to branded alternatives in safety, efficacy, and quality.

Behind the belief/perceptions and attitude of clients towards LMPPs, many predictor factors are responsible for the outcome. Consumer perception is affected by several factors such as perceived price, perceived quality, country of origin, information source of the client about the product, and perceived risk. Among all, professional counseling service plays a great role. In this process, the involvement of pharmacy professionals especially CPs are noticeable and the attitude of CPs will influence what the client believe or comprehend.

Therefore, the current study aimed to determine factors that affect the attitude of community pharmacists towards LMPPs, and findings helps the pharmaceutical companies to be aware of the CP's attitude towards their products to design better marketing strategies. In addition, it is an input for regulatory authority and other stakeholders to create a mechanism to improve confidence in LMPPs.

1.7. Organization of the paper

This paper is organized into six chapters. The first chapter is an introduction that includes the background of the study, problem statement, the objective of the study, research questions, significance of the study, and scope of the study. The second chapter is a review of related works of literature which consists of theoretical background and important findings from different pieces of literature. The third chapter involves methodologies applied in the study. Chapter four presents the result of the study. Chapter five discusses the findings. Then, chapter six concludes based on the findings of the study and recommendations are given based the result findings.

Chapter two:

2. Literature review

2.1. Theoretical review

2.1.1. Definations of LMPPs/generic drugs

A generic drug is a medication created to be the same as an existing approved brand-name drug in dosage form, safety, strength, route of administration, quality, and performance characteristics. Generic medicines work the same as brand-name medicines. As part of a generic product, LMPPs are produced after the patent expiration of the innovator product in a specific area/country. In this case, the final destination of LMPPs is to patients and it is through a dispensing pharmacist called Community Pharmacist. (FDA, 2018) Even though the current study addressed factors that affect specifically CPs' attitude towards LMPPs, in the next section, we will overview three major studies conducted to assess the perception of pharmacists (in general), physician, and patients towards non-branded pharmaceutical products.

Previous study that was carried out shows that, brand name medicines are typically more expensive than generic versions of the same medicine, which in general have identical therapeutic effects. A research work on the variable cost of health care said, there is a general perception with substantiated facts that, broad prescribing of generic products would achieve savings without compromising safety. Generic medicines are believed to provide therapeutic effects similar to those of their brand name alternatives. *Haas et al.* (2005) carried out a survey to examine the potential savings associated with generic medicine and arrived at the conclusion that greater use of generic medicine could result in important health care savings in the United States while maintaining quality of care. There is no question that prescription of generic medicines can be extremely cost effective. This is because the production of generic medicines does not attract the

extra cost of research and development that the production of new medicines requires. However, it is not always the case that generic medicines are cost effective compared to brand name medicines because if a generic medicine fails, it becomes more expensive to salvage the situation. Thus, there is a certain risk attached to the use of generic medicines if there is an issue

of lack of consistency in quality among generic medicines. However, in terms of purchase price alone, generic medicines are less expensive in the vast majority of cases (Haas et al., 2005).

Medicine prescribing is a complex experience and is influenced by many medical and nonmedical factors, all of which are relevant to issues of healthcare. Factors can be grouped under three factors as technical, patient and social factors. Denig classified and utilize this classification method; technical factor, patient factor and social factor in 1994. Technical factors are factors related to HCWs and medicines. Patient factors are patient-related factors. Patient's age, gender, socio-economic status and demands can be given as an example to this. Social factors are factors such as health care systems and the cultural structure of the society (Denig, 1994). Technical factor is the major factor affecting the HCWs' perception and choice of medicines followed by patient factor and social factor. Among technical factor the most emphasized factors are the originality, efficacy, quality, costs and safety of the medicine, guideline and scientific studies. From the patient factor the main factors are socio-economic status and demands of the patient. Among the social factors medicine availability is the most emphasized factor (Spurling et al., 2010).

Perception is the process by which people select, organize and interpret information to form a meaningful picture of the world. Perception is the study of how sensory information is processed into perceptual experiences. In some cases, actions are guided by sensory information processed outside of awareness. A study was done at Tikur Anbessa Specialized Hospital in 2016 on the perception of physicians and pharmacists towards non-branded medication among physicians and pharmacists rate. The hospital has more than eight hundred beds and delivers services beyond three hundred thousand patients per year. It also serves as a teaching school. This study was a cross-sectional descriptive study conducted between March – April 2015. It included one-hundred ninety-seven physicians and ninety-two pharmacists with 88.34 and 92% response rates. The pharmacist's year of service was less than fifteen years, sixteen up to thirty years, and greater than thirty years for about 34, 25 and 35.35%, respectively. A higher proportion of respondents, more than 75%, receive 16-30 patients every day. 15.3% of the respondents received more than 30 patients per day**,** while only 8.2% of the respondents received less than or equivalent to 5 patients per day. (Abebe, 2015)

More than 75% of the participants received 16-30 medical representatives every month**,** and 13% of the participants received more than 30 medical representatives monthly. When asked about generic drugs that are cheaper than brand-name drugs, the results obtained by pharmacists showed that about 88.2% of respondents prefer generic drugs to brand-name drugs. In agreement with this, more than 48% of pharmacists believe that doctors should be more informed about drug prices 43.5% agree with the idea of building patient confidence in low-cost brands. Approximately 39% of the interviewees held a neutral view of the poor quality of generic drugs and the lower safety of brand-name drugs. About 60% of pharmacists were neutral on differences in effectiveness, while 42.2% of respondents disagreed with the adverse side effects between generic drugs and brand-name drugs. When it comes to the health of inexpensive generic drugs, 40% of pharmacists disagree on the safety compared to brand-name drugs. Over participants (52%) disagreed with the possible treatment failures of generic drugs. Among the respondents, 65.9% felt that their dispensing decision is influenced by medical representatives on the contrary only 8.2% responded otherwise. Only 5% of the respondents strongly agreed on the presence of difficulty in remembering brand-name medicines while most of the respondents remained neutral. Again the effect of medical and sales representatives is higher on the pharmacist. (Abebe, 2015)

Consumer perception is affected by several factors such as perceived price, perceived quality, country of origin, and perceived risks which indirectly affect CPs perception. Perceived quality is defined as a buyers‘ evaluation of a product‘s cumulative excellence. When products are differentiated and quality is highly difficult to verify before purchase, consumers may turn to price as a signal of quality. However, when information about true quality is available, price becomes a less significant indicator of quality. A study by (Hailu et al., 2018) about generic medicine perception among physicians and pharmacists: a myth that harms the poor which was a phenomenological qualitative study conducted by using semi-structured interviews done in Ethiopia. The objective of the study was to assess physicians’ and pharmacists’ perceptions towards generic medicine use in Addis Ababa. The study included fifteen physicians and twenty pharmacists who were working both in private and governmental health institutions. Most pharmacists encountered about sixty up to ninety prescriptions per day while two-third of the pharmacists had experienced between one to five years. 75% of pharmacists were certain that generic products had the same quality as the innovator product and they strongly disagreed that

“generic products do not work as effectively as the originator”. Additionally, three-fourth of the pharmacists agree that non-branded medicines are manufactured to the same quality as the brand medicines. In contrary to this one out of four pharmacists expressed that generic medications are not manufactured to the same quality as the originator. 70% of pharmacists agree that generic drugs are as safe as originals. Despite this, 40% of pharmacists prefer to take the original drug instead of the generic, even if it is more expensive. There were responses by pharmacists who believed that generic medicines are less effective than brand medicines, believe that there is variation in price between brand and generic medicines as a result 80% of pharmacists report recommending generic drugs first when counseling family members. They also noted that this difference is not because generic drugs are not as effective as brand-name drugs. They believe that brand-name drugs are expensive because additives added to the product will increase additional costs. However, 15% of the participants answered that generic drugs are cheaper because they are not as good as the originals. Most pharmacists report that patients are confused about which drugs to take, especially when informed about the price difference between brand-name and generic drugs. They mentioned that many patients believe that the price difference is due to changes in efficacy, if they have enough money it is better to buy expensive brand name drugs rather than generic ones. However, those patients who do not have enough money buy cheaper generic drugs. Pharmacists also mentioned that the choice of the medications depends upon the severity of the disease (Hailu et al., 2018).

Another study conducted in Gonder, Ethiopia by (Gebresillassie et al., 2018) on evaluating patients’, physicians’, and pharmacy professionals’ perceptions on the concern regarding generic medicine was a quantitative cross-sectional survey by using a five-point Likert scale. The study had eighty-six pharmacy professional participants who were selected by using convenient sampling. According to the survey, the majority of pharmacy professionals (87.2%, n = 68) agree /strongly agree that they need to develop standard guidelines for prescribing physicians and pharmacists in the brand replacement process. Again 91% of pharmacy professionals agree that cooperation between physicians and pharmacy professionals will improve the patient's vision of the quality use of generic drugs. A similar proportion of pharmacy professionals 89.7% agreed that patients should receive sufficient information about generic drugs to ensure that they truly understand the medicines. In addition, 92.3% of pharmacy professionals indicated that more information is needed on the safety and efficacy of generic drugs. Interestingly, 87.2% of

pharmacy professionals surveyed agreed that drug advertisements would affect their dispensing practices. Finally, when asked about the impact of drug procurement budgets, 59% of pharmacy professionals agreed/strongly agreed that this would affect their drug choice (Gebresillassie et al., 2018)

2.2. Empirical review

2.2.1 Knowledge, attitude, and practice (KAP) Studies on LMPPs

In this section, five pieces of literature are included. Except for one study, all the included studies addressed knowledge, attitude, and practice towards generic medications among pharmacy professionals. Three of them are from Ethiopia, one from Nigeria, and one from Turkey. The study done in Istanbul, Turkey addressed only the knowledge and attitude of registered pharmacists and patients.

Academic literature on assessment of the knowledge, attitude, and practice among pharmacy professionals towards generic medicines was conducted between April and July 2018 in Addis Ababa, Ethiopia. Data were collected by a self-administered questionnaire distributed among four hundred twenty-four pharmacy professionals and was analyzed by multi-variable binary logistics regression. The majority (77.1%) of the participants stated that they had some knowledge of the concept of generic drugs. Knowledge is significantly related to the educational qualifications and work experience of the participants. More than half (55%) of respondents believe that brand-name drugs are of higher quality than generics, and 37.6% of respondents believe that generic drugs are not as effective as brand-name drugs. About 80% of the participants stated that locally produced generic drugs are cheaper than imported generic drugs. Customer affordability, the cost-effectiveness of generic drugs, and consumer preference or demand are the most common reasons for the distribution of generic drugs (Nasir et al., 2019).

A similar survey on knowledge, attitude, and practice of pharmacy professionals towards generic medicines, in Northern Ethiopia, Mekelle was assessed in 2016. Pharmacists who work on retail outlets were the targeted population. The study was Facility based cross-sectional study was used and the data collection tool was a self-administered questionnaire. Statistical test binary logistic regression has been done to determine predictors of knowledge and attitude toward generic

medicine. Pharmacy professionals with experience of from 2 to 5 years (AOR=25.620 [1.954-335.896) and those with more than 5 years (AOR=106.543 [2.375-4779.542) were more likely to have a positive attitude toward generic medicines compared to those with work experience of up to 2 years. From the study more than half of the respondents 52.9% (agree=32.2%, 20.7% strongly agree) claimed that they have known the concept of generic medicine. Among those surveyed, 34.4% believed that these drugs were less effective than brand-name drugs. However, 40.2% of people do not believe in the idea that brand-name drugs are of higher quality than generic drugs. Among the participants, 68.8% believed that patients should be fully explained for their reasons for choosing generic drugs. Almost half of the participants (48.3%) said that lack of confidence in generic drugs is a major factor that hinders the dispensing of generic drugs. 73.6% and 70.9% of the participants indicated that affordability and consumer preferences are factors that reduce the choice and dispensing of generic drugs (Y. Belay, 2017).

A facility-based cross-sectional survey was conducted in Eastern Ethiopia, Harara from September to October 2018. This research determined the knowledge, attitude, and practice of pharmacy professionals on generic medicines. Among 80 community pharmacists' approaches, 74 completed the survey, providing a response rate of 92.5%. About two-thirds of the respondents have a degree in pharmacy and work as an employee in a community pharmacy (60.8%). 82.4% of the respondents were not members of the Ethiopian Pharmacists Association (EPA), and only about 24.3% of the participants had more than 5 years of experience in community pharmacy practices. 86.5% of participants knew that generic drugs were cheaper than brand-name drugs and were bioequivalent to brand-name drugs 67.6%. On the other hand, more than 39.2% of participants did not support the view that widespread use of generic drugs in Ethiopia would help reduce the country's healthcare costs. Among the study participants, 48.6% believed that generic drugs were not as effective as brand-name drugs, and more than average 56.8% believed that brand-name drugs were of higher quality. Thirty-five participants who disagreed with generic drugs started to move slowly, and 50% of the respondents cited the price difference between brand and generic drugs as the reason for replacing generic drugs. 46% of respondents stated that the quality of locally produced generic drugs was similar to that of imported generic drugs and refused to believe that local generic drug manufacturers had reliable supply and logistics systems (44.6%). More than half (56.7%) of respondents believe that locally produced generic drugs are equivalent to imported generic drugs in terms of safety and efficacy,

and say that locally produced generic drugs are cheaper (77%). More than 54% of the study participants stated that they lack confidence in generic drugs because this is the main factor hindering the selection and distribution of generic drugs. Among the participants, 78.3% and 86.5% respectively considered the consumer affordability and cost-effectiveness of generic drugs as determinants of the selection and distribution of generic drugs (Mohammed et al., 2020b).

A quantitative cross-sectional study regarding knowledge, attitudes, perceptions, and practices of community pharmacists about generic medicines was done in Nigeria. Randomly recruited three-hundred eighty community pharmacists were given to fill out a questionnaire between April and June 2019 yielding a response rate of 98% and results were analyzed using descriptive statistics. They had mean years of 15.7 experiences. About half of those surveyed, 56% believe that generic drugs and brand-name drugs have different bioequivalence, even if they contain the same dose and show the same efficacy. However, a small number of people, 18.7% believe that generic drugs are more likely to cause more side effects than their brand-name drugs, while 26.6% do not. They answer whether generic drugs can produce more side effects than their brand-name counterparts. Most gave correct answers to the meaning of generic drug substitution 79.3%, interchangeable product 68.7%, and pharmaceutical substitution 79.2%. The average knowledge score of community pharmacists on generic drugs is 5.6 ± 2.9, with a total score of and the highest score is 10. The distribution of the calculated knowledge score is 47.9%, 27.6%, and 24.5% of poor, medium, and good knowledge, respectively. There is a significant correlation between the knowledge of community pharmacists about generic drugs and gender, age, practical experience, and the place where they were trained (p = 000). While professional qualification was found to have nothing with their knowledge about generic medicines. 92.4% of community pharmacists felt that utilization of non-branded drugs will decrease medicines cost 70% of the participants believed that innovator products were too expensive. However, 89% of community pharmacists felt that patients need to have intensive counseling while they were dispensed with generic drugs. Almost all interviewees (94.5%) believe that genetic modification reduces the cost of medicines and at the same time will break the monopoly of brand-name drug manufacturers. A large number (90.3%) of those surveyed believe that genetically modified organisms will improve access to medicines because, on average, they believe that genetically modified organisms are cheaper and more affordable. 75% of the interviewees believe that generic medicines packaged in different colors may confuse patients, and the cooperation between

healthcare professionals will improve the quality of the use of generic medicines (Osemene et al., 2021).

A study in Istanbul, Turkey concerned with knowledge and attitudes of pharmacists, prescribers, and patients towards generic drug use were conducted by a face-to-face questionnaire in the Kadikoy district of Istanbul in April 2010. Randomly chosen respondents, 68 pharmacists, 56 prescribers, and 101 patients consented to participate in the study. 31% and 32% of pharmacists and prescribers respectively stated that they think there is no difference between generic drugs and original drugs, while only 24% of patients believe it. 40% of pharmacists and 82% of prescribers said they were not sure about the bioequivalence of generic drugs. 10% of patients stated that they immediately accepted a generic drug replacement from a pharmacist, while 26% of patients received a prescription drug replacement. Cost is the most important factor considered in the substitution of generic drugs (92% for prescribers, 83% for patients, and 82% for pharmacists) (Toklu et al., 2012).

2.3. Conceptual framework

2.3.1 Studies on equivalent generic substitution

A literature review is needed for generic substitution because a pharmacy professional who is dispensing at a community pharmacist will recommend substitution of a brand product by a generic or local product if he/she has a positive attitude towards generic products. A professional with a negative attitude will hesitate to do so. So that knowing how CPs will respond to generic substitution will strengthen our study. Three studies have been included in this section from Saudi Arabia, Palestine, and Qatar conducted on community pharmacists.

A cross-sectional study on the evaluation of community pharmacists' perspectives and practices concerning generic medicines substitution in Saudi Arabia using a 25-item self-completed, anonymous questionnaire was conducted in the Makkah region of Saudi Arabia between February and March 2016. A total of one hundred and twenty-eight community pharmacists were given the questionnaire. Of this one-hundred and twenty-one, questionnaires were completed resulting in a 95% response rate. Only 63.3% correctly believed that pharmacists could substitute generic drugs without consulting a doctor. The vast majority of pharmacists

90.1% and 93.4% correctly determined that the generic drug must have the same drug form and the same dosage as the brand-name drug. More than two-thirds of the participants (79.3%) knew that generic drugs are bioequivalent to brand-name drugs. About two-thirds of the respondents (83; 68.5%) of the participants supported (agreed or strongly agreed) generic substitution and believed that it is a good practice and will improve patients' quality of life. More than 79% reported having 'occasionally' dispensed generic medicines while 6% stated that had never dispensed generic medications in their practice. Some of the most common generic substitutions made were for antibiotics (40%) followed by analgesics (37%) and antihypertensive medicines (8%) (Alkhuzaee et al., 2016).

Another study in Palestine with the same title was done on three-hundred and thirty-nine community pharmacists. However, only three hundred and two pharmacists agreed to fill out the questionnaire with a response rate of 89.1%. About 86.1% of the pharmacists had a B.Sc. in pharmacy and the remaining had Pharm D. or higher pharmacy degrees. Ten knowledge items were tested, the median score of knowledge on generic medicines of the participants was found to be 6.00. The highest knowledge score value was 8 out 10 that obtained by 26 (8.6%) of respondent pharmacists, while 2 out 10 scored the lowest scale. Knowledge score was not significantly influenced by any of the socio-demographic characteristics. Our data showed that most of the included pharmacists in the study (95.4%) agreed that health authorities should implement bioequivalence policies before marketing approval of generics, while 87.4% of participants agreed that they should be given the right to substitute generics and the majority (62.3%) support generic substitution for brand name drugs in all cases when a generic is available The main two factors affect pharmacists' selection and dispensing of generic medicines are personal faith in the product (86.1%) and cost-effectiveness of generic medicines (84.1%) (Shraim et al., 2017b).

In Qatar, the above study title was conducted. A total of 160 surveys were distributed to community pharmacists of which 118 were returned (response rate, 74 %). The mean total score of generic medicines knowledge among the pharmacists was 6.8 ± 1.6 (maximum possible score was 10). Years of practice as well as the place of obtaining an academic degree did not influence knowledge score. Approximately 72 % of the pharmacists supported generic substitution for brand name drugs in all cases where a generic medicine is available and the majority (93 %)

agreed that pharmacists should be given generic substitution right. Nearly 61 % of the pharmacists considered a lack of proven bioequivalence to original brands as an important barrier for selecting generic medicines and 55 % rated "lack of policy for directing the practice of generic medicine" as an important barrier. To enhance the quality use of and promote the practice of generic medicines in Qatar, an educational program should be implemented. A national generic medicine policy and guidelines are warranted in the State of Qatar.

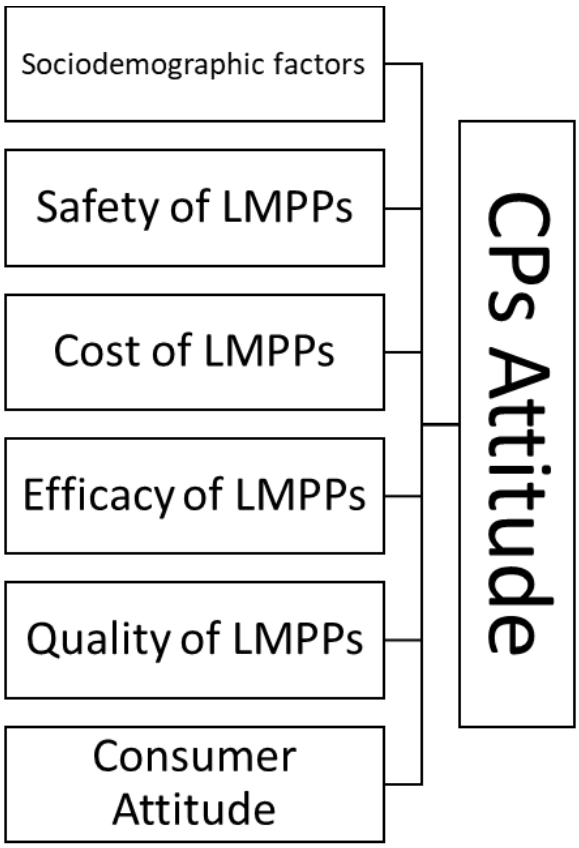


Fig. 1: Conceptual Framework for the Current Study

Chapter three:

3. Research methodology

3.1. Introduction

This chapter described the methodology used in gathering the data, the population of the study, sample size, and sampling procedure. Moreover, it presented the research design, sources, and types of data collected at the time of the study and the type of data analysis.

3.2. Research design

There are several research designs in use based on the nature and type of the research being done. In this study, a cross-sectional study design with a quantitative approach was used. An interviewer-administered semi-structured questionnaire was utilized to collect data from CPs working in community pharmacies in Addis Ababa, Ethiopia.

3.3. Study area and period

The study area for this research is Addis Ababa, Ethiopia which is the economic and political capital city of Ethiopia, with an estimated total population of 5,005,524. (World Population Review, 2021) The city has three layers of administration; the City Administration at the top, 10 Sub-cities Administration in the middle, and 116 Districts at the bottom. Each sub-city administration has an estimated population of 300,000 and each District administration has a population of 30,000. (Abera, 2012) In Addis Ababa, there are around 106 health centers (9 in Bole, 10 in Gulele, 14 in Yeka, 9 in Niafas Silk, 10 in Arada, 11 in Kolfe, 6 in Lideta, 10 in Addis Ketema, 9 in Akaki-Kaliti, and 8 in Kirkos), 14 public hospitals, 687 community pharmacies, and 335 drug stores. (G. Debrework, personal communication, 2021) The data collection was held from 30 August to November 30 2021 based on the calculated sample size.

3.4. Population

3.4.1. Source population

All registered pharmacists in Addis Ababa, Ethiopia.

3.4.2. Study population

All registered pharmacists in Addis Ababa, Ethiopia, and who met the study inclusion criteria.

3.5. Inclusion and exclusion criteria

3.5.1. Inclusion criteria

The first inclusion criteria for the current study was all registered pharmacists actively working in community pharmacies during the study period in Addis Ababa, Ethiopia. Being actively working in a community pharmacy is required because a registered pharmacist can work in other pharmacy settings like import, wholesaler, and manufacturer if he/she is not actively working in a community pharmacy which might hinder or affect the actual attitude of him/her. The second inclusion criteria was all registered pharmacists who had practiced in community pharmacy service for one or more years and actively worked in community pharmacies during the study period in Addis Ababa, Ethiopia. This is because having a practice in a community less than a year duration is not enough to have a proper understanding of the business and practice at the dispensing bench and can give a shallow perspective so that the study excluded those pharmacists having less than a year experience at the community pharmacy (ies).

3.5.2. Exclusion criteria

A person dispensing in a community pharmacy without being registered as a pharmacist was excluded from the current study because usually with less than a pharmacy degree like druggist and pharmacy technician can dispense in a community pharmacy without having a registered pharmacist license. Secondly, all registered pharmacists who practiced in community pharmacy for less than a year were excluded. Finally, those community pharmacists who fulfilled the inclusion criteria but were unable to participate due to illness, lack of willingness, and so on were excluded from the study.

3.5.3. Operational definitions

Attitude: a feeling or opinion about something or someone, or a way of behaving that is caused by surrounding factors (Cambridge English Dictionary, 2022).

Perception: a belief or opinion, often held by many people and based on how things seem (Cambridge English Dictionary, 2022).

Generic products: are a type of product that contains the same active pharmaceutical ingredients as the brand product (FDA, 2018).

Brand products: A brand medication is the "innovator" or pioneer product, and gets patent and exclusivity protection so generics can't compete right away (FDA, 2019).

3.6. Sample size determination and sampling procedure

The sample size was determined using a formula for single population proportion (Lwanga et al., 1991) $n = (z\infty/2)^2 p*(1-p)/d^2$ where p was a CPs attitude towards LMPPs (50%; no similar study found) and confidence interval of 95% with a margin of error 5%, to arrive at the required sample size. Thus, the sample size was calculated to be: n= (1.96)2 *0.5(1-0.5)/ (0.05)2=384, plus 5% for non-response rate equals to 404.

Based on the WHO/HAI standard sampling technique,(WHO/HAI, 2008) six survey areas which cover a population of about 100,000 to 250,000, reachable within one day's travel from the main urban center, large enough to represent the survey region and contain the requisite number of community pharmacists were selected. Based on this from 10 sub-cities in Addis Ababa, six of them were selected purposively as a survey area. After selecting the survey areas, study participants were selected using a simple random sampling technique from each survey area.

3.7. Data collection procedures and tools

The data were collected from DROs using standardized data collection tools developed through an extensive review of available literature on attitudes and perceptions of CPs regarding LMPPs. The questionnaire contains socio-demographic profiles of the participants followed by questions that assess their attitude and perception of LMPPs. A half-day training was given for data

collectors before the initiation of data collection, and a pre-test was done in 10% of the samples, and appropriate corrections were made accordingly.

3.8. Data processing and analysis

The collected data were entered and analyzed using a statistical package for social sciences (SPSS) version 26 and descriptive statistics such as frequency and percentage were used to summarize the finding. Multivariable binary logistic regression analysis was used to assess the association of the independent variables with participants' perception and attitude about LMPPs after univariable analysis (p-value < 0.2) to control confounders and p-value < 0.05 was considered statistically significant. For the ease of binary logistic regression analysis, the dependent variable was dichotomized. In the attitude part, the scoring of negatively worded questions were reversed.

3.9. Dissemination of findings

The study findings were disseminated to the College of Business and Economics, Addis Ababa University, and for Addis Ababa Health Bureau. Furthermore, it will be published in a reputable scientific journal to share the result with the scientific community.

3.10. Research ethics and consent

Ethical clearance was obtained from the College of Business and Economics, Addis Ababa University Ethical Review Board. A support letter was written from the Department of Management to Addis Ababa City Administration Health Office which finally brought to the administrative bodies of the facilities to get permission for the study. In addition, a brief explanation of the study objectives was given for the pharmacy professionals at dispensary positions to get their full cooperation.

Permission was also asked from the owner of private DROs or the pharmacist or druggist at the dispensary position before starting data collection. Written consent was obtained from each study participant. The confidentiality of the data was maintained throughout the study conduct by ensuring that only authorized persons access the information. Individual DROs or professionals' anonymity was maintained during the reporting of study findings.

Chapter four:

4. Results

According to the WHO/HAI standard sampling technique, (WHO/HAI, 2008), six survey areas were purposively selected from Addis Ababa Sub-cities. The calculated sample size in the current study was 404 including the non-response rate, unfortunately, 42 questionnaires failed to fulfill the data clearing process and due to missing information, they were excluded from the analysis in the study. The response rate in the current study was 89.6%. The total number of samples taken from each sub-cities are detailed in the table below, ***Table 1***.

Table 1: Description of the study area and data collection sampling (N = 362)

No.	Sub Cities	Total Sample Collected
1.	Akaki Kaliti	60
2.	Arada	64
3.	Gullele	50
4.	Kirkos	54
5.	Lideta	66
6.	Yeka	68
Total		362

Socio-demographic characteristics of the participants

Participants' age range was 20 – 51 years and nearly three-fourth (74.3 % of them had bachelor's degrees as their highest educational achievement. Regarding work experience as a community pharmacist, 46.7 % of the study participants had more than five years of work experience. The rest figures are given in ***Table 2***.

Table 2: Socio-demographic characteristics of the participant in Addis Ababa city, 2021 (N = 362)

Variables		N	(%)
Gender	Male	183	50.6
	Female	179	49.4
Age (in years)	20-30	178	49.1
	31-40	121	33.4
	41-50	46	12.8
	51-60	17	4.7
Maximum Educational Status	Bachelor in Pharmacy	269	74.3
	Masters in Pharmacy	63	17.4
	*Others	30	8.3
Professional Status	Community pharmacist	210	58
	Manager at the community pharmacy	111	30.7
	Owner of the community pharmacy	41	11.3
Year of Experience in community pharmacy practice	1-5	193	53.3
	6-10	138	38
	≥11	31	8.7
EPA^ membership	Yes	94	26
	No	268	74

*includes those CPs having a masters degree in other fields other than pharmacy (i.e. MBA and so on); ^Ethiopian pharmacists association

The present study revealed that LMPPs are considered as effective as brand products by 188 (51.8 %) of the study participants. But, 228 (63.1%) of the study participants agreed on the better quality of brand products than LMPPs. Furthermore, regarding their response rate, more than half [200 (55.3%)] of the participant CPs said LMPPs took longer time than brand products. (***Table 3***)

Table 3: Attitude of CPS towards LMPPs in Addis Ababa, 2021 (N = 362)

Variables	Strongly disagree N (%)	Disagree **N (%)**	Neutral **N (%)**	Agree **N (%)**	Strongly agree N (%)
LMPPs are less effective than branded medicines	88 (24.3)	100 (27.6)	66 (18.3)	74 (20.4)	34 (9.4)
LMPPs produce more side effects than brand name medicines	140 (38.7)	136 (37.6)	10 (2.8)	44 (12.1)	32 (8.8)
The price of LMPPs is lower because they are inferior to branded drugs.	40 (11)	88 (24.3)	98 (27.1)	101(27.9)	35 (9.7)
Brand drugs are made in more modern facilities than LMPPs.	36 (9.9)	28 (7.7)	103 (28.5)	27 (7.5)	168 (46.4)
Branded medicines are of higher quality compared to LMPPs.	20 (5.5)	38 (10.5)	86 (23.8)	100 (27.6)	118 (32.6)
There is a need to conduct an awareness program for patients and health professionals about LMPPs.	30 (8.3)	31 (8.6)	16 (4.4)	256 (70.7)	29 (8)
LMPPs have a slow onset of action.	62 (17.1)	31 (8.6)	69 (19.1)	140 (38.6)	60 (16.6)
I support LMPPs substitution for branded medicines in all cases where an LMPP is available	46 (12.7)	100 (27.6)	118 (32.6)	77 (21.3)	21 (5.8)
The price difference between generic and branded medicine would be a good reason to dispense generics especially for people who do not have prescription medicine benefits in Ethiopia	31 (8.6)	91 (25.1)	98 (27.1)	64 (17.7)	78 (21.5)
I use consumers' feedback on LMPPs as evidence to say the local product is not effective/quality	34 (9.4)	90 (24.9)	26 (7.2)	198 (54.7)	14 (3.8)
Repeated consumers' complaints on LMPPs made me question the efficacy, quality, and safety of the generic products	20 (5.5)	24 (6.6)	98 (27.1)	214 (59.1)	6 (1.7)
Consumers' viewpoint on LMPPs affected my attitude towards them.	44 (12.1)	118 (32.6)	11 (3.1)	98 (27.1)	91 (25.1)

Patients should be briefed on the reasons for choosing LMPP	14 (3.9)	88 (24.3)	139 (38.4)	95 (26.2)	26 (7.2)
The intensity of promotional activities by medical representatives is crucial for dispensing LMPP	48 (13.3)	88 (24.3)	76 (21)	108 (29.8)	42 (11.6)
CPs should be allowed to perform LMPP substitutions without consulting prescribing physicians	68 (18.8)	49 (13.5)	181 (50)	39 (10.8)	25 (6.9)

Six variables were entered into the univariate binary logistic regression analysis and a cut point value was set to choose candiadate variables into the multivariate binary logisitic regression analysis of variables. A variable with a p-value of <0.2 was eligible to the multivariate analysis. The p-values of each variables with their crude odds ratio are given in ***Table 3***.

Table 4: Univariate Binary Logistic Regression Analysis of Variables towards CPs attitude on LMPPs in Addis Ababa City, Ethiopia (N=362)

Variables		**CPs attitude on LMPPs**				
		P-Value	Yes (%)	No (%)	COR [95% CI]	
Age	20-30	**0.033**	100	78	0.031	0.861
	31-40	**0.191**	80	41	0.064	1.728
	41-50	0.455	26	20	0.100	2.803
	51-60	0.484	7	10	1	
Maximum Educational Status	Bachelor in Pharmacy	0.681	151 (56.1)	118 (43.9)	0.122	3.944
	Masters in Pharmacy	**0.022**	57(90.5)	6 (9.5)	0.037	1.477
	Others	0.173	24(80)	6 (20)	1	
Sex	Male	0.725	83	100	0.474	2.927
	Female	**0.000**	130	49	1	
Professional Status	Community pharmacist	**0.009**	150	60	0.111	0.731
	Manager at the community pharmacy	**0.002**	96	15	0.232	2.675
	Owner of the community pharmacy	0.202	21	20	1	
Year of Experience in community pharmacy practice	1-5	0.321	93	100	0.402	1.822
	6-10	**0.065**	108	28	1.021	3.432
	≥11	**0.030**	27	4	1	

EPA membership	Yes	**0.005**	70	24	0.108	0.677
	No	**0.006**	180	88	1	

In the multivariate binary logisitic regression analysis of variables, three variables were associated with CPs attitude towards LMPs. These are; maximum educational status, professional status, and year of experience in community pharmacy practice. Those CPs having masters in pharmacy and other fields had a better attitude towards LMPs with AOR = 2.49, CI (1.213 – 4.343) and AOR = 2.13, CI (1.203 – 4.123), respectively when computed relative to a bachelor pharmacy degree. When compared to owners of the community pharmacy, community pharmacist and manager at the community pharmacy had 2.1 (AOR = 2.10 [1.439 – 6.435)] and 1.9 [AOR = 1.50 (1.010 – 2.830)] times higher attitude, respectively. Moreover, CPs having more than five years of working experience had 2.5 times higher attitudes when compared with CPs having five years and fewer years of experience. (***Table 5***)

Table 5: Multivariate Binary Logistic Regression Analysis of Variables towards CPs attitude on LMPPs in Addis Ababa City, Ethiopia (N=362)

Variables		**CPs Attitude on LMPPs**			
		Yes; N [%]	No; N [%]	COR [CI = 95%]	AOR [CI = 95%]
Maximum Educational Status	Bachelor in Pharmacy	151 (56.1)	118 (43.9)	1	1
	Masters in Pharmacy	57 (90.5)	6 (9.5)	3.02 (1.268 – 6.343)	2.49 (1.213 – 4.343
	Others	24 (80)	6 (20)	2.68 (1.283 – 5.123	2.13 (1.203 – 4.123)
Professional Status	Community pharmacist	190 (90.4)	20 (9.6)	2.96 (1.249 – 5.838)	2.10 [1.439 – 6.435)
	Manager at the community pharmacy	98 (88.3)	13 (11.7)	1.83 (1.210 – 3.822)	1.50 (1.010 – 2.830)
	Owner of the community pharmacy	30 (73.2)	11(26.8)	1	1
Year of	1-5	103 (53.4)	90 (46.6)	1	1

Experience in community pharmacy practice	6-10	108 (78.3)	30 (21.7)	2.603	(0.968–5.361)	1.231	(1.968–4.361)
	≥11	26 (83.9)	5 (16.1)	2.920	(1.520–6.032)	1.552	(1.134 – 4.236)

Assumption Testing for Multiple Regressions

Prior to performing the logistic regression analysis, two assumption test were checked. Multi-collinearity, and linearity. (Osborne & Waters, 2002)

Multi-Collinearity

There are two crucial conditions to fulfil before conducting a regression analysis. Firstly, the sample size should be adequate and the second one is there should not be correlation among the independent variables. The size of the sample has a direct effect on the statistical power of the significance testing in multiple regressions, which refers to the probability of detecting statistically significant R-square or a regression coefficient at a specified significance level. Cognizant of this fact, the sample size should be at least 20 times the number of independent variables. (Ho, 2013; Jan & Shieh, 2019; Popović, 2015) Given this rule of thumb, the number of participants used for this study 362 is beyond the minimum requirement.

The other thing to consider is that there should not be correlation among independent variables. multi-collinearity is a situation in which the independent/predictor variables are highly correlated. When independent variables are multicollinear, there is "overlap" or sharing of predictive power, which may lead to a situation where the regression model fits the data well, but none of the predictor variables has a significant effect in predicting the dependent variable (Ho, 2006).

To check the existence of multi-collinearity, calculating "Tolerance" and "Variance Inflation Factor (VIF)" values for each predictor is possible. The tolerance value is an indication of the percentage of variance in one predictor that cannot be accounted for by the other predictors. The value of tolerance should be above 0.10 and any value lower than this indicates the existence of multi-collinearity. On the other hand, VIF is computed as "1/tolerance," VIFs start at 1 and have

no upper limit. A value of 1 indicates that there is no correlation between this independent variable and any others. VIFs between 1 and 5 suggest that there is a moderate correlation, but it is not severe enough to warrant corrective measures. VIFs greater than 5 represent critical levels of multi-collinearity where the coefficients are poorly estimated, and the p-values are questionable.

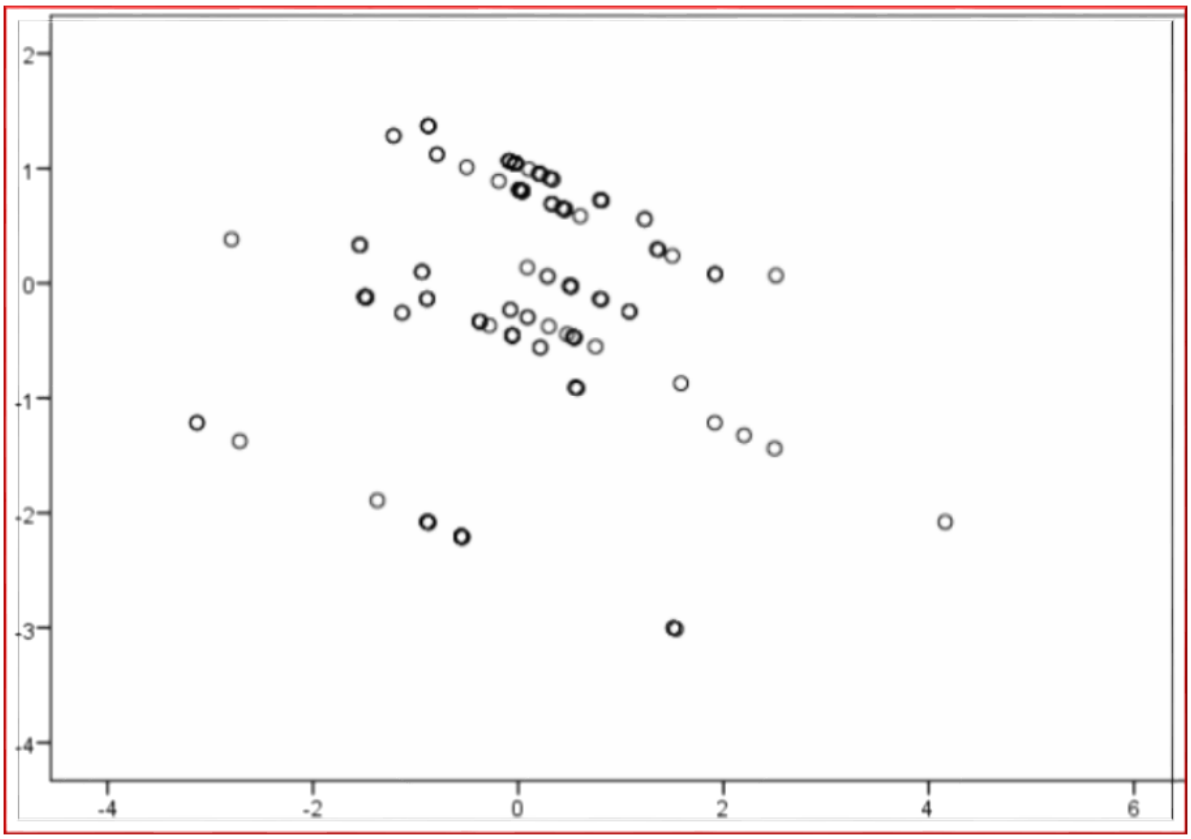
For the current study, both the values of tolerance and VIF calculated for each independent variable on both regression analyses fulfills the criteria discussed above, which indicate the non-existence of multi-collinearity. Value of tolerance for each independent variable is above 0.10 this indicates the nonexistence of multi-collinearity. VIF of each independent variable it almost closes to 1 that indicates that there is no correlation between this independent variable and any others.

Linearity

The degree to which the change in the dependent variable is associated with the independent variable represents the linearity of the relationship. linear models predict values falling in a straight line by having a constant unit change (*slope) of the dependent variable for a constant unit change of the independent variable.

The linearity of the relationship between the dependent and independent variable represent the degree to which the change in the dependent variable is associated with the independent variable. In a simple sense, linear models predict values falling in a straight line by having a constant unit change (*slope) of the dependent variable for a constant unit change of the independent variable. Conventional regression analysis will underestimate the relationship when nonlinear relationships are present, i.e., R^2 underestimates the variance explained overall and the betas underestimate the importance of the variables involved in the non- linear relationship. The scatter plot of standardized residuals versus the fitted values for the regression models is as follows

Attitude (Outcome Variable)



It is possible to say that the linearity assumption is satisfied and the hetereoskedasticity assumption is satisfied if we run the fully specified predictive model.

Fig. 2: Linearity assumption test scatter plot

Chapter 5:

5. Discussion

Pharmacists are experts of a drug in designing, formulating, and dispensing it. Their role extends from serving patients to making huge economies of countries based on their pharmaceutical industries. (Sakeena et al., 2018) Pharmaceutical products are essential and are meant to be reached across the world. (Wirtz et al., 2017) Considering all the factors behind the accessibility and affordability limitations of the products, it is a must to have country-based manufacturing industries to meet the demand of the residents and improve their quality of life. (World Health Organization, 2011)

Even though pharmacists are the backbone of the healthcare system, there are challenges that they face in making the reality of the above statement. These factors are not limited to the general pharmacy profession, but also extend to the final patient or client. (Hambisa et al., 2020; Summit et al., 2003) Cognizant of this fact, community pharmacists are commonly the closest health professionals that interact with clients for simple cases/ailments management, advice for chronic patients, and cosmetics. This makes them the heart of pharmacists to understand patients' satisfaction, need and demand. (Rutter, 2015; Zeleke & Fenta, 2016) Patients/clients are free to discuss products either sold by the pharmacist or what they have used before. They can say this product is not good or effective at some time or in a nother case words of appreciations. (Holdford, 2021) These scenarios will lead the community pharmacists working in a community pharmacy to develop an attitude towards pharmaceutical products.

When the commented product is local, various myths are given as reasons to justify the inefficacy and poor outcome of patients. Which indicates attitude discrepancies among patients, health professionals on brand products, and locally manufactured pharmaceutical products. (Alemayehu et al., 2018) Therefore the current study assessed attitudes of community pharmacists towards locally manufactured pharmaceutical products in six sub-cities of Addis Ababa, Ethiopia.

In the current study, 29.8% of the participated CPs have an attitude of LMPPs being less effective than brand products, and 63.1% of the study participants believed on brand products are better quality than the LMPPs. These findings are comparable to studies by (Y. Belay, 2017)

(34.4 and 59.2%) and (Nasir et al., 2019) (37.6 and 56.1%). The reported gap is an indicator for awareness issues and there should awareness creation movements on promoting locally produced pharmaceutical products to the community pharmacists. The awareness creation can be done by providing training, arranging workshops, and other engaging programs as a single-time project or regular programs for the professionals. Moreover, the influence of manufacturers' promotional activities on their products should be balanced according to a guideline to the scientific fact available through rigorous researches. It will also be good to do inspectional activities to control wrong or misleading promotional activities that hinder or discourages locally manufactured ones.

The present study revealed that three variables were associated with CPs attitude towards LMPs. These are; maximum educational status, professional status, and year of experience in community pharmacy practice. When compared to owners of the community pharmacy, the community pharmacist and manager at the community pharmacy had 2.1 and 1.9 times higher attitudes, respectively. A better attitude of employees compared to the pharmacy owners might be due to interest in maximizing profit on their business and influence from manufacturers' or suppliers' to purchase and dispense their products. This indicates that the owners of the pharmacy might be individuals having the financial ability and working with the license of a registered pharmacist but with a different profession. Regarding the rest two, educational levels might be the reason for the positive attitude towards LMPPs.

Similarly, CPs having more than five years of working experience had 2.5 times higher attitudes when compared with CPs having five years and fewer years of experience. The results show how work experience years increase the positive attitudes of CPs. Because they are exposed to the field, they will not be deluded to any fake promotional activities, and they value the actual scenario on the patient. Moreover, CPs had more experience and educational qualification in their profession, they could have better information and view on local products. Similarly, the existence of an association between work experience and participants' attitudes toward local medicines was reported in a study somewhere else. (Y. Belay, 2017)

In the current study, 56.1% of the participants revealed that the extent to which they substitute locally manufactured pharmaceutical products against branded drugs, which is 10-25%. Moreover, 48% of the participants had no preferences when they buy medicines for themselves over brand and LMPPs.

CPs prefer to dispense LMPPs in most cases (43%) for both cost-benefit for the patient and to maximize retail margin reasons. The rest figure are given in ***Table 5***

Table 6: Perception of community pharmacist towards locally manufactured pharmaceutical products in Addis Ababa, 2021 (N = 362)

Variables	N (%)				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I prefer Locally Manufactured Pharmaceutical Product substitution, but not in all instances	60 (16.6)	80 (22.1)	66 (18.2)	140 (38.7)	16 (4.4)
I will substitute a brand medicine with a Locally manufactured Pharmaceutical Product when the prescribed medicine is not available.	_	56 (15.5)	200 (55.2)	100 (27.6)	6 (1.7)
I suggest a Locally manufactured Pharmaceutical Product for symptoms of minor ailments	20 (5.5)	30 (8.3)	87 (24.0)	214 (59.1)	11 (3.1)
Locally manufactured generics are equal in quality compared to the imported generics	62 (17.1)	30 (8.3)	100 (27.6)	140 (38.7)	30 (8.3)
Locally manufactured generics are equal in safety and efficacy to the imported generics	18 (5)	87 (24)	40 (11.1)	201(55.5)	16 (4.4)
Manufacturers of local generic products have a reliable logistic and supply system	4 (1.1)	210 (58)	60 (16.6)	45 (12.4)	43 (11.9)
I prefer to stock and dispense locally manufactured generics because of the financial incentives provided by companies	6 (1.7)	311 (85.9)	20 (5.5)	21 (5.8)	4 (1.1)
The credibility of the generic manufactures/suppliers is my concern when stocking medicines in my pharmacy	10 (2.8)	11 (3.1)	300 (82.9)	20 (5.5)	21 (5.8)
I will only stock locally manufactured product which is well advertised by the company.	15 (4.1)	276 (76.2)	4 (1.1)	40 (11.1)	27 (7.5)
Imported generics need to pass a more stringent approval process compared with locally manufactured ones.	17 (4.7)	42 (11.6)	245 (67.7)	50 (13.8)	8 (2.2)
Locally manufactured generics are cheaper compared to imported generics.	13 (3.6))	43 (11.9)	34 (9.4)	189 (52.2)	83 (22.9)
Drug Regulatory Authorities need to convince pharmacists on higher quality of locally manufactured generics	56 (15.5)	50 (13.8)	200 (55.2)	40 (11.1)	16 (4.4)

Regarding participants' perception, nearly half (47%) claimed that locally manufactured generics are equal in their quality compared to the imported generics which is lower than the finding from (Y. Belay, 2017)(55.9%) and (Nasir et al., 2019)(63.9%). Furthermore, about 59.9% of the study

participants agreed with the concept of locally manufactured generics which are equal in their safety and efficacy compared to the imported generic which is still lower than the report from Belay et al (60.3%) and Nasir et al (68.3%).

This study indicated that 75.1% of participants agreed that LMPPs are cheaper as compared to imported generics but only 24.3% of them agreed regarding manufacturers of local generic products have a reliable logistic and supply system. This indicates CPs and owners' concern regarding the continuous supply and supply chain safety of LMPPs. This might be due to the capacity of the local manufactures is still very low (only about 15%) and the rest (85%) is imported from other countries. Therefore, local manufactures in Ethiopia should have more effort to optimize their supply in the future and this might be one business target in Ethiopia having more than a hundred million people.

There are many factors, hidden or known that affect the selection and dispensing of LMPPs among the community pharmacists since the stakeholders within the pharmacy profession are many. Cognizant of this fact, in this study, those factors can affect positively or negatively the dispensing pattern among CPs. Lack of belief in generic medicines (89.2%), Substitution agreement with the prescriber (83.2%), and Consumer preference/ demand (40.9%) were factors that affect CPs LMPPs dispensing practice negatively. In another way, the Cost-effectiveness of generic medicines (51.9%) was the factor considered to cause a positive impact on CPs LMPPs dispensing practice. Similar findings were reported from the study by Belay et al. These factors are expected in Low-Income Countries like Ethiopia. These factors can be minimized by raising awareness of the client and CPs and working on LMPPs availability across the country.

Table 7: Possible factors to influence the selection and dispensing of LMPPs among the community pharmacists

Possible Factors	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Lack of belief in generic medicines	12 (3.3)	16 (4.4)	11 (3)	283 (78.2)	40 (11.1)
Availability of policies, laws & regulations	43 (11.9)	68 (18.8)	197 (54.4)	20 (5.5)	34 (9.4)
Affordability to the customer	40 (11.1)	248 (68.5)	25 (6.9)	30 (8.3)	19 (5.3)
Lacking options	31 (8.6)	178 (49.2)	128 (35.4)	13 (3.6)	12 (3.3)
Consumer preference/ demand	58 (16)	48 (13.3)	108 (29.8)	98 (27.1)	50 (13.8)
Cost-effectiveness of generic medicines	81 (22.4)	26 (7.2)	67 (18.5)	148 (40.9)	40 (11.1)
Substitution agreement with the prescriber	10 (2.8)	21 (5.8)	30 (8.3)	245 (67.7)	56 (15.5)

Chapter six:

6. Conclusions and recommendations

6.1. Conclusions

In conclusion, the attitude of CPs was inadequate that requires an intervention to optimize LMPPs utilization. Educational qualification, employment position, and work experience were shown to be the determinants of participants' attitudes. Lack of belief in LMPPs, substitution agreement with the prescriber, cost-effectiveness of LMPPs, and consumer preference/demand were the most influencing reasons for the selection of LMPPs. The current study revealed that there is a gap in the attitude of CPs towards generic and brand drugs. In multivariate analysis, CPs were more likely to have a positive attitude than owners and overall positive attitude was higher in those who have more than 5 years of work experience. More than half of the study participants claimed the lack of belief in generic medicines as significant factors that affect the selection and dispensing of LMPPs.

6.2. Recommendations

In the current study, it was revealed that attitudes of CPs are vulnerable to many factors, and some factors were identified as a major factor that results in having negative attitudes towards LMPPs. It requested the support of government to improve the utilization of LMPPs and more scientific evidence about the safety and efficacy of LMPPs will improve generic prescribing. There is a range of policy options to encourage CPs to respect preferences of clients for LMPPS . They range from encouraging to making mandatory the prescribing of the generic medicines.

Based on these findings we recommend:-

- Further investigations both qualitative and quantitative, should be conducted to strength the evidences generated in the current study. Science Experts should fill the knowledge gap, avoid negative perception and improve LMPPs prescription; through teaching the concepts and values of generic medicines and disseminating knowledge on the standards required to manufacture generic medicines.

- In addition, there should be a focused study in the future on how client-community pharmacist interaction affects CPs' attitudes towards LMPPs.

- Local companies collaboratively with the Ministry of Health and other stakeholders should give continuous professional education to fill the gap in knowledge and perception of the pharmacological properties and differences of brand and LMPPs. Training will increase the prescribers‟ familiarity (knowledge) with generic medicines and their prescrip Not only on CPs but also on the final clients too.

- The Ethiopian Food and Drug Authority (EFDA) should closely follow the marketing strategies of foreign multinational companies and their promotional activity. Furthermore, EFDA should have a guideline on the ethical promotional activity of drug companies. Standard treatment guideline should be developed by EFDA on generic and brand dispensing and prescribing. Regulation to permit or mandate the prescribing of generic medicines the like government hospitals. Exceptions will be typically made in certain cases to prescribed branded product with clear exemption rules and documentation. This will promote uptake of generic medicines in the private health care system

- Last but least, the Ethiopian Pharmacy Association also has a responsibility to create awareness among its members that seemed to be necessary to fill the gap in knowledge and attitude of CPs.

6.3 Theoretical contribution and policy implication

Upon the research findings and conclusion the following recommendations and policy implication were forwarded;

- As it is clearly indicated in the current study as well as in similar papers, attitude is a determining factor which widen the knowledge gap regarding LMPPs and brand medicines, so that working on this factor is a key thing to improve the service provided at dispensing retail outlets.
- Based on the findings, CPs working at community pharmacy should strive to have a better understanding of LMPPs and the real gap between brands. A better understanding from the CPs will help clinets to build trust on LMPPs. A professional who is not

confident enough on LMPPs will definatily make the clients to develop negative attitudes towards LMPPs.

6.4 Limitation and future research direction

The current cross-sectional study were not without limitations. We forwarded the paper limitations along with future research directions as follows:-

- The study included samples from the capital city of Ethiopia, Addis Ababa. Even though the sample distribution was fair it is not representative for the general popoulations. Meaning, Ethiopian CPs. So that, it is highly recommendable to do similar researches in various regions of Ethiopia to get an all round picture for further action.
- Moreover, the research design by itself is a limitation. Being cross-sectional limits the reseach capability to interevene an actual research problem. We advise future research works to be done as a longituidinal/follow up/Interventional studies.
- The recommendation drawn from the research in the prior section might not apply for regional states since there inferenetial limitation. The recommendations should be applied to the current study area only.
- Had it been the research included both CPs and cliants side by side, it might refelect an all rounded view, but it didn't. Better to do researches that addresses professionals and patients/clients view/attitude in a single work.
- Finally, interaction/communication between CP and client is a key factor for developing positive or negative attitudes towards both LMPPs and brand medicines. The current study couldn't reveal the degree to which this interactions can affect positive attitude. As a future direction possibly by considering actual realistic case, deduction should be made for the interplay.

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Annexes

Annex I: Consent form

Participant information sheet and informed voluntary consent form for the pharmacy professional to assess factors that affect the attitude of community pharmacists towards locally produced medicines in Addis Ababa, Ethiopia.

My name is _____. I am working as a data collector for the study being conducted by Miss Gelila Tamyalew who is conducting a study for the partial fulfillment of a Master's degree in Bussiness Administration (MBA) at Addis Ababa University. I kindly request you to lend me your attention to explain to you about the study and being selected as the study participant.

1. The research title:

Factors Affecting Attitude and Perception of Community Pharmacists towards Locally Manufactured Pharmaceutical Products in Addis Ababa: A Cross-Sectional Study

2. Purpose of the study:

This study aims to assess the attitude and perception of community pharmacists towards locally produced medicines in Addis Ababa, Ethiopia.

3. Participation

If you agree to join the study, you will be kindly requested to answer all the questions that will be asked by the data collector.

4. Confidentiality

Information obtained from you will be treated confidentially and will NEVER be used for any purpose other than this study.

5. Risk

No harm is expected to happen to anyone participating in this study.

6. Benefit

Your participation in this study will help us to understand factors that affect the perception then the attitude of community pharmacists regarding locally manufactured pharmaceutical products and suggest ways to improve them.

❖ If you agree to participate in this study choose YES.

• YES • NO

Annex II: Data abstraction tool

ADDIS ABABA UNIVERSITY, COLLEGE OF BUSINESS AND ECONOMICS, DEPARTMENT OF MANAGEMENT, MASTERS OF BUSINESS ADMINISTRATION (MBA)

FACTORS AFFECTING ATTITUDE OF COMMUNITY PHARMACISTS TOWARDS LOCALLY MANUFACTURED PHARMACEUTICAL PRODUCTS IN ADDIS ABABA: A CROSS-SECTIONAL STUDY

DATA COLLECTION FORM

I. Socio-demographic characteristics of the community pharmacists

No	Demographics		Number (No.)	Percent
1.	Age (in Years)	18-30		
		31-40		
		41-50		
		51-60		
2.	Sex	Male		
		Female		
3.	Maximum Educational Status	Bachelor in Pharmacy		
		Masters in Pharmacy		
		Others (Please Specify_____ _____		
4.	Professional Status	Community pharmacist		
		Manager at the community pharmacy		
		Owner of the community pharmacy		
5.	Year of Experience in community pharmacy practice	1-5		
		6-10		
		≥11		
6.	Ethiopian pharmacists association (EPA) membership	Yes		
		No		

I. The attitude of community pharmacists towards generic medicines

No	Attitude-related questions		No	Percent
1.	Locally manufactured Pharmaceutical Products (LMPPs) are less effective than branded medicines	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		
2.	LMPPs produce more side effects than brand name medicines	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		
3.	The price of LMPPs is lower because they are inferior to branded drugs.	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		
4.	Are brand drugs made in more modern facilities than LMPPs?	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		
5.	Branded medicines are of higher quality compared to LMPPs	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		
6.	There is a need to conduct an awareness program for patients and Health professionals about	Strongly disagree		
		Disagree		

	LMPPs.	Neutral		
		Agree		
		Strongly agree		
7.	LMPPs has a slow onset of action	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		
7.	I support LMPPs substitution for branded medicines in all cases where an LMPP is available	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		
8.	The price difference between generic and branded medicine would be a good reason to dispense generics especially for people who do not have prescription medicine benefits in Ethiopia	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		
9.	Patients should be briefed on the reasons for choosing LMPP	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		
10	The intensity of promotional activities by medical representatives is crucial for dispensing LMPPs	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		
11	Community pharmacists should be allowed to perform LMPP substitutions without consulting prescribing physicians	Strongly disagree		
		Disagree		
		Neutral		

		Agree		
		Strongly agree		

II. Perception of community pharmacists towards locally manufactured medicines

No	Perception-related Questions		No	Percent
1.	I prefer LMPPs substitution, but not in all instances	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		
2.	I substitute a brand medicine with LMPP when the prescribed medicine is not available.	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		
3.	I suggest LMPPs for symptoms of minor ailments.	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		
4.	I substitute LMPPs against branded drugs to the extent of	<10%		
		10-25%		
		>25%		
5.	When buying drugs for yourself, You typically choose	LMPPs		
		Brand drugs		
		No preferences		
6.	I prefer to dispense LMPPs because	Maximum retail margin		
		Cost-benefit for patient		

		Both		
		Other (Please specify_____		
7.	Locally manufactured generics are equal in quality compared to the imported generics	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		
8.	Locally manufactured generics are equal in safety and efficacy to the imported generics	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		
9.	Manufacturers of local generic products have a reliable logistic and supply system	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		
10.	I prefer to stock and dispense locally manufactured generics because of the financial incentives provided by companies	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		
11.	The credibility of the generic manufactures/suppliers is my concern when stocking medicines in my pharmacy	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		
12.	I will only stock locally manufactured product which is well advertised by the company.	Strongly disagree		
		Disagree		
		Neutral		

		Agree		
		Strongly agree		
13.	Imported generics need to pass a more stringent approval process compared with locally manufactured ones.	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		
14.	Locally manufactured generics are cheaper compared to imported generics.	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		
15.	Drug Regulatory Authorities need to convince pharmacists on higher quality of locally manufactured generics	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		

III. Possible factors to influence the selection and dispensing of LMPPs among the community pharmacists

No	**Possible Factors**		**No**	**Percent**
1.	Lack of belief in generic medicines	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		
2.	Availability of policies, laws & regulations	Strongly disagree		
		Disagree		
		Neutral		
		Agree		

		Strongly agree		
3.	Affordability to the customer	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		
4.	Lacking options	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		
5.	Consumer preference/ demand	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		
6.	Cost-effectiveness of generic medicines	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		
7.	Substitution agreement with the prescriber	Strongly disagree		
		Disagree		
		Neutral		
		Agree		
		Strongly agree		

Thank you!!