COMMUNICATION, PHARMACY PERSONNEL KNOWLEDGE, CONSUMER PREFERENCE AND GENERICS UPTAKE IN RETAIL PHARMACIES IN NJIRU SUB-COUNTY, NAIROBI

BY

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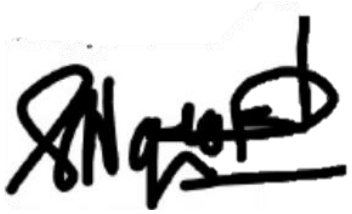
DECLARATION

I hereby declare that this project is my original work and has not been presented for award of a degree, diploma or certificate in this or any other university.

Sign…  Date…28/10/2021…..……

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This project has been submitted for examination with my approval as University supervisor.

Sign…  Date…28/10/2021……

Prof. Ndeti Ndati

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DEDICATION

To my uncle and guardian, James Aggrey Okumu Ng'onde, whom God has so graciously used in countless ways as a blessing to me; and who, aside from blazing the family education trail (and stimulating from childhood my love for reading with all the newspaper presents and books — what a treasure!) and being an inspiration on many fronts, suggested the idea of a Master's degree at my first graduation, and has always believed in and spurred me on to higher achievements against all odds

and

My sister, Ruth Aoko, from whom I learned my first ABC, who has always urged me on to greater pursuits even without meaning to, and shared the joy of each of my successes.

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LIST OF ABBREVIATIONS AND ACRONYMS

AAM	Association for Accessible Medicines
ANDA	Abbreviated New Drug Approval
ANOVA	Analysis of Variance
ARV	Antiretroviral
ASPE	Assistant Secretary for Planning and Evaluation
CAGR	Compound Annual Growth Rate
CI	Confidence Interval
CRH	Centre for Rural Health
Co.	Company
COMESA	Common Market for Eastern Africa
Comm.	Communication
CP	Consumer Preference
CVD	Cardiovascular Disease
Df	Degrees of Freedom
DTC	Direct-to-Consumer
EC	European Commission
EMM	Estimated Marginal Means
Eta^2	Ratio of variation in the dependent Variable in one-way ANOVA/proportion of variance associated with or accounted for by each of the main effects, interactions, and error in an ANOVA study
F	F Statistic/F-Statistic
F	Cohen's f
FAO	Food and Agriculture Organisation
FDA	Food & Drug Administration
FET	Fisher's Exact Test
FTIS	Fourier Transformed Infrared Spectroscopy
H_n	Hypothesis to the nth value
H_0	Null hypothesis
H_1	Hypothesis 1
H_2	Hypothesis 2
H_3	Hypothesis 3
H_4	Hypothesis 4
H_5	Hypothesis 5
IRP	International Reference Price
FPC	Finite Population Correction
IAB	Innovation Adoption Behaviour
Inc.	Incorporated
IFC	International Finance Corporation
IPC	Infinite Potentials Consulting
HIV/AIDS	Human Immune Virus/ Acquired Immune Deficiency Syndrome
(K) Ltd.	Kenya Limited
KES	Kenya Shillings
KNBS	Kenya National Bureau of Statistics

KHEUS	Kenya Household Expenditure and Utilisation Survey
KPPB	Kenya Pharmacy and Poisons Board
LCL	Lower Confidence Limit
LICs	Low-Income Countries
LMI	Low and Middle Income
LMICs	Low-and Middle-Income Countries
M	Mean
Max	Maximum
Min	Minimum
MS	Mean Square
MICs	Middle-Income Countries
MOE	Margin of Error
MOE	Ministry of Education
MOH	Ministry of Health
MRA	Medicines Regulatory Authority
MPR	Median Price Ratio
MS	Microsoft
N	Population/Full Sample
n	Subset of Sample
NACS	National Association of Chain Drug Stores
NPMB	Non-Prescribed Minimum Benefits
NACOSTI	National Commission for Science, Technology and Innovation
NGO	Non-Governmental Organisation
NIH	National Institute for Health
OECD	Organisation for Economic Cooperation and Development
OTC	Over-the-Counter
p-value	Probability Value
PwC	Price Waterhouse Coopers
R	Correlation Coefficient
RD	Research and Development
Rho	Spearman's Rank Correlation
RLD	Reference Listed Drug
SD	Standard Deviation
SE	Standard Error
DoJMC	Department of Journalism and Mass Communication
SPSS	Statistical Package for Social Sciences
SS	Sum of Squares
TB	Tuberculosis
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
UCL	Upper Confidence Limit
UHC	Universal Health Coverage
UK	United Kingdom
UNIDO	United Nations Industrial Development Organization
US	United States
WHO	World Health Organization

ABSTRACT

Adoption rate of generics remains low in Kenya (30%) despite well-demonstrated cost-saving benefits, amid pervasive perceptions of low quality, thus impeding access to affordable medication. The moderation effect of pharmacy personnel knowledge and consumer preference on the relationship between communication and uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi, is established. The study was a cross-sectional descriptive survey through which quantitative data were randomly collected from retail pharmacies in Njiru Sub-County (N = 121). A corresponding number of pharmacists, pharmacy technologists/technicians or pharmacy assistants constituted the respondents. The study had five objectives. One, to establish the relationship between communication and the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi. Two, to assess the effect of pharmacy personnel knowledge on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi. Three, to determine the effect of consumer preference on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi. Four, to evaluate the interaction effect of communication and pharmacy personnel knowledge on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi. Five, to establish the interaction effect of communication and consumer preference on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi. Five corresponding hypotheses were formulated from the objectives. Descriptive and inferential statistics were used to analyse the data, which were then presented as frequencies, percentages, mean, standard deviation and range in tables, charts and plots. The results show that communication has a significant effect on the uptake of generics ($\eta^2 = .16$; $p<.01$). Pharmacy personnel knowledge has a statistically significant effect on the uptake of generics ($\eta^2 = .11$; $p<.05$). Consumer preference has no statistically significant effect on the uptake of generics ($\eta^2 = .05$; $p = .059$). Communication and pharmacy personnel knowledge do not have a statistically significant effect on the uptake of generics ($\eta^2_p = .000$; $p = .845$). Communication and consumer preference have a statistically significant effect on the uptake of generics ($\eta^2_p = .27$; $p<.01$). It concludes that communication is a focal predictor of uptake of generics, together with pharmacy personnel knowledge and consumer preference, which two variables also moderate its relationship with the criterion; but its interaction with pharmacy personnel knowledge has no effect.

Key words: communication, pharmacy personnel knowledge, consumer preference, uptake of generic medicines, retail pharmacies, moderation effect

CHAPTER ONE: INTRODUCTION

1.0 Overview

This chapter provides a background to the extent of utilisation of generics (and specific attendant concerns) within the global, regional and national medical supply chain. It also presents the preliminary considerations of the study,—problem statement, purpose of the study, hypotheses, rationale and justification, assumptions, scope, limitation and delimitation, operational definitions,—and shows its organisation.

1.1 Background of the Study

Generic medicine, which is the type of medicine produced without a license from the innovator company after the expiry of the patent or other market exclusivity rights on the innovator product, has been hailed as the ultimate game-changer in the healthcare system. This is especially because it competes with innovator brands and drives down the cost of medication thus enabling huge cost-savings (Mrazek, 2000; Bateman, 2014; World Health Organization [WHO], 2016; McKinsey, 2018). Generics are safe and effective alternatives to the innovator brand or Reference Listed Drug (RLD) for they go through Abbreviated New Drug Application (ANDA) process based on pharmaceutical (similar formulation) and bioequivalence/bioavailability (plasma concentration) parameters of the RLD that does away with expensive pre-clinical and clinical trials (Food and Drug Administration [FDA], 2021). This abbreviated or accelerated drug approval pathway reduces the eventual cost. Thus, ideally, they are only nominally differentiated from their branded counterparts.

Generics are considered a way of reducing the cost of medication particularly in low-and middle-income countries (LMICs), where medicines cost 20-60% of total healthcare cost (Ongarora et al., 2019). This realisation continues to spur the adoption of generics, with global statistics showing that it ranged from 60% to 90% by 2015 (Tachi et al., 2018). Statistics on the adoption of these medicines vary from place to place, though, with persistent concerns over perceived and real quality. These concerns arise mainly from inadequate communication, which affects both the supply- and demand-side of generics thus posing a challenge to greater adoption.

Advances in genetics and genomics have made possible the manufacture and availability of medicines with greater efficacy (PwC, 2012). This has led to exponential growth in the pharmaceutical industry. The growth notwithstanding, however, availability and accessibility of pharmaceutical products remain a challenge, largely due to the gap existing between the perceived and real quality of some of the medicines. The most affected medicines in this case are generics, which are considered in some quarters to be of sub-standard quality, and have even borne the label of counterfeits.

Much as they are dogged by acceptability concerns, however, the efficacy, safety and cost benefit of generic medicines are attested to by numerous studies on bioequivalence or similarity of the constitutive compounds with the comparator drug (Patel et al., 2012; WHO, 2016).

Global health care systems exist within a dynamic context of growing prevalence of chronic diseases such as diabetes, Human Immune Virus/Acquired Immune Deficiency Syndrome (HIV/AIDs) and cancer (PwC, 2007). Coupled with the disease burden are issues of limited resources and growing healthcare spending, of which the cost of medicine constitutes the largest portion (McKinsey & Company, 2018). All these are important variables in the healthcare system. Together, they have implications for the type and cost of medicine, and its adoption (PwC, 2007). It means, therefore, that there is need to determine what medicines are affordable and to abandon or discontinue therapies that are less effective than comparable options. Besides, it implies the need to pay based on outcomes from these products and therapies (International Finance Corporation [IFC], 2019). This is because the goal of all participants in healthcare spaces is to ensure that prescriptions are both appropriate and cost-effective (Shanks et al., 2009). As a result, most interventions targeting to change prescription patterns in favour of generics have been aimed at doctors, pharmacists and patients.

Global healthcare spending stood at US$ 8.0 trillion in 2015, with about 7% estimated Compound Annual Growth Rate (CAGR) in 2005-2020 in the developing countries, where the population was projected to grow to 3.5 billion by 2020 (McKinsey & Company, 2018). Healthcare reforms in the US have focused on reducing the cost of out-of-pocket (OOP) spending on pharmaceuticals (PwC, 2012). High cost of medicines is a huge burden that patients, particularly in developing nations, continue to bear, given

that most of the medicines are paid for OOP (WHO, 2004; Ongarora et al., 2019). Further, about a third of the global population does not have access to necessary medicines. The situation is particularly grim in Africa, which remains the world's largest reservoir of infectious diseases such as malaria, Tuberculosis (TB) and HIV/AIDS, partly because of the tropical climate (Crisp, 2018).

Although Sub-Saharan Africa accounts for at least 68% of the global disease burden (especially Malaria, TB and HIV/AIDS), it has only 4% of the health workforce. Moreover, the pharmaceutical sector experiences many challenges including high cost of medicine and regulations, opening floodgates for illicit trade in medication—import and production of illicit medicines (Crisp, 2018). As Infinite Potentials Consulting (IPC) (2014) states, since 2000, healthcare spend across many African countries has been growing at 9.6% Compound Annual Growth Rate (CAGR), which is comparable to McKinsey & Company (2018) estimates of 9.6% CAGR between 2010 and 2014.

While the pharmaceuticals market in Africa is valued at US$ 13.6 billion (IFC, 2019), more than 50% of pharmaceutical sales in Africa were concentrated in Egypt, Morocco, South Africa and Algeria, valued at US$10.7 billion by 2018. Kenya, at 17% CAGR, falls in the same category with Botswana (12%) and Nigeria (13%); that is, other countries with the fastest growing pharmaceutical spending rates in terms of CAGR. Similarly, McKinsey & Company (2018) put Kenya's growth of pharmaceuticals at 6.4% in the period 2005-2015. Together, these three countries accounted for US$ 2.6 billion in pharmaceutical sales in 2011. These statistics indicate that the country is fast becoming an established pharmaceuticals market (IPC, 2014).

High cost of medication (particularly of innovator brands) means that generics now occupy the centre stage in primary-healthcare as a viable option (Bateman, 2014; WHO, 2016; McKinsey, 2018; Ongarora et al., 2019). By 2017, adoption of generics in developed countries such as the US stood at 84% of all prescriptions (WHO, 2011; Wouters, Kanavos & McKee, 2017), up from 65% in 2008 (PwC, 2009). In Eastern and Central Europe, it stood at 70% in 2008 (PwC, 2009). In Western Europe, specifically Germany and the United Kingdom (UK), the adoption rate was 80% and 83%, respectively (Wouters, et al., 2017). India, the hub of generic medicines manufacture, however, has a relatively low adoption rate at less than 50% (Roy & Rana, 2018).

Generally, such global trends in acceptability of generics are possible because the medicines substantially reduce the cost of medication without compromising the quality (Shanks et al., 2009). Similar rate of adoption would best serve the interest of developing nations. However, as WHO (2011) statistics indicate, adoption of generic medicines is less than 60% across the regions where the organisation has a presence, including Sub-Saharan Africa at 62%.

High cost of medicines remains an impediment to accessibility of healthcare and better health situation for many South Africans (Bangalee, 2015). Generic medicines, therefore, are a vital policy option in South Africa, for they enhance accessibility to therapeutic medicines (Patel, Gauld, Noris & Rades, 2012). However, the authors observe that relevant government authorities must be able to guarantee the quality of such medicines. Moreover, lingering negative perceptions towards generic medicines have to be dealt with by, among others, pharmacists to make people more confident about using them.

Pervasive negative perception towards generics, therefore, puts focus on communication (health communication), which is integral to access and promotion of health in its widest sense and multiple facets (Rimal & Lapinski, 2009). Health communication is integral for it serves to initiate actions; make known needs and requirements; exchange information, ideas, attitudes and beliefs; engender understanding; and establish relations (Thomas, 2006). The essence of health communication then is the application of communication strategies to inform and influence individual and collective decisions that lead to better health outcomes. That includes use of communication means to counter prevailing adverse perceptions and attitudes towards generics.

Dealing with the perception hindrance to adoption of generics thus calls for purposeful, objective-based multichannel and frequent communication used strategically and in a broad sense. The communication should span, for example, creating awareness and educating the patients or their representatives on a range of issues relating to "generic substitutions, such as compliance with therapy and avoidance of potential confusion that may arise due to changes in brands of same medication" (Kirking et al., 2001 cited in Hasali et al., 2012, p. 2). That is besides communication playing a role in providing

information on the quality and safety of generics to both the consumers and healthcare providers.

Pharmacist knowledge, as far as perception goes, is very critical, for pharmacists play a big role in reassuring consumers of the safety, quality and efficacy of generics, and guiding their decisions, and thus they must have a good understanding of generics (Hasali et al., 2012) and related issues that affect the overall acceptability of these drugs. These are issues relating to not only the form of the drug and what it contains but further include other industry dynamics as well. Such dynamics comprise existing and new medicines, cost, consumer perception, dubious promotional practices, models and strategies of business, besides the value of therapeutic expertise in drug substitution (Radyoeijati & Haak, 2003; Williams & Jones, 2004; Patel et al., 2012; Mukherji, 2012; PwC, 2017).

Consumer preference significantly affects the uptake of generics, too (Quick et al., 1997; Patel et al., 2012; Hasali et al., 2012). Bateman (2014) observed that the adoption of generic medicines has grown significantly in South Africa, from 35% to 60% over a decade, following a shift in perception and the realisation of their cost-saving benefits. The South African case is a classic example of government intervention, where the government passed a law that paved way for substituting innovator brands with generic versions provided the doctor and pharmacist agreed on it.

Generic medicines have to meet the most rigorous standards, though, and must have the same identity, strength, quality, purity, efficacy, and safety as its brand name counterpart (Patel et al., 2012; Bateman, 2014). Such standards reflect an intention to ensure the bare minimum safeguards are in place against the possibility of unscrupulous agents to pass off counterfeits as genuine medicine, especially given the ever-growing demand for quality and affordable medication. The seemingly great prospects for generics aside, the country still faces concerns about high mark-ups in the medical supply chain, leading to high specialist generics prices. For example, generic Gleevec for cancer treatment cost 1654% more (US$2913) in South Africa compared to India, the country of origin, where it cost US$166 (Organisation for Economic Cooperation and Development [OECD], 2018).

Access to medicines is an integral component of the right to healthcare as guaranteed by national and international legal instruments, including the Kenya Constitution 2010 in article 43 (MOH, 2010; UNIDO, 2012; IFC, 2019; Njuguna & Wanjala, 2019). However, affordability of healthcare remains a major problem as many Kenyans still pay for the services at the point of service. Besides, OOP expenditure on drugs still constitutes a high percentage of medical cost. It is against such a background that the government endeavours to provide universal health coverage, a major aspiration involving all the different relevant aspects of access to medicines. Access to medicines consists of having safe medicines that are not only always available at both public and private health facilities and medicine outlets but are affordable as well (PwC, 2009; WHO, 2011; McKinsey, 2018).

Medicines come at a cost, which can sometimes be too exorbitant for the patient, or his or her relatives to bear. Moreover, to be able to offer generic medicines, they have to be in supply. It is only then that they can be a solution to the problem of unavailability of medicines due to high cost. The need for access to reliably available and affordable alternative (to innovator brands) medicine as a solution to the demand for quality and affordable healthcare means that generics are in focus. Prospects of generics, however, are plagued in no small part by lack of promotion. There is no documentation of efforts made so far specifically to effectively promote the use of these medicines especially in developing countries, leading to lack of preference or negative attitude from largely ignorant consumers who think that only branded medicines are available and/or effective (WHO, 2011). Studies indicate, however, that both branded and generic medicines offer the same quality and are effective in the management of disease (KenlinkKenya, 2010; Bateman, 2014).

Adoption of generic medicines in Kenya remains rather unimpressive compared to South Africa, the highest adopters in Africa, at more than 60% (Bateman, 2014), or even to its regional counterparts, Tanzania and Uganda at 63% and 67%, respectively (Olingo, 2017). The country's rate of 30% is far lower than the global average (50%) and extremely lower than that of the US (86-90%), which, ironically, hosts most of the top-ten drug innovators in Pfizer, Johnson & Johnson, Merck & Co Inc., AbbVie, Amgen, Bristol-Myers Squibb and Alexion (Ellis, 2019; Iyer, 2019; PharmaTech, 2019; FDA,

2021). Significant to note also is that the US managed to save US$265 billion in 2017 up from US$97.3 billion in 2008, marking a 172.4% growth in savings over a decade, due to the adoption of generics (Association for Accessible Medicines [AAM], 2018). Specifically, generic anti-ulcerants cost US$3 billion instead of the US$24.6 billion that would have been the cost of brand-name medicines. Other sources indicate overall generics associated cost savings of US$1.67 trillion for the US healthcare system between 2007 and 2016 (FDA, 2021).

The pharmaceutical sector in Nairobi City County includes a formulation segment where dosaging and packaging of medicaments take place to avail them to patients and doctors within the healthcare system. Most of what is manufactured locally in Nairobi comprise non-sterile, over-the-counter (OTC) products (Kalunda et al., 2012). There are 1,230 retail pharmacies/chemists in Nairobi County, 175 of which are in Njiru Sub-County (Kenya Pharmacy and Poisons Board [KPPB], 2020). The pharmaceutical retail sector in Njiru Sub-County comprises retail pharmacies and chemists that support the healthcare system by selling both branded and generic medicines, including tablets, injectables, syrups, drops and other preparations to consumers—both patients and healthcare providers.

Pharmacists, pharmacy technologists/pharmacy technicians operate the pharmacies. Increased adoption of generics calls for effective communication to consumers to highlight the benefits while allaying negative perceptions surrounding aspects such as identity, cost, quality and efficacy. The communication factor must be considered alongside pharmacy personnel knowledge and consumer preference to the extent that each respective interaction with the factor leads to varied outcomes. The terms generics, generic medicines and generic drugs are interchangeable in this study. Similarly, frequency of communication and frequency of messaging can be substituted.

1.2 Problem Statement

At 32%, about one-third of all health expenditure, OOP remains high in Kenya, pushing many below the poverty line and impeding access to healthcare (Njuguna & Wanjala; 2019; Karen, Stephan, Asta, Steven & Tigere, 2019). Consequently, about 6.7% of Kenyans are victims of catastrophic expenditure (about 40% of their non-food

expenditure goes to health). Thus, healthcare remains a major concern in the country today, and availability of medicine is one of the key things that contribute to that concern (Ongarora et al., 2019).

Statistics indicate that "even when medicines are available, the cost is up to 60% of health care expenditure" (Cameron et al., 2011 cited in Ongarora et al., 2019, p. 2). Currently, millions of Kenyans who are in need of treatment do not seek it, partly due to the cost of drugs. Generic medicines are, therefore, a remedy to the cost of medicine and their increased uptake holds part of the solution to the problem of lack of access to healthcare (Karen et al., 2019). They not only mean a drastic reduction in the cost of medication but can be just as effective as their branded counterparts as well (PwC, 2009; WHO, 2011; Patel et al., 2012; Bateman, 2014).

While the availability of generic medicines is higher in the private than public sector in all regions of the world, their use in the Western Pacific, South-East Asia and Sub-Saharan Africa region is less than 60%. Kenya, a country aspiring to provide universal health coverage (UHC) by 2022, would do well to promote better adoption of such medicines, but at present the uptake of these medicines is low at 30% (Olingo, 2017; Dutta, Maina, Ginivan & Koseki, 2018; Njuguna & Wanjala, 2019). Part of the reason for the low uptake is possible lack of information or awareness on the availability, quality and use of these medicines. For example, there is prevalent information that generic medicines are counterfeits. This notion obtains even as medical data show that generic medicines resemble brand-medicines in both active ingredients and effectiveness (PwC, 2009; Patel et al., 2012; Bateman, 2014; Olingo, 2017).

Furthermore, whereas KPPB provides policy guidelines on how to advertise and promote medicines in Kenya (KPPB, 2011), it has no specific guidelines on promotion of generic prescription and substitution by practitioners, particularly pharmacists, pharmacy technologists/pharmacy technicians, which perhaps explains the low endorsement and uptake of these drugs. This is a possible consequence of lack of meaningful communication on the overarching rationale for generics as a cost-saving alternative in access to medication, which potentially cascades to the pharmacy personnel. Such lack of sufficient information points to a gap in communication, particularly in terms of whether

the retail pharmacists or pharmacy technologists/pharmacy technicians, package and disseminate information on these medicines to the consumers, and how often.

The need to have sufficient information on and understanding of the interplay and implications of these communication-related concerns therefore warrants and forms the basis of this study.

1.3 Objectives of the Study

1.3.1 General Objective

The broad objective of this study was to establish the moderation effect of pharmacy personnel knowledge and consumer preference on the relationship between communication and the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

1.3.2 Specific Objectives

1. To establish the relationship between communication and the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi
2. To assess the effect of pharmacy personnel knowledge on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi
3. To determine the effect of consumer preference on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi
4. To evaluate the interaction effect of communication and pharmacy personnel knowledge on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi
5. To establish the interaction effect of communication and consumer preference on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi

1.4 Hypotheses of the Study

The null and alternate hypotheses were stated as follows:

1 H_0: Communication has no statistically significant relationship with the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi

H_1: Communication has a statistically significant relationship with the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

2 H_0: Pharmacy personnel knowledge has no statistically significant effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

H_2: Pharmacy personnel knowledge has a statistically significant effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

3 H_0: Consumer preference has no statistically significant effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

H_3: Consumer preference has a statistically significant effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

4 H_0: Communication and pharmacy personnel knowledge have no statistically significant interaction effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

H_4: Communication and pharmacy personnel knowledge have a statistically significant interaction effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

5. H_0 Communication and consumer preference have no statistically significant interaction effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

   H_5 Communication and consumer preference have a statistically significant interaction effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

1.5 Justification/Significance of the Study

Healthcare is important for any nation and access to and cost of medicine is an important aspect of it. Yet, this cost can be extremely exorbitant, especially where innovator brands of medicine are concerned. Generic medicines, though just as efficacious as this first option, are comparatively cheap thus offering a reprieve for cash-strapped consumers. Adoption of generics in Kenya, however, is low, standing at only 30%. This is due to insufficient information reaching would-be consumers, who still equate generics to counterfeits.

This study purposed to determine the moderation effect of pharmacy personnel knowledge and consumer preference on the relationship between communication and uptake of generic medicines in retail pharmacies in Njiru Sub-County. Fundamentally, it sought to establish the extent to which retail pharmacists or pharmacy technologists/technicians consider quality, multimodal and frequent communication to be an important part of creating awareness among their customers of the type and use of generic medicines in the market in Njiru Sub-County with a view to shoring up their adoption. Hence, it aimed to establish if there was a link between the perceived value of communication and the sale of generic medicines in the pharmacies of interest, controlling for the moderation effect of pharmacy personnel knowledge and consumer preference.

Creating understanding on the value of quality frequent multimodal communication has the potential effect of increasing awareness and access to medication, and reducing its cost for the public to afford. The net effect is an improvement of their health status, something that is particularly important because the availability of generic

drugs in Kenya, more so from 2001, has driven down the prices of HIV, TB and malaria treatment significantly, cutting it by about 80% (Azavedo, 2017). The benefit makes even greater sense considering that the rebasing of the economy in 2006 to lower middle-income has resulted in a greater burden of healthcare financing, with the expected government contribution to vaccines, anti-malarial and TB drugs, and anti-retrovirals (ARVs) increasing from 5% to 20% (Njuguna & Wanjala, 2019). The outcome of reduced cost of medication could be cascaded to other diseases and conditions.

Pharmacies stand to gain from new information on the role played by communication, pharmacy personnel knowledge and customer preference on the uptake of generics in terms of tailoring their advertising/promotional efforts appropriately. Such efforts would optimise the use of information and communication within these set-ups. In particular, they would be able to deploy the right communication tools to provide sufficient information, and effectively, to the consumers, and by so doing improve the stocking and sale of these drugs.

MOH would also likely benefit from the results of this study to the extent that they provide a rationale for using communication to encourage mainstreaming of generic substitution or prescription of generics in place of innovator brands as an evidence-based policy option within government health facilities.

The results of this study would empower consumers to make better choices of pharmaceutical expenditure through dissemination of information on the options of medicine available and general cost differential in a data-driven and effective way. Significantly, the study would enable policy makers to develop pro-poor interventions with the aim to shore up access to the needed medicines, the net effect of which is increased access to quality and affordable healthcare, and an improvement to the economy.

The study benefits scholarship by creating understanding of the nexus among the four key variables, communication, pharmacist knowledge, consumer preference and uptake of generics, and how the interactions are linked to theories of communication. It could also potentially stimulate further research in the area of communication and adoption of generics, or something similar.

1.6 Assumptions of the Study

This study was based on the following assumptions:

1. Retail pharmacies in Njiru Sub-County applied some form of communication to ensure their customers were informed about specific aspects of generic medicines.
2. There was preference for either innovator brands of medicine or generics among customers of the retail pharmacies.
3. There was knowledge/attitude differential among the retail pharmacy personnel on the value of communication; and about the value of understanding quality-, efficacy-, and effectiveness-related issues of generics, therapeutic expertise, drug identity-related issues, and pharmaceutical industry dynamics.
4. The pharmacy personnel stocked either generics or innovator brands of medicine or both.
5. The pharmacy personnel would be ready and willing to divulge information relating to the sale of medicines in the pharmacies.
6. The period of the study would be enough to conclude all the relevant processes and lead to valid findings.

1.7 Scope of the Study

The study was on the moderation effect of pharmacy personnel knowledge and consumer preference on the relationship between communication and uptake of generic medicines in retail pharmacies in Njiru Sub-County. It was limited to these variables and associated relevant parameters. The study was conducted in Njiru Sub-County between January and May 2021.

The retail pharmacies and chemists in the Sub-County formed the target population, a sample of which was determined using Daniel (1999) formula. Moreover, much as utilisation of medicine as an aspect of healthcare was a countrywide phenomenon, the study limited itself to Njiru Sub-County.

The respondents comprised 121 pharmacists, pharmacy technologists/ pharmacy technicians or pharmacy assistants. The low- and middle-income (LMI) characteristics of this population suited the focus of the study in terms of the prevalence of the targeted

characteristics, especially those relating to concerns of limited access to and the burden of OOP expenditure on medication; thus, it provided a basis for valid parameter estimation.

Two theories were applied: Diffusion of Innovations (Rogers, 1995; Rogers, 2003) and Theory of Planned Behaviour ([TPB]; Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980). The study was based on a cross-sectional descriptive design that used a survey to understand the key issues in question. Both descriptive and inferential statistics were used to analyse the data.

1.8 Limitations and Delimitations of the Study

This study faced a potential limitation of participant dropout in the course of data collection for reasons such as personal commitment. Then, there was the issue of self-report. Using a questionnaire for data collection meant that the participants could end up giving false or irrelevant data particularly those relating to the sales made over the period of interest thus compromising the accuracy of the data.

The cross-sectional nature of the survey, however, lessened the potential lethargy and attrition that might have resulted from long periods of conducting a longitudinal survey, for example. In addition, appropriate follow-up done in some cases ensured the respondents had completed the questionnaire as expected.

The study focused on pharmacies in Njiru Sub-County, using the status of private ownership as site/participant inclusion-exclusion criterion. Accordingly, it targeted only retail pharmacies. Besides, only the lead pharmacist, pharmacy technologist/technician or pharmacy assistant, one from each pharmacy, took part in the study.

The study design was purely cross-sectional and descriptive. Hence, it did not have the benefit of observation of outcomes of the predictor variables on the criterion over time as happens in a longitudinal study. Specifically, it did not allow for determination of communication outcomes based on experimental and control groups as would be possible with an experimental or quasi-experimental design. This did not affect the validity of the findings, though, for the focus was only on categorical attitudinal and interval/ratio constructs aptly measurable from cross-sectional data. The study limited itself to positivist paradigm as exemplified by the use of a quantitative survey.

Analysis of Variance (ANOVA), the statistical model applied on the data, used only categorical predictors measured on an attitude-based scale. An alternative model based on objective, absolute value measurements would have tested the relationships to reveal other insights about the magnitude and direction of the effect of the predictor variables.

Overall, the cited limitations did not mar the validity of the findings.

1.9 Operational Definitions

The variables, communication, pharmacy personnel knowledge and consumer preference are attitude-based constructs measured at an ordinal level on a scale ranging from 1 to 5 (Strongly Disagree - Strongly Agree).

The criterion, uptake of generics, was measured as the proportion of generic sales vis-à-vis innovator brands.

The key terms are defined as follows:

Effect: The extent to which communication, pharmacy personnel knowledge and consumer preference contribute to the adoption or lack of it of generic medicines in pharmacies, singularly or in an interaction model

Pharmacy personnel: A health professional in a retail pharmacy, including a registered pharmacist, enrolled pharmacy technologist/technician or enlisted pharmacy assistant who dispenses medicines from medical prescriptions (or prescribes them) and also offers information on how best to use the medication thus optimising and monitoring drug therapy in collaboration with physicians and/or other healthcare professionals

Pharmacy personnel knowledge: Knowledge measured in terms of understanding of or the positive or negative disposition towards the value of quality-related issues, therapeutic expertise, attitude towards the identity of generics, efficacy of generics, and critical market dynamics in the medical products supply chain in so far as they affect preference for either generic or innovator brands

Consumer preference: Inclination by the person (patient or patient representative) who buys medicines for either innovator brands or generics from pharmacies, and how it affects the uptake of generics, measured in terms of preference based on perceived

efficacy, quality and cost of generics, strong attachment to an innovator brand and risk aversion

Communication: Perceived or considered importance of quality, frequent and multimodal communication as possible determinants of consumer preference for generic medicines

Generic medicine (generic): The type of medicine produced without the license from the innovator company after the expiry of the patent or other market exclusivity rights on the innovator brand of medicine

Uptake of generic medicines: Rate of movement of generic drugs from the pharmacy to the consumer measured in terms of proportion generic medicine sales vis-à-vis innovator brands in the period 2019-2020

Pharmacies: Retail pharmaceutical shops/chemists in Njiru Sub-County

1.10 Structure of the Report

This research project report comprises five chapters. Chapter One deals with the background of the study, problem statement, justification/significance of the study, objectives, hypotheses, assumptions, scope, limitations and delimitations of the study, and operational definitions. Chapter Two focuses on review of literature on communication, pharmacy personnel knowledge and consumer preference, and the respective relationship with uptake of generic medicines. Moreover, there is presentation of a review of relevant theories and the conceptual framework that anchors the study.

Chapter Three looks at research methodology and all its constitutive elements. Chapter Four is a presentation, analysis, and interpretation of the findings. Chapter Five presents a summary of the findings and the integration of the findings with reviewed literature and theories, and provides conclusions, theoretical implications, recommendations and suggested areas of further study. The appendices provide the survey instrument, additional reporting on the assumptions of ANOVA, work plan and the relevant research authorisation documents.

1.11 Summary of Chapter

This chapter has provided the overview of the study, background to the extent of utilisation of generics (and specific attendant concerns) within the global, regional and national medical supply chain. It has also presented the initial considerations of the study, including problem statement, purpose of the study, hypotheses, rationale and justification, assumptions, scope, limitation and delimitation, and operational definitions. In addition, it has shown how the study is organised. The next chapter reviews relevant theoretical and empirical literature, lays out the theoretical basis of the study, and presents the conceptual framework with the hypothesised relationships.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter presents a theoretical review of general topical content on the pharmaceutical industry, regulation of the pharmaceutical industry, generic medicines and bioequivalence, and prices, availability and affordability of key medicines. It also reviews specific relevant literature (including empirical data) on communication, pharmacy personnel knowledge and consumer preference, looking at how each one links to adoption of generic medicines. In addition, it points out the theoretical and methodological gaps identified, and shows the analytical framework—theoretical and conceptual framework—that guides the study.

2.1 Theoretical Review

2.1.1 Pharmaceutical Industry

United Nations Industrial Development Organisation ([UNIDO], 1980) explains that the pharmaceutical industry is a formulation industry where dosaging and packaging of medicaments take place to avail them to patients and doctors within the healthcare system. How it works is by taking therapeutically active agents from the pharmochemical industry and dosaging them "into tablets, injectables, syrups, drops and other preparations with the final formulation, end-product, having one or more active substances and flavouring agents, stabilisers and other excipients" (UNIDO, 1980, p. 3).

Pharmaceutical industry includes pharmaceutical products in different therapy areas, vaccines, diagnostics, medical services, biologics, consumer health, crop science and animal health (PwC, 2009; WHO, 2016; PharmaTech, 2018; Ellis, 2019). The bulk of what is manufactured locally comprise non-sterile, OTC products (Kalunda et al., 2012).

The industry continues to witness momentous changes, with many different pharmaceutical companies striving to provide better products through research and development to beat the competition (PwC, 2009; Ellis, 2019; Pharmatech, 2019). The goal is to offer better and newer products for different kinds of diseases. Thus, some medicines have completely changed the treatment paradigm for the targeted illnesses and effectively advanced patient care as contrasted to just a few years ago. Still, others have

dramatically improved survival rates for serious diseases like cardiovascular disease (CVD), cancer and HIV/AIDS (Pharmaceutical Research and Manufacturers of America [PhRMA], 2010).

Global pharmaceutical market stood between US$952.5 billion and US$1.1 trillion in 2018 (PharmaTech, 2019; Ellis, 2019), with the figure set to hit 1.4 trillion in 2020. The industry is research-driven with pharmaceutical companies spending roughly US$150 billion annually on research and development ([RD]; Ellis, 2019). The US dominates the market share of the global pharmaceutical industry at US$341.1billion, but there are emergent markets in China, South East Asia, Eastern Europe and South America. Ellis (2019) ranks the top ten global pharmaceutical companies, based on revenue from pharmaceuticals, as Pfizer Inc. (US, US$53.7bn), Roche (Switzerland, US$45.6bn), Johnson & Johnson (US, US$40.7bn), Sanofi (France, US$39.3bn), Merck & Co Inc. (US, US$37.7bn), Novartis (Switzerland, US$34.9bn) and AbbVie (US, US$32.8bn). Amgen (US, US$23.7bn), GlaxoSmithKline (UK, US$23bn) and Bristol-Myers Squibb (US, US$22.6bn) complete the list of ten.

Similarly, PharmaTech (2019) lists leading global pharmacos by market share and revenue (pharmaceutical and other products) as of 2018, in this ascending order: Eli Lily and Co. (2.6%, US$24.6bn); Bayer AG (2.8 %, US$45.3bn); AbbVie Inc. (3.5%, US$23.7bn); Sanofi (4.1%, US$39.2bn); GlaxoSmithKline Plc. (4.9%, US$40bn); Johnson & Johnson (4.3%, US$81.6bn); Merck & Co Inc. (4.4%, US$42.3bn). F. Hoffman-La Roche Ltd. (4.7%, US$57.7bn) Novartis (5.4%, US$51.9bn); and Pfizer Inc. (5.6%, US$53.6bn), top this list, again in ascending order. These statistics indicate how huge the pharmaceutical industry is, how much concentrated it is in the developed countries, and how important it is to the global economy as a business, and as a component of the health industry.

Kenya Government has continued to promote both local and foreign investment in the pharmaceutical sector leading to rapid expansion (Kalunda, Nduku & Kabiru, 2012). As a result, the country is the largest producer of pharmaceutical products in the Common Market for Eastern and Southern Africa (COMESA) region (IFC, 2019). It supplies about 50% of the region's market, and as at 2012, it had about 30 of the region's estimated 50 pharmaceutical manufacturers (Kalunda et al., 2012). The drugs

manufactured, however, do not meet the country's needs and so about 70% of what the country uses locally is imported (IFC, 2019). There is also heavy reliance on imported raw materials.

Kenyan pharmaceutical industry comprises a number of players that includes manufacturers (pharmacos), distributors and retailers (Kalunda et al., 2012). All these players work to support the ministry of health. Some of the pharmaceutical companies operating in Nairobi County include Novartis Pharma Services, Bayer, Sanofi, Dawa, Cosmos Ltd., Healthcare Direct (K) Ltd., GlaxoSmithKline, Global Merchants Ltd., Pharmaken, Roche Kenya Ltd., Surgilinks Ltd., C Mehta & Co Ltd., Medisel Kenya Ltd., Bee Health Propolis (K) Ltd., Dapco Pharmaceuticals and Accord Health Care (K) Ltd. (KPPB, 2020). The pharmaceutical market is evidently dominated by foreign multinational firms (IFC, 2019).

There were 1,230 retail pharmacies/chemists in Nairobi County by 2020, 175 of which were in Njiru Sub-County (KPPB, 2020).

2.1.2 Generic Medicines: Bioequivalence and Importance

Generic medicines, or simply generics, are medicines that are produced without the license from the innovator company after the expiry of the patent or other market exclusivity rights on the innovator product. Acceptance of generic medicines is determined largely by bioequivalence as can be demonstrated by significant efficacy and pre-clinical studies (Patel et al., 2012; WHO, 2016; FDA, 2021). Bioequivalence is "the absence of a significant difference in the rate and extent to which the active ingredient or active moiety in pharmaceutical equivalents or pharmaceutical alternatives becomes available at the site of drug action when administered at the same dose" (WHO, 2016, p. 1). In other words, it is the ability of active molecules in a generic medicine to perform as efficaciously as those of the comparator medicine, usually an innovator brand. As Hoen, Hogerzeil, Quick and Sillo (2014) explain, application of this approach to ARVs led to a global scale up of and consequent access to safe, efficacious, quality and more affordable ARV treatment in the early 2000s.

Bioequivalence studies have gained wider acceptance as a regulatory standard and replaced clinical trials for efficacy and safety studies, having replaced the latter in 1984

in the US (WHO, 2016). As PwC (2008) reports, the year 2020 would see a trend in which patients would likely need healthcare options that comprise innovator brands, generic medicines and OTC products regardless of the company that manufactures them provided the product works. Generics can also be interchanged with each other. WHO (2016) has performed indirect comparisons of pre-qualified drugs using data obtained from independent bioequivalence studies done against the same comparator medicine.

2.1.3 Regulation of the Pharmaceutical Sector

WHO (2011) opines that countries that have been able to successfully address anti-competitive practices at every stage of the pharmaceutical supply chain are those with well-developed and -enforced competition-related laws. It explains that companies found to have engaged in anti-competitive practices leading to high prices or restricted availability of essential medicines, including monopolisation, have been penalised based on the existing laws and forced to change their behaviour.

An effective and efficient competition, which is essential for reasonable pricing and availability of medicines at the points-of-service, depends much on industry regulation (WHO, 2011). Accordingly, general laws, for example, criminal law, contract law, and competition law can be used to ensure healthy competition. That is besides pharmaceutical sector regulation with the aim of having only safe and quality products available in the supply chain. The net effect of both application of relevant laws and sector regulation is availability of sufficient information to and increased knowledge among consumers, retailers and doctors about price, quality and proper use of medicines. Utilisation of generics, therefore, is a responsibility that lies with respective country governments.

A range of complementary policies exists that is potentially beneficial to the health and pharmaceutical sector ministries in terms of effective competition and enhanced uptake of generics. These include credible regulation of the efficacy, safety, and quality of medicines, coupled with low-cost, timely and transparent registration (WHO, 2011). There is also the creation of room for trading in quality-assured generic medicines and zero tariffs, and competition-promoting incentives in the supply chain targeted at provider payment policies. These policies make healthcare providers price-conscious and align their incentives with the goal of rational use of least-cost, quality-

assured essential medicines. There should also be a well-established way to track and monitor the prescribing and dispensing of medicines, and finances by the government of insurers as a basis for effective market regulation and provider payment. Lastly, there should be enforcement of ethical codes of conduct for the industry, doctors and pharmacists.

Matters of registration and distribution of generic medicines and generic substitution policies are more advanced in developed nations compared to LMICs. In the US, for example, the pharmaceutical industry is regulated by FDA, which approved about 55 novel medicines besides increasing its generics approvals from 763 in 2017 to 781 in 2018 (Ellis, 2019). Although the WHO establishes norms and standards of quality of medicine in member countries, it is reported that enforceability of interchangeability remains largely low-key if not non-existent. The other concern relates to inability of pharmaceutical companies in these countries to carry out bioequivalence studies to the level required. Worse still, even in cases where there is regulation, resource constraints make it hard to increase the uptake of generic medicines.

South African pharmaceutical industry has benefited from the application of law to cases of strategic importance and in which multinational firms were involved, besides those involving local generic medicine manufacturers and wholesale/distribution. Even private sector retail pharmacy and public procurement were not left out (WHO, 2011). WHO further suggests that the South African case is worth emulating by other middle-income countries (MICs) and low-income countries (LICs) that have sufficient general institutional capacity in their legal and regulatory systems. IFC (2019) makes a similar case when it advocates for accelerating the adoption of cross-recognition of common regulatory standards in the pharmaceutical sector within EAC COMESA region particularly to increase the acceptability of Kenya's exports.

Concerning regulation of Kenyan pharmaceutical industry, Kalunda, Nduku and Kabiru (2012) observe that the industry is dogged by complications mostly arising from licensing and pricing control by the MOH. They argue that in most cases, apart from being the control mechanism, the state is equally the most important customer through Kenya Medical Supplies Agency (KEMSA). The agency buys about 30% of medicines in the Kenyan market for distribution to government medical institutions.

KPPB has the main role of quality assurance of all pharmaceuticals on the Kenyan market (UNIDO, 2012). Thus, it deals with issues of enforcement of quality standards, awareness creation of quality concerns among consumers, as well as establishing a quality management system (training, dispensing, prescribing, and pharmaceutical care, etc.).

Kenya has several complementary laws governing the pharmaceutical sector courtesy of multiple regulatory bodies (IFC, 2019), both in and out of the health sector. There are no legal or regulatory provisions affecting medicines prices in Kenya though (MOH, 2010). Much as the government has an actively monitors national medicines price, especially retail patient prices in the different facilities, the public, faith-based and private, there is no regulation for mandatory publicising of retail medicine price information. This rather lax regulatory environment is likely to contribute to high cost of medicines charged by exploitative retailers.

2.1.4 Prices, Availability and Affordability of Key Medicines

Data obtained from the National Association of Chain Drug Stores (NACS) indicated US$39.73 as the average retail prescription price for a generic drug in the US in 2009, 76 % less than US$155.5, the average cost for a branded drug (Assistant Secretary for Planning and Evaluation [ASPE], 2010). Generic subscription now stands at about 92% of all prescriptions in the US. Elsewhere, IMS Institute for Health Informatics (2015) also reported a 92% proportion of generics treatment volume in the European Union (EU), which contributed to cost savings of 61% or €100bn in 2014 across countries and increased patient access to medicines across varied therapeutic areas.

The contribution was a result of both direct offers of low prices and promoting competition, but it would have to be assessed in the next few years for the expected reduction in the number of small-molecule innovator brands set to lose market exclusivity rights in Europe. Significant to note, however, is that high drug prices and the contributory effect of generics to cost reduction evidently is a global concern, which the African continent certainly shares.

A study by Bangalee and Suleman (2015) compared the prices of innovator brand, lowest-priced generic and International Reference Price (IRP) for cardiovascular class of

medicines in South Africa and found a median price ratio (MPR) of 21, and 4.3, respectively. They concluded that the policies in place had yet to realise the lowest drug prices by international comparison. The prices of drugs from the private sector were obtained from the South African Medicine Price Registry, while the IRP was obtained from the Management Sciences for Health International Drug Price Indicator Guide (2012 edition). High drug prices—and low accessibility—exemplified by large innovator-generic drug price disparities therefore is a continental problem, which is equally, if not more, acute domestically.

A study in Kenya revealed that the mean availability of medicines in the public sector was 66% for originator medicines compared to 81% in the private sector (WHO, 2004). Availability of generics was computed using the median price, with the public sector having 37.7 and the private, 72.4.

Price of medicines in Kenya compared to the IRP, and expressed as a ratio of the same, revealed glaring disparities with significant implications for affordability within the public and private sectors. Much as public procurement prices were below IRP (Median Price Ratio [MPR] of 0.7 for generics), public and private patient prices were substantially higher than IRPs. In the public sector prices, a median price of 3.6 was recorded for originators and 2 for generics. The private sector prices were higher—18.1 for innovator brands and 3.3 for generics.

A WHO (2004) survey included a core group of 30 medicines in all countries, and a supplementary group of 15 medicines unique to Kenya. The core group medicines were considered based on global disease burden and the availability of standard formulations and significance, while the supplementary group medicines were chosen because of how important and/or frequent they are in managing common health issues in Kenya. The surveyed medicines came from 53 public health facilities, 57 private sector facilities, and 47 mission or Non-Governmental Organisation (NGO) health facilities. The survey presented prices as MPRs, which is the ratio of the local price divided by an IRP converted into the same currency. The results showed that the lowest priced generic medicine was at least 5.1 times less expensive than a matching innovator brand (n = 33).

Ironically, some of the innovator brands were widely available despite being priced very highly. For instance, 43% of the private sector outlets stocked innovator

brand furosemide, which was 5000% or 50 times more expensive than the lowest priced generic equivalent (93.1% availability [WHO, 2004]). The least priced innovator brand, omaprazole, was found to be 7.5 times more than that of its generic equivalent at 55.2% availability and 79.3% availability, respectively.

In the NGO sector, it was shown that procurement prices for the lowest priced generic medicines was 0.7 times the IRP, meaning that the NGO procurement prices are 26% less than the published international market prices of non-profit generic medicines suppliers (WHO, 2004). Table 2.1 shows the price differential between innovator brands and lowest priced generic equivalent for 10 medicines with the greatest differences.

Table 2.1

Price and Availability of Innovator Brand versus Lowest-Priced Generic

Patient prices and availability in the private sector for innovator brands compared to lowest priced generic equivalents		Availability	
Number of times more expensive innovator: lowest priced generic		Innovator	Generic
Amitriptyline	8.0	22.4%	72.4%
Atenolol	8.5	36.2%	60.3%
Ciprofloxacin	36.2	48.3%	87.9%
Clotrimazole cream	14.0	39.7%	98.3%
Diazepam	16.0	31.0%	82.8%
Doxycycline	20.0	12.1%	96.6%
Furosemide	50.0	43.1%	93.1%
Omeprazole	7.5	55.2%	79.3%
Phenytoin	10.0	39.7%	67.2%
Trinidazole	30.0	51.7%	86.2%

Note. Adapted from *Medicine prices in Kenya*, by WHO 2004 (n = 58 facilities) (http://haiweb.org/wp-content/uploads/2015/07/Kenya-Report-Pricing-Surveys.pdf)

Generally, the extent to which medicines were available in the three sectors varied, with 65% (n = 29 facilities), 81.9% (n = 58 facilities) and 61.4% (n = 44 facilities) availability in the public, private and NGO sector, respectively (WHO, 2004). In the public sector, particularly where patients paid for medicines, they paid 20% less than in the NGO and 30% lower than in the private sector, respectively. Patient prices in the private

sector were 48% higher than public sector patient prices and 19% higher than NGO sector patient prices. On average, innovator brands cost 5 times more than the lowest-priced generics. Medicine prices in the NGO sector outlets were higher compared to the public sector, and closer to those of the private sector, while availability in the NGO sector was generally greater than in the public sector.

Another study by Cameron et al. (2012) sought to determine what could be saved by switching from originator brand medicines to generic equivalents in selected developing countries. They found that those who bought medicine in the private sector pay more for innovator brands even though there were generic alternatives. They estimated the savings that could be obtained from a supposed switching from innovator brands to lowest-priced generic alternatives for a selection of medicines in 17 countries. The prices of innovator brands and their lowest-priced generic substitutes were obtained from facility-based surveys conducted by using a standard methodology. Fourteen medicines most commonly included in surveys, and three statins were sampled.

For each medicine, the volume of private sector consumption of the originator brand product was obtained from IMS Health, Inc. (Cameron et al., 2012). The median unit prices for both the innovator brand and the lowest-priced generic alternative and the respective volumes were then used to derive the final cost. Prices were adjusted to 2008 using the consumer price index data, and further adjustment made for purchasing power parity.

For the medicines considered, 9% to 89% annual savings, on average, were realisable by any country that switched from innovator to lowest-priced generic in the private sector. In China's public hospitals specifically, US$ 370 could be saved by switching just four medicines, leading to 65% savings. Assessing individual medicines, potentially, an average of 11% savings could be realised on beclometasone inhaler to 73% on ceftriaxone injection (Cameron et al., 2012).

The authors concluded that switching from innovator to lowest-priced generic equivalents could lead to substantial cost savings, and so this calls for strategies to promote generics uptake. Generic substitution by pharmacists and encouraging positive perception of professionals are possible policy options.

2.1.5 Communication and Generic Medicines

In any intervention that aims to improve health prospects of any given population, communication is of utmost importance (Corcoran, 2007). This is because any information that seeks to promote health and wellbeing must be communicated; and even more so because communication is a transactional process that is only as purposeful as it is able to elicit the expected feedback, response to or action on the message.

Communication quality dimensions

The value of communication lies in understanding and acceptance of what makes quality communication. Communication quality refers to the ability of communication to elicit the desired response in a context of mutual understanding and respect. Therefore, critical thinking should go into the process of communicating, taking note of the various facets of quality communication (Skarbaliene, Gedrime & Skarbalius, 2019). Some of the facets of such communication include objective-based action, conciseness, correctness, relevance and feedback.

Critically thinking about health-related communication must also consider or base itself on short-term and measurable steps that best lead to the expected goal (Centre for Rural Health [CRH], 2018). These steps are the objectives, which should be specific, realistic, prioritised and measurable. When formulating the objectives one should be clear about the purpose by posing and responding to these issues: whether the focus is on educating or providing new information; whether the target audience is being called to action; or whether the aim is behaviour change.

Only carefully defined objectives can lead to quality communication indicated by respectful and effective relationships cultivated with patients and their relatives, besides showing personal leadership, resolving conflicts and motivating others (Skarbaliene, et al., 2019). Quality communication enables patients to understand their situation better. Besides, good communication skills help build respectful and effective relationships with patients, their relatives, and colleagues. Additionally, a positive correlation was found between effective communication of healthcare professionals and better, improved health outcomes for the patients (Oh et al., 2001; Laidlaw et al., 2001; Alotaibi, 2018).

Another study by Choudhary and Gupta (2015) looked at the effects of training on basic communication skills and effective techniques of patient interviewing, with pre-and post-training evaluation carried out. The results indicated that 86% of the respondents agreed on the benefit of developing their communication skills for effective communication for their practice in future. Ninety percent of the respondents felt their communication had improved as a result of the training. The authors concluded that it was important to build the communication skills of the students in the medical and healthcare programmes.

Application of marketing communication in the pharmaceutical industry must be understood within the context of the reality of new media formats, which are a consequence of the development of the internet and other related digital technologies. Several opportunities now exist to reach target audiences or consumers, as challenging as this maybe for a variety of reasons (Fill & Jamieson, 2014).

Multi-channel advertising/ promotion

Communicating effectively requires using various means, usually interpersonal communication, community-based channels, and several other different media to cause a dynamic, two-way exchange of information and ideas. Studies also indicate that the effectiveness of messages increases in proportion to the number of media channels in use (O'Sullivan et al., 2003). Fragmentation of the media, therefore, is a reality that actors in the marketing communications field have to deal with if their efforts are to be successful. It is especially important to note that different audiences are best reached through particular channels and not others. Thus, marketing efforts must necessarily consider the right channel or mix of channels through which to engage potential consumers. As Fill and Jamieson (2014) put it, consumers now have many different ways to spend their leisure time, from television to general and specific interest magazines to the internet with a lot of websites offering limitless information sources and opportunities to do online shopping. Availability of such media, however, does not automatically translate to good prospects for generic advertising.

Advertising and promotion is one of the anti-trust practices manufacturers and retailers of branded medicines have used to stifle competition from generics (WHO,

2011). They often use differentiated prices and advertising targeting to build brands and related promotional activities as a way to prevent consumer switchover to a rival product or pharmacy. The pharmaceutical sector is rife with direct-to-consumer (DTC) advertising and detailing by company representatives, which enable suppliers of branded medicines to increase prices (Brekke & Kuhn, 2005). Such anti-trust practices are not helped either by risk aversion among consumers.

Risk-averse consumers, about quality, are reluctant to switch from familiar products or reputable brands. As Mrazek and Frank (2004) note, in places where doctor and patient confidence in effective quality control regulation is low, there is greater effect of product differentiation and branding. The reason is that consumers cannot easily assess product quality, as evidence suggests that many consumers actually perceive high prices to be an indication of quality. Further, European Commission ([EC], 2004) refers to a study that found that some innovator companies did not just promote their products but also sought to discredit generics, calling into question their quality.

Equally, Japan, uncomfortable with a 54.6% adoption rate of generics and a high cost of medication (4.1 billion in the year 2015) for its ageing population, undertook to promote the use of generics to at least 60% by 2018 (Tachi et al., 2018). Accordingly, local and national reforms focused on medical policies and health systems to increase the use of generics, besides medical facilities carrying out their own promotional initiatives. These included highlighting patient-and physician-related factors. In addition, there has been an evaluation of the situation in other countries in terms of healthcare policies and promotional activities.

To underscore further the value of communication in the adoption of medicines, PwC (2009) reported that between 1996 and 2005, pharmaceutical promotions rose from US$11.4 billion to US$29.9 billion in the US. AstraZeneca, for example, spent about US$500 million to advertise esomeprazole (omeprazole isomer), Nexium, to the US public over a two-year period and realised medicine sales of US$4.6 by 2005 (Mintzes, 2012). Yet, another study suggested that actual value, which includes meetings and e-promotions, was about US$57.5 billion in real terms within a similar period (Gagnon & Lexchin, 2008).

One of the other options is DTC. Although PwC (2008) reports that it has not delivered to the industry's expectations, countries such as the US and New Zealand still allow companies to market directly to consumers and (Mintzes, 2012). Elsewhere, the EC was reported to be considering lifting "the ban on direct communications that provide 'objective non-promotional' information" (Pharma Times Forum, 2008 cited in PwC, 2009, p. 18). In the period 1990-2000, the sales of 50 most heavily advertised medical products shot up by 32% in comparison to the average growth of 13.6%. Relatively more recent studies, however, dispute the value of DTC in advertising, suggesting that it has little to no long-term impact on demand (National Institute for Health [NIH], 2008 cited in PwC, 2009).

Pharmacy personnel have a big role to play in pharmaceutical advertising. This role is of particular note because the distribution channels of the pharmaceutical industry leaves the final decision to the pharmacy personnel on which drug to dispense, wresting the decision from the consumer (Hasali et al., 2012; Kim & King, 2009 cited in Oduol, 2015;). Whereas it is generally assumed that the physician makes the final decision on the drug to buy, there is significant variance in actual practice between developed and developing countries. Research findings indicate that in many developing countries, pharmacy personnel's considered expertise makes them the most important source of information and consequently the final decision-makers on what medicines to purchase (Oduol, 2015). Among populations living below the poverty line, pharmacy personnel's role extends beyond prescription to that of influencing, prescribing and switching (Taher, Stuart & Hegazy, 2012).

The evolving and steadily expanding role of a pharmacy personnel points to a future where greater communicative abilities will be demanded, besides decision-making, leadership, management, continued learning and teaching to increase his/her effectiveness (WHO, 1997). By virtue of the extensive periods and more frequent contact with patients compared to physicians, pharmacy personnel are in a very good position to assume the role of primary healthcare providers and so contribute significantly to affordable healthcare. As Maniscalco, Daniloski and Brinberg (2010) opine, they are perhaps more strategically and therefore better placed to deliver healthcare information than is possible with patient-doctor relationships.

A pharmacy personnel's power to influence decisions is rooted in the concept of expert power, which finds basis in the perception that the influencer has residual special knowledge, information, or skills in a particular and relevant area (Bush & Wilson, 1976 cited in Murshid, Mohaidin & Goh, 2016). This power has seen a pharmacy personnel's role change from that of simply dispensing to that of influencing and being actively involved in decision-making in the context of drug therapy. Accordingly, a pharmacy personnel's influence is recognised to the extent that they are considered as possessing itemised knowledge, information, skill, confidence, and power to control outcomes of the drug (Wheeler et al., 2012 cited in Murshid, Mohaidin & Goh, 2016).

Pharmaceutical companies and pharmacies have to analyse and understand the value chain to be able to identify how to work more effectively with healthcare payers (governments, health insurers and employers, or patients) and providers to be able to produce and stock medicines that have real social and economic value to everyone involved. The recognition of the role of communication in increasing the utilisation of generic medicines has seen insurers and health systems develop "campaigns to improve patient perceptions about the value of generics" (O'Malley et al., 2008 cited in Shranks et al., 2009, p. 2). The intention of such campaigns is the assumption of patients gaining sufficient knowledge to influence the kind of medicines prescribed to them.

A study done in Egypt to assess the role of pharmacists in patient medicine purchase patterns revealed that forty-five percent of the patients came with a prescription, 30% presented just an empty package of previous medication or one that had been recommended. Twenty-five percent had nothing and so sought the pharmacist's advice based on the indications. Notably, 14% of the patients who bore a prescription to the pharmacy or had a box/ name of a drug had the prescription switched. Overall, the pharmacist did 39% switching as 25% had only presented an indication (Stuart, Hegazy & Taher, 2012). The main reasons for the switch of prescription were the conviction that the new drug would be more effective and economic status of the patient, or unavailability of the prescribed drug in stock.

Communication frequency

Frequency of communication has a significant effect on the person who receives the message, especially in terms of gratification received (Zizka, 2014). A study dubbed

"communication channels: the effects of frequency, duration, and function on gratification" found, through a multiple linear regression analysis, that communication frequency (and other variables such as duration and function) predict gratifications obtained when applying communication channels. The study used duration, frequency of use, and functions as predictor variables, with the criterion being gratifications received. It was observed that the overall linear combination of the stated predictor variables had a significant effect on the criterion, F (3, 131) = 45.68, p<.01. Coefficient of Determination (R^2) was 0.52, indicating that approximately 52% of the variance of gratification received could be accounted for by the combined effect of duration, frequency of use, and function. Overall, the regression model predicted gratifications received significantly well.

While Zizka (2014) study is relevant for it uses communication variables—duration, frequency and function—as predictors in a regression model, and the result, it neither tests any moderation effect nor has any direct application in the context of communication and healthcare, let alone uptake of generics. The current study necessarily differs from it in domain, scope and methodology, by seeking to determine how communication affects the uptake of generics in retail pharmacies, while accounting for the effect of two other variables on that relationship.

2.1.6 Pharmacy Personnel Knowledge and Generic Medicines

Patel and Paras (2016) did an exploratory study of knowledge, attitude and priority of medical practitioner towards generic medicines in Vadodara, India. They reported on a study conducted in the US in 2005, which showed that 78% of physicians were pro-generics in most cases, and 17% were willing to prescribe generic medicines in all cases provided they were available. Just 5% indicated their lack of support for generic substitution. In the study, 95% of the physicians showed that they were knowledgeable about generic bioequivalence.

In Karachi, Pakistan, an exploratory study on similar parameters showed that 71.8% of the physicians were knowledgeable about the similarity between the generic and brand name medicines, while 41.3% registered doubt about the quality and safety of

generics. The study concluded that knowledge, together with attitude, patient's economic condition and legal aspect were important factors in the acceptance of generics.

Meanwhile, in India, a study regarding doctors' knowledge, attitude and practice revealed that 76% had such knowledge. Such disparity in knowledge between the physicians from the US and India, for instance, explains the disparity in the rate of adoption, which stands at 84%-90% in the former (WHO, 2011; Wouters et al., 2017; FDA, 2021) and 50% in the latter (Roy & Rana, 2018). Likewise, pharmacy personnel's knowledge, though not tackled in existing literature, is a crucial factor in the uptake of generics.

Knowledge of industry dynamics

How well a retailer understands the dynamics of business, including his or her customers is important for business success (Mukherji, 2012; PwC, 2017). Retailers often find themselves in a tough spot as they deal with business-related technological change upheavals that require them to innovate constantly. The stakes are getting increasingly higher and the competition fiercer. To compete in retail business today, new entrants do not require brick-and-mortar kind of retail stores or warehouses (PwC, 2017). They can leverage their knowledge and technology to innovate for better competition and success.

Beyond the knowledge of existing and new medicines, and where and how best to share such knowledge, there is need for a radical shift in mental models and strategies of doing business (and engaging consumers; IFC, 2019). Knowledge of the right business model to adopt has implications for the growth of generics markets in developing nations. In a study by PwC (2012), it was revealed that there is need to adopt specific strategies for each market. This is exemplified in strategy continuum, with innovation-driven strategy occupying one end, and market-driven strategy occupying the other end. While companies at the former end of the spectrum focus on quality (and higher-priced products) rather than quantity, those companies at the latter end of the spectrum focus on volume of sales and market share through pricing differential, and opening of companies manufacturing generic medicines in particular key locations.

Knowledge of the existence of dubious promotional practices (PwC, 2012) by advertisers is another critical factor and a step forward in having improved adoption. As

Public Citizen (2012) reports, between 2000 and mid-2012, the US pharmaceutical industry paid US$30 billion as settlement for 226 violations. These violations included off-label marketing and overcharging of taxpayer-funded insurance schemes like Medicaid. Thus, retailer knowledge is important to avert potential criminal court action resulting from fraud in the purchase of medicines.

It is also important to understand what promotional advertising method works, since traditional advertising seems to have lost its attraction with people preferring a genuine story. No longer is the global population much attracted to traditional advertising; rather, they want authentic information that is readily accessible and at their fingertips (PwC, 2017), such as what their friends are doing, the popular brands on social media, and what their popular influencers find trendy. It is advisable, therefore, for retailers to find creative ways of telling their story to connect with their customers. In the West, for example, many retailers are using facebook for digitising their catalogues with carousel adverts. Another example is the Chinese use of Tencent's QQ/WeChat.

Facebook is now able to supply customers with real-time information about what is in stock, encouraging the prospect to make an order (PwC, 2017). Similarly, other retailers are using narratives such as short stories with product placement and publishing them on Facebook and other social platforms. Since social media is mainly about connecting with customers, emotionally engaging them can be effective, especially if it is achieved via a series of linked narratives featuring to-be-promoted products and services. Application of social media, however, is tempered with the need to hire and train expert staff who understand properly the retail brand, what they post about and the target audience. Besides, it also helps to have social media listening tools to be able to catch a negative story before it ruins the brand story (PwC, 2017; Keyhole, 2020).

Having a retailer website also provides a platform to inspire purchases. Yet, such a website should not just be consistent with but also connected to the company's social media. This has the advantage of complementing the brand story and providing a coherent brand experience, consequently making it easy to convert social media leads.

A review by Kaplan et al. (2012) of literature on the impact of policies designed to enhance uptake of generic medicines in LMICs focused on studies evaluating the impact of pro-generic policies. Ten, 13.7%, of the 73 articles touching on generic

medicines policies in LMICs considered the impact of competition, trade, pricing and prescribing policies on generic medicine price and/or volume. The articles identified key barriers to applying generic medicine policies in LMICs as negative perceptions of generics among stakeholders and the attractive private sector financial incentives to sell medical products that fetch the highest profit margin. Additional barriers are legal or regulatory, and they include the absence of generic substitution regulations. Promotion of generics is also generally difficult due to lack of price information provided by health care provider organisations to physicians.

Knowledge of the value of therapeutic expertise

The business environment has shifted markedly, with consumers becoming ever more scrutinising of the medicines they purchase and demanding for greater value from these (PwC, 2012). Furthermore, there is demand for new clinically superior and economically better treatment options and facts to prove claims of superiority of one medicine to another. The implication is that retailers must be equipped with authentic and reliable data on their products and be ready to share such information whenever it is needed.

Knowledge of identity and efficacy of generics

Healthcare provider's knowledge is one of the factors that influence the use of medicine (Radyoeijati & Haak, 2003; Williams & Jones, 2004). Patel et al. (2012) study demonstrated that healthcare providers' knowledge of certain medicines as having favourable health outcomes determined consumers' preference for innovator brands over generic alternatives. Similarly, a study involving pharmacists and prescribers found that knowledge about generics among health professionals (and the population in general) significantly affects their acceptance and use (Guttier et al., 2017).

Knowledge of quality and value of generics

Knowledge of the potential value of generic medicines measured based on what potential payers and providers might think leads to conscious thought about what a particular medicine is likely to generate (PwC, 2012). Aside from that, the motivation for the promotion of innovator brands despite high prices must also be understood within the context of competition with the generic alternatives. In the US for example, the adoption

of the Hatch-Waxman law in 1984 led to the loss of half of the market of some originator brands only a year after the introduction of its generic alternative (Grabowski, 1984 cited in WHO, 2011).

A cross-sectional descriptive study conducted in Malaysia explored the perceptions of 48 Malaysian community pharmacists towards locally manufactured generic medicines. The study used self-completed anonymous mail questionnaire. The findings revealed that while 97.9% dispensed generics, just 37.5% viewed locally manufactured generics as equal in quality to the imported generics (Hasali et al. 2012). Regarding safety and efficacy, however, approximately 60% of the respondents agreed that local generics were equal to the imported ones. The Malaysian regulatory authorities, 68% of the respondents felt, could reduce the negative perceptions by convincing pharmacists on the quality of domestic generic medicines.

Igbinovia (2007) carried out a study in South Africa on the perceived benefits of generic versus branded medicines using a cross-sectional descriptive design to determine the perceptions of consumers of generic medicines vis-a-vis branded ones. The study surveyed 391 patients from 30 government and private pharmacies, and assessed their perceptions of benefits of generics and branded medicines across factors such as race, income, age, educational level, cost, quality and safety. The results showed disparities in the perceptions of benefits of the two medicine categories across these factors.

The current study expands Hasali et al. (2012) study by applying quantitative techniques to determine not just perception as a standalone variable but also its moderating role in the relationship between communication and adoption of generics. It also departs from Igbinovia (2007) study, for while the author considers perception in and of itself, without linking it to uptake of generics, it focuses on different indicators of perception and its indirect effect on the uptake of generics in the context of a communication variable.

2.1.7 Consumer Preference and Generic Medicines

Consumer preferences denote how positively motivated consumers are and are expressed by the emotional identification with a product/service or some trading form (Voicu, 2008, p. 127). Retail business environment consists of consumers who invariably

prefer a particular product or a variety of products and services. Preference stems from long-term relationship between a brand and a consumer, where the latter learns to connect the brand with a given symbol and perceives it to be of high quality (Voicu, 2008).

Although theoreticians have sometimes equated preference to choice, the two are markedly different concepts (Hanson & Grüne-Yanof, 2006). The former is a state of mind, while the latter is an action. Consumer preference is one of the ways of gauging how, for example, an advertising campaign has fared, and it can be measured before and after the campaign (Kottler, 2008). A number of factors including competing substitutes, quality, cost, risk-aversion, identity, efficacy, association with a given product, determines the preference for a product.

Competition-driven preference for generics

Pharmacies, like other retail businesses, have consumers, and must compete with others for their attention and preference. As Fill and Jamieson (2014) put it, they have choices to make over numerous offerings, thousands or tens of thousands. Consumer preference is thus an important part of business-to-consumer relationship, or, generally speaking, service provider-consumer relationship. Sparking consumer interest in a product requires application of the right mix of strategies.

Utilisation of generic medicines has been affected greatly by the preference that consumers often have for branded medicines, besides other determinants which include prescription and information asymmetry (WHO, 2011; Patel et al., 2012; Bateman, 2014). Organisations invariably have to use marketing communications to convey the real value of their products and services to consumers, but this is not always easy when it is considered that a number of variables may come into play, among which the existence of a pioneer, original brand, is significant (Carpenter, 2008).

Effective introduction of a second brand into a new market dominated by a pioneer requires a strategy that is cognisant of consumer preference dynamics (Carpenter, 2008). He further argues that optimal entry strategy must take into account the perpetual dominance of the pioneer brand. Such a strategy needs, therefore, to consider brand positioning, advertising, and price, for pioneer brands always benefit from enduring competitive advantages.

Quality- and cost-driven preference for generics

Generally, governments continue to lay emphasis on adoption of generic medicines for their potential to lower the cost of healthcare, but there are perceived doubts obtaining on the quality and equivalence of these medicines (Dune & Dune, 2015). Perceptions of generic medicines being of low quality linger in many places on the African continent (PwC, 2009; Bateman, 2011; McKinsey, 2018). While generic medicines policies stand as a viable option for driving down the cost of pharmaceuticals and improving access to affordable medicines, their utilisation faces the headwinds of negative societal perceptions as their efficacy, safety and quality is determined by societal norms (Patel et al., 2012). This is a consequence of promotion.

Separately, commercial features such as brand names and cost hugely influence perceptions of what medicine is efficacious and safe (Waber, Camon & Ariely, 2008 cited in Patel et al., 2012). Further, as King and Kanavos (2002) observe, there is a dominant notion that generic medicines are of poor quality.

Risk-aversion-driven preference for generics

The perceptions of low quality are not entirely unfounded though, as recent studies in some developing countries have proved. It has been found that there exist low quality medicines in these countries (Patel et al., 2012). Low quality medicine is evidenced by its failure to meet the acceptable standard of identity, purity and bioavailability of the active ingredient or pharmaceutical properties, as well as appropriate packaging and labeling of the final product (Quick et al., 1997).

Studies have shown that consumers rely mostly on the advice of their healthcare providers, who rely on experience, pharmaceutical marketing, prior utilisation of the medicine and clinical outcomes (Patel et al., 2012). Thus, the preference for a particular medication may not necessarily be based on proper assessment but a host of factors that have very little to do with quality.

Drug identity-based consumer preference for generics

Over time, it has been noted that shared experience and knowledge in the local setting influences the use of medicines.

Patel et al. (2010) studied how South African consumers perceived drug quality, and whether the perceptions influenced how people procured and used their medicines. The study used a combination of purposive and snowball sampling to recruit participants from low and middle socio-economic groups as well as the elderly and teenagers. Data were collected through 12 focus group discussions involving 73 participants.

Thematic analysis was performed on the transcripts. The results indicated that consumers' perceived quality of generic medicines depended on cost, whether the medicines were free or not, and who prescribed the medicines—doctor or pharmacist. Doctors were the more trusted prescribers. In addition, using the medicines made them feel "second-class."

Another study by Patel et al. (2012) on the quality of generic medicines in South Africa found that although they remain a policy option for the ever-increasing cost of pharmaceuticals, they are dogged by persistent consumer suspicions of low quality. Much as their adoption would significantly increase access to affordable and essential medicines, there was still low confidence in their use. The issue needed addressing by the relevant government regulatory bodies. Thus, the quality of generic medicines needed to be guaranteed, and campaigns mounted to instill confidence in the would-be users of these medicines to increase the uptake.

The study was conducted in three South African cities of Johannesburg, Durban and Cape Town. It was a qualitative study—a focus group discussion involving 73 consumer participants and 15 randomly selected healthcare providers from private and public universities in an attempt to understand the perceptions. Data were obtained through focus group discussions with the consumers and semi-structured interviews with the healthcare providers. In the test, 135 products comprising paracetamol tablets (n = 47), amoxillin capsules (n = 45), hydrochlorothiazide tablets (n = 43) were obtained from private and public healthcare providers. The tablets were then subjected to *in vitro* dissolution, uniformity of weight, and identity tests through Fourier Transformed Infrared Spectroscopy (FTIS). Specified methods from British (2005) and US (2006) Pharmacopeias were used for the tests. Description of drug quality was done in relation to the action and effect on the symptoms.

It was determined that procurement and utilisation behaviour of healthcare providers depended on experience, manufacturer's name and the consumer's economic status or ability to pay. All the drug formulations tested passed the *in vitro* tests for quality. The results showed that there were obvious differences between perceived quality and actual quality of medicines, pointing to lack of public engagement by the relevant government departments concerning the quality of generic medicines. This was an indication of how negative perceptions of quality of medicine have affected the uptake of generics.

Although generics hold part of the answer to lack of affordable pharmaceuticals, in some instances, strategic sale of branded generics by multinationals out to elbow out their local rivals has complicated issues (PwC, 2012). As a result, consumers have been willing to pay huge sums of money for the big brands at the expense of the locally available generic options. As Hasali et al. (2012) found, a step towards enhancing perception of generics would be for regulatory authorities to encourage the consumption of locally manufactured generics.

A change of perception is necessary for greater willingness to use generics in general; but even more important is to buy them from local manufacturers and retailers. Such change of perception could potentially have a corresponding increase in the adoption of generics and subsequent savings in the cost of medication. In Malaysia, for example, consumers can save as much as 60% should they opt for generic medicines (Chong et al., 2011 cited in Hasali et al., 2012). This cost saving is a result of price differential, which can be anything from 10% to 90%, between a generic and an innovator brand.

Bateman (2014) observed that adoption of generic medicines had grown in South Africa, from 35% to 60% over a decade, following a shift in perception and the realisation of its cost-saving benefits. These statistics closely mirror OECD's (2018) estimates of 36% originator and 64% generics in terms of sales volumes. The sale of generics, in monetary terms, however, paints a different picture, with the total sales of 32.3% and 36.7% of the total pharmaceutical sales and prescription drug sales, respectively. What these statistics point to is that whereas larger volumes of generic

prescription medicines are dispensed, larger amounts of money go to innovator brands (OECD, 2018)

The South African case is a classic example of government intervention, where a law was passed paving way for substituting innovator brands with generic versions provided the doctor and pharmacist agreed on it. Generic medicines, however, have to meet the most rigorous standards and must have the same identity, strength, quality, purity, efficacy and safety as their brand name counterparts (Bateman, 2014), ideally.

By 2014, it was reported that generic medicines accounted for about 100 million annual prescriptions in South Africa (Bateman, 2014). This marked a change in consumer perception of generic medicines as being inferior to the innovator brands. The change followed the realisation that treatment outcomes accruing from generic alternatives were not any different from what could be obtained from their branded counterparts. It was reported also that adoption of generics saved the South African health sector billions of money while ensuring that millions of patients were able to afford the medicines.

Managing chronic conditions on innovator brands can be very expensive whereas by adopting generic options patients can save up to 80% (Bateman, 2014). Massive wastage of healthcare resources in South Africa was attributed to underuse of quality generics. Yet, sustaining the healthcare system was largely contingent on affordable medication. Empirically, it was shown that 1% increase in the adoption of generic medicines led to savings of about R270 million.

Greater adoption of generics was in the South African public health sector where state-funded public sector purchased 70%-80% of all medicines, most of it generics. The only issue was this sector had only 30%-40% of the pharmaceutical market share. Private sector (healthcare insurers, medical schemes and other private sector healthcare funding), on the other hand, had 60%-70% market share but only purchased 20%-30% of generics by volume.

The highest uptake was of HIV/AIDS medicines (93.3%), oncology (88.5%) and non-prescribed minimum benefits (NPMB) chronic (82.4%). Prescription of generics also dominated in the other disease categories, including CVD, at 74.5%. Government pharmacies (GPs) were the largest providers at 89.8%, followed by courier pharmacies (83.7%), other providers (76%) and retail pharmacies (74.5%). The South African case

points to narrowing of the gap between generic medicines and innovator brands (Bateman, 2014).

Drug efficacy-based preference for generics

Several studies have looked at patient preferences for generics and highlighted varying degrees of perception concerning safety, efficacy and cost of generics as well as patient self-reported willingness to use generic medication (Carroll & Wolfgang, 1988; Gaither, Kirkling, Ascione & Welage, 2001). Further, several other studies have shown that communication between patients, pharmacists and physicians about new prescriptions are often incomplete and cost is rarely communicated (Shranks et al., 2009). Therefore, there is much dividend obtainable from a number of complementary policies designed to support consumer participation, education and advocacy. Such consumer-centric policies have the potential of mitigating the effects of the impediments resulting from unfair competition and consequently lowering medicine prices (WHO, 2011).

The second possible policy option is public support for consumer advocacy organisations, having legal provisions that give due consideration to consumer interests and not just focusing narrowly on market structure and employees' code of conduct. That would make a great difference where consumers are less informed or not well placed to do effective price comparison and make quality purchases.

Third is getting the public to support generic medicine advertising/promotion /education for consumers, doctors, as well as pharmacists. In light of possible infiltration of counterfeits, a fourth option is to consider legislation that protects the consumer/ patient, "including functioning systems for post-marketing surveillance and pharmacovigilance" (WHO, 2011, p. 15). Fifth is regulating medicine promotion. Last is giving greater weight to consumer/patient interest and consumer representation in addition to self-regulation and regulation of professional ethics.

Individual association-driven preference

The basis of consumer preference is effectively explained by the theory of rational choice, which has attitude components. Fully understanding consumer preferences necessitates determining what their demands and desires are about the functional value of

the purchase, what emotional results they expect, besides the subjective norms or standards they use to identify a product as different from others (Voicu, 2008).

A study conducted and published in English from 1980 on 52 articles (screened from 2,737) found that a high proportion of doctors, pharmacists and ordinary people negatively perceived generics (Colgan et al., 2015). Ordinary people (35.6%) and doctors (28.7%) were found to be more likely to consider generics as less efficacious than innovator brands compared to pharmacists (23.6%). Besides, a larger proportion of ordinary people (34.0%) had negative perception about generic substitution in comparison to doctors (24.1%) and pharmacists (11.0%). The rates of negative perceptions of generics did not appear to have changed substantially over time in the general population or among physician groups, $p>.431$. Such negative perceptions, however, showed a decreasing trend among pharmacists over the study period, $p = .034$.

Thus, the adoption of the medicines faces serious challenges driven largely by negative perception whose solution lies only in well-considered multi-stakeholder interventions in policy and practice to create a substantially positive shift.

The empirical studies reviewed show methodological limitations, for they do not assess quantitatively the effect of relevant variables on the uptake of generics or are limited in the number of variables included in the study, particularly those with potentially moderating effect on postulated relationships. For example, Patel et al. (2012) assessed qualitatively the perception of quality of generics among healthcare providers and consumers but does not assess any relationship.

This study methodologically differs from Patel et al. (2012) study by quantitatively studying the effect of three different variables on the uptake of generics, including the main and moderating effect of two predictor variables on the relationship between the focal factor and the dependent variable. Moreover, while the former study considers healthcare providers and consumers, the current study focuses on the pharmacy personnel. Colgan et al. (2015) study, similarly, does not assess any relationship between the perception of quality of generics and their uptake. This study considers the relationship between communication, pharmacy personnel knowledge, consumer preference and uptake of generics in retail pharmacies, testing both the main effect and the interaction effect in each relevant pairing in line with stated hypotheses.

2.2 Theoretical Framework

This study uses two theories, namely Diffusion of Innovations (Rogers, 1995; Rogers, 2003) and TPB (Fishbein & Ajzen, 1975; Ajzen &, Fishbein, 1980). These two theories have been chosen for their appropriateness to the context of innovation and adoption decisions for generic medicines. They are often considered complementary in that while diffusion of Innovations Theory focuses on the characteristics of an innovation, TPB is concerned with those variables that affect the behaviour of a would-be decision-maker (Weigel, Hazen, Ceglieski & Hall, 2014).

2.2.1 Diffusion of Innovations Theory

An innovation is an idea, practice, or object that is perceived to be new by an individual or other unit of adoption. Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system (Rogers, 1995; Rogers, 2003). Thus, innovation, channels, time and social system constitute the key variables in the theory. Adopting an innovation means agreeing to utilise fully an innovation as something that represents the most viable action to take in a given situation, while the opposite, rejection, is failing to adopt an innovation. The theory categorises adopters of innovations into five: innovators, early adopters, early majority, late majority and laggards.

Innovators, who occupy the first category of change adopters, are people who willingly take risks, and are often seen to be of the highest social status and have proven financial resources. They are also social and have the closest contact with scientist sources and interaction with other innovators. Their willingness to take risks, however, often lets them adopt technologies that do not necessarily work in the end.

Early adopters occupy the second category, and show the highest degree of opinion leadership compared to the other adopters (Rogers, 1995; Rogers, 2003). Their social status is high, and they have high proven financial ability besides being highly educated. Early adopters tend to be more discreet than innovators in the adoption of an innovation. They adopt innovations after carefully weighing the pros and cons.

Early majority falls in the third category and adopt an innovation much long after the innovators and early adopters have done so. Their social status is above average and

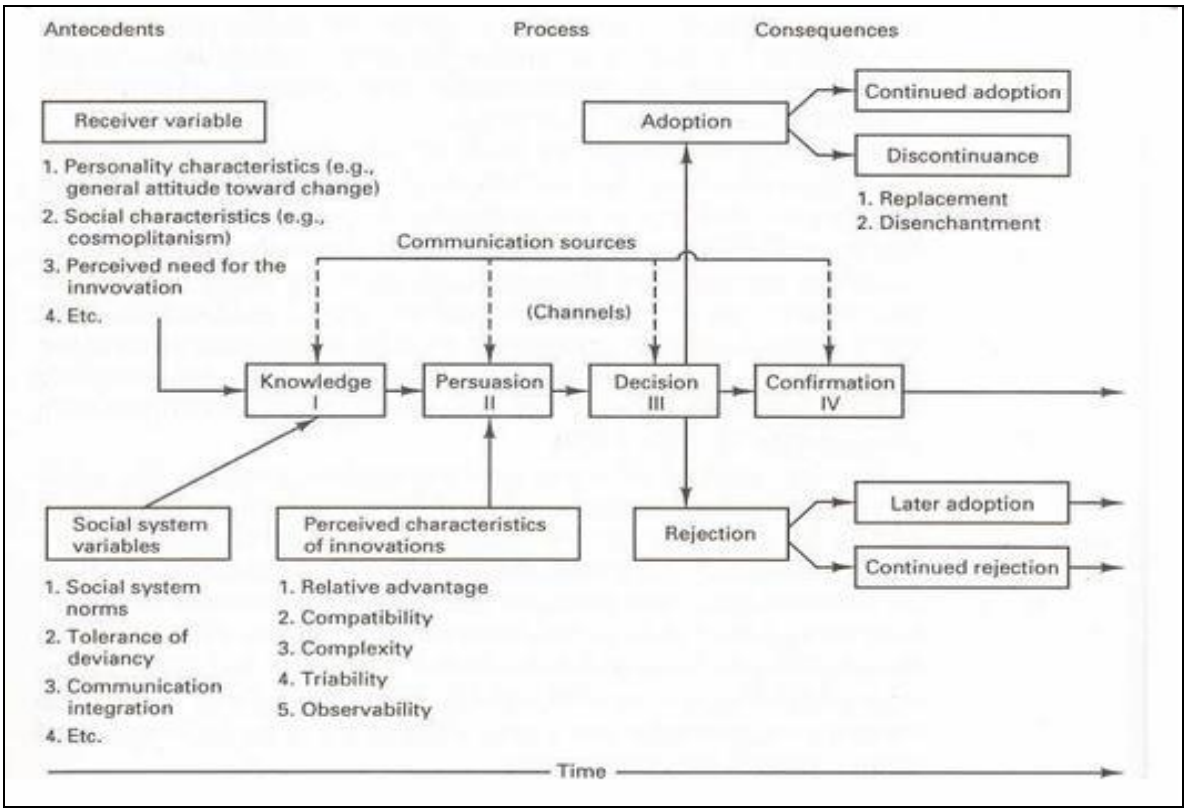
they make contact with the early adopters (Rogers, 2003). Hardly do they show opinion leadership though.

The fourth category is comprised of late majority who tend to adopt an innovation only after the average person or participant, or majority of the society. They are highly skeptical of innovations. The final category has laggards who tend to be the last to adopt an innovation. These adopters show little opinion leadership and are mostly averse to change-agents.

Figure 2.1 illustrates the process of diffusion of an innovation, taking into account the different variables/constructs that constitute and influence the process of innovation adoption.

Figure 2.1

Diffusion of Innovations Model



Note. Source: Rogers (2003)

From Figure 2.1, the main constructs associated with adoption decision are relative advantage, compatibility, trialability, observability and complexity. Adopting an

innovation may be influenced by one or any combination of these factors. The process, however, occurs in four stages, namely knowledge, persuasion, decision and confirmation.

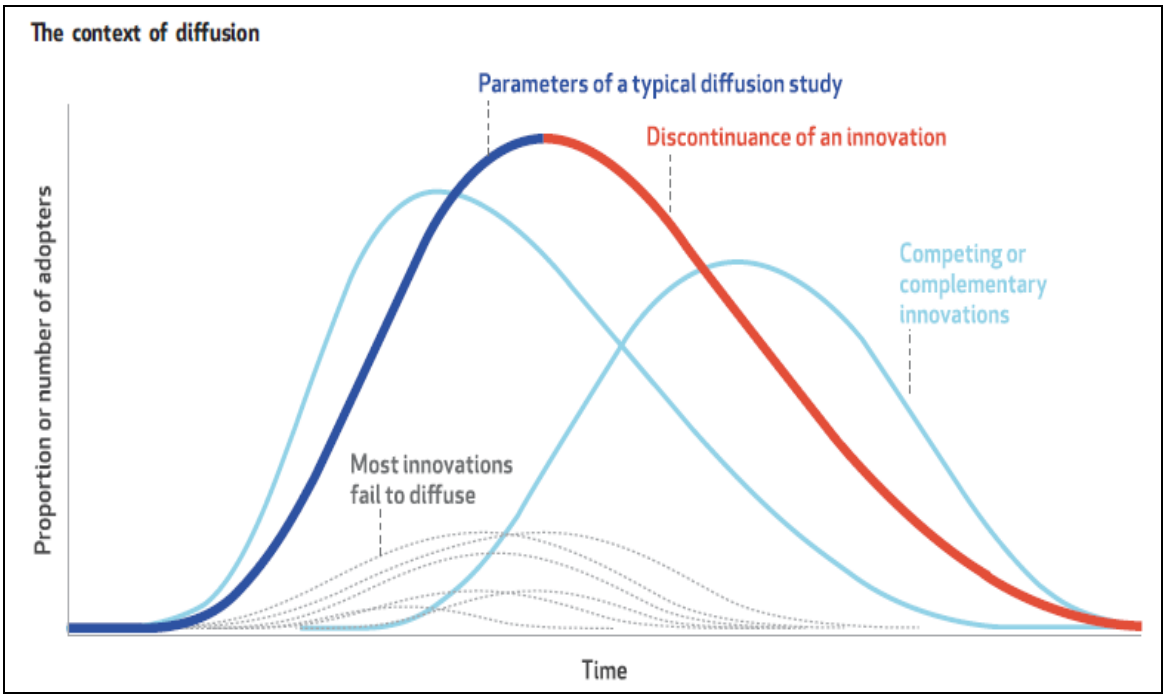
Diffusion of innovations has been studied from the perspective of the applicability of the theory and the parameters of diffusion processes—what they are, how they operate, and why notable innovations in healthcare do not spread more rapidly (Dearing & Cox, 2018). Studies have often looked at "'concepts such as government policies as innovations in the diffusion tradition, starting with a seminal US study about the spread of traffic-safety legislation among the states to hundreds of diffusion studies about policies concerning education, health, civil rights, and lotteries'" (Karch, 2007 cited in Derring & Cox, 2018, p. 4).

Diffusion of one innovation is sometimes rapid but characteristically follows an S-shaped curve similar to that of other innovations in terms of cumulative distribution over time (Dearing & Cox, 2018). Long latency periods too are often observed before the effect of media and public attention causes accelerated adoption, something similar to what happened in the 1980s with HIV/AIDs.

Figure 2.2 is a depiction of the S-curve, with time-dependent acceleration/deceleration. It indicates a number of contextual factors that affect adoption of an innovation—competing or complementary innovation, failure and deceleration. The importance of these factors is to the extent that adopters always have a choice over what innovation to adopt, most innovations fail to diffuse, and deciding to adopt one innovation means dropping the prior one.

Figure 2.2

Context of Diffusion



Note: Source: Dearing and Cox (2018)

A meta-analysis of the application of Diffusion of Innovations Theory and TPB was carried out focusing on a common criterion, adoption propensity (Tornazky & Klein, 1982 cited in Weigel, Hazen, Cegielski & Hall, 2014). Antecedents drawn from both models were used to develop a new model, Innovation Adoption Behaviour (IAB). Three characteristics of innovation, namely relative advantage, perceived compatibility and complexity were seen to be the most consistently significant associations with innovation adoption. The results indicated that attitude toward behaviour highly correlated with adoption propensity. Innovation characteristics of relative advantage, compatibility, trialability and observability were moderately correlated with the criterion, adoption propensity. Complexity, however, was negatively correlated with adoption propensity.

Diffusion of Innovations Theory applies in this study as far as perceived advantage of a generic alternative over innovator brand is likely to determine the decision to dispense the drug, which advantage may be in terms of cost to patients and sales volumes. Compatibility with industry norms of substituting innovator brands for generics on account of biosimilarity and similar therapeutic outcome is likely to determine the

propensity to dispense a generic. As regards trialability, whether the efficacy of a generic has been tested through action on a disease or condition is an equally important determinant of subsequent adoption. Observability of health outcomes attributable to a given generic likely influences a decision to adopt or not to adopt the practice of substituting an innovator brand for a generic. Complexity is a key adoption determinant too. How difficult it is or not, based on therapeutic expertise and relevant industry dynamics (e.g., cost, prescription, incentives), to do actual substitution of innovator brands for generic alternatives is a key variable in the proclivity to adopt the practice of dispensing generics.

Furthermore, the theory is appropriate to the extent that stocking or selling (dispensing) of generics or innovator brands of medicine is an individual time-specific psychosocial-based decision that can fall in any of these categories: innovator, early adopters, early majority, late majority and laggards. Thus, the theory is applicable, for it shows the category in which pharmacy personnel is likely to belong and how the category characteristics are likely to be exhibited in the degree of adoption of the prescription of generic medicines as a matter of course.

It is expected that pharmacy personnel profile, most importantly the level of education, and financial worth of the pharmacy are likely determinants of adopter category, with the implication that they are strong predisposing factors for stocking and sale of generic medicines. The medicines are considered a medical innovation that is revolutionary for their potential to lead to huge reductions in the cost of medicine and healthcare if adopted.

Diffusion of innovation has some limitation though. It assumes that media and interpersonal networks are sources of information that influence both opinion and judgment and thus determine the rate of adoption of an innovation.

2.2.2 Theory of Planned Behaviour

TPB, which is an improvement on the Theory of Reasoned Action (TRA), is an attempt at predicting someone's intention to behave in a given manner at a given time. It attempts to explain all the behaviours over which an individual is capable of exerting self-control. The main element in the theory is behavioural intent where intentions are

affected by the attitude that the resulting behaviours will have expected results and the personal subjective evaluations of the attendant risks and benefits of those results.

TPB has had applicative success in predicting and explaining health-related behaviours and intentions not limited to smoking, health services utilisation, drinking, mammography, cancer screening, breastfeeding and substance abuse.

The theory states (hypothesises) that behavioural achievement depends on both motivation (intention) and ability ([behavioural control]; Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980). The theory has six elements providing an individual's actual control over the behaviour:

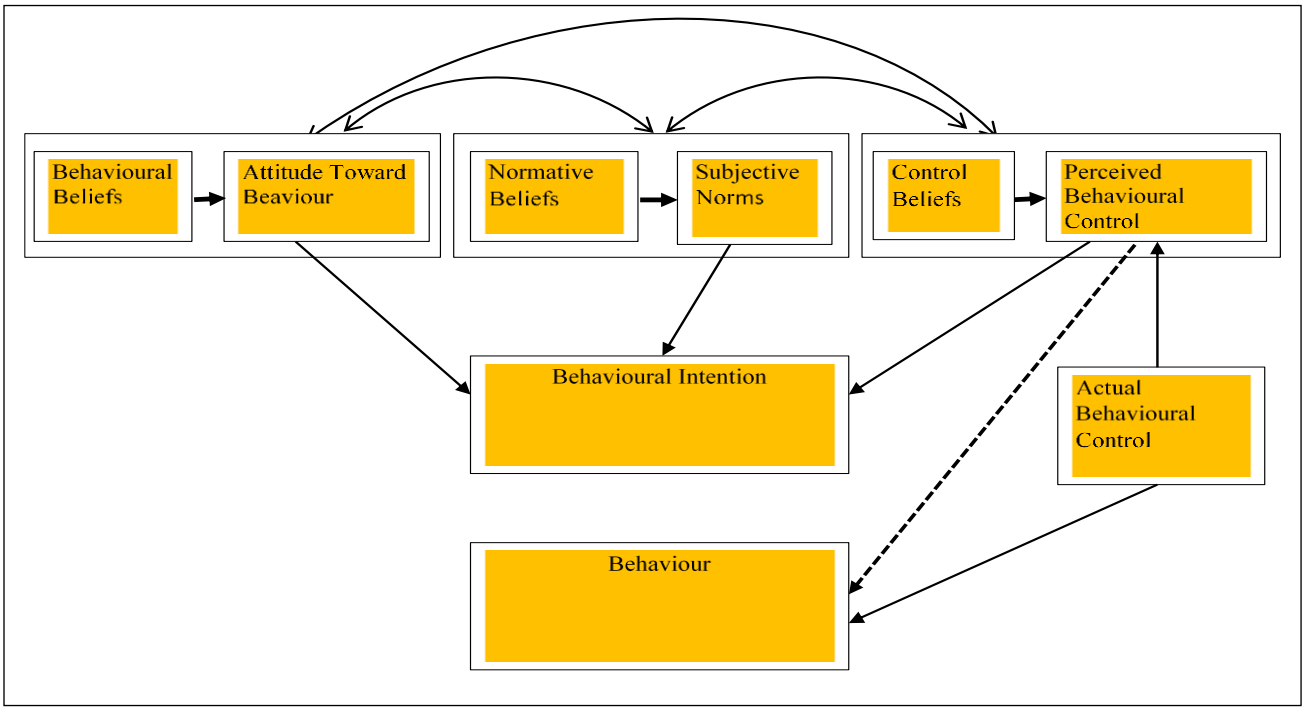
1. Attitudes: The extent to which a person evaluates favourably or unfavourably the behaviour of interest.
2. Behavioural intention: The motivational factors that affect a given behaviour in which the likelihood of performing the behaviour depends on the strength of the intention to perform the behaviour.
3. Subjective norms: Belief about whether or not people approve or disapprove of the behaviour, and mainly relates to what belief a person has about his or her important peers approval or disapproval of the behaviour.
4. Social norms: Customary codes of behaviour that are present in a group or among a people, or even within a larger cultural context. Such norms are taken to be normative or standard in a group of people.
5. Perceived power: Perception of existence of factors that can either facilitate or impede a person's performance of a behaviour can contributes to what he or she perceives that he/she can do to control the factors.
6. Perceived behavioural control: How a person perceives the intended behaviour to be easy or difficult to perform. This varies across situations, and actions, and thus lead to a person's varying perceptions of behavioural control and that depends on the situation.

The addition of this sixth construct is what distinguishes TPB from the original TRA.

Figure 2.3 is an illustration of the theory, specifying the different constructs and the interplay among them.

Figure 2.3

Theory of Planned Behaviour



Note. From Fishbein and Ajzen (1975)

Numerous studies have applied TPB in different contexts with the aim of predicting how knowledge is shared/knowledge-sharing behaviour (Jalili & Ghaleh, 2020). A meta-analysis of 47 studies conducted to validate TPB's application revealed that knowledge-sharing intention and perceived behavioural control predicted knowledge sharing behaviour. Intention was found to be a function of attitude toward knowledge sharing and subjective norm relating to knowledge sharing and perceived behavioural control to perform knowledge-sharing behaviour. For all TPB's applicability and utility as a predictor of intention and behvaiour, however, there was evident limitation in participant overestimation of both knowledge-sharing intention and knowledge-sharing behaviour. Measuring participants' actual knowledge-sharing behaviour could overcome such a limitation, the authors observe.

Another meta-analytic review examining the validity of TRA/TPB and contribution of additional variables focused on the main theoretical constructs—behaviour, intentions, attitudes, subjective norms, perceived behavioural control—and self-efficacy, and past behaviour across studies (n = 72) in a context of physical activity (Hagger, Chatzisarantis & Biddle, 2020). Meta-analytic methods were applied to correct the correlations in the TRA/TPB constructs for statistical artefacts across the studies.

In addition, path analyses were conducted to assess the pattern of hypothesised relationships among the variables. The results showed that TRA and TPB demonstrated good model fit with the corrected correlation matrices. Besides, there was a moderation effect of self-efficacy, where it accounted for variation in the intention. Including past behaviour in the model, however, led to attenuation in the amount of variation in these relationships: intention-behaviour, attitude-intention, self-efficacy-intention, and self-efficacy-behaviour. There was also evidence of moderation of the stated relationships by attitude-intention strength, and age. Support for the major relationships of the TRA/TPB was demonstrated.

The applicative value of TPB in this study lies in how it explains the attitude of a pharmacy personnel as the starting point for the intention to stock and/or sell generic medicines. Both attitude and intention are influenced in great part by the subjective norms, that is, whether an individual feels that significant peers in the industry approve of their stocking and/or sale of generics. The second normative category, social norms, would hold that stocking and/or prescribing of generics is embedded within the larger pharmaceutical industry and health sector dynamics that dictate standards of what medication is normal or acceptable, be it conventional or specialty.

The element of perceived power comes into play where pharmacy personnel takes a decision to stock or dispense generics if he or she perceives that variables such as consumer preference, their knowledge, cost and existing information within the healthcare system on the efficacy, safety and cost of generics can favour his or her considered decision. Moreover, perceived behavioural control, the final element in the six-step framework of TPB, fits in where a decision to stock generics may well depend on whether an individual believes they have the knowledge and therapeutic experience to prescribe generics that will match the innovator counterparts on disease outcomes.

The theory, however, faces a number of limitations including the assumption that an individual has the required opportunities and resources to perform successfully the intended behaviour, regardless of the intention. The complementary explanation provided by Diffusion of Innovations Theory offsets this limitation, though; especially through the constructs of trialability and complexity, which focus on factors that would likely impede the process of adoption.

2.3 Research Gaps

Many studies have looked at perception of quality of generics vis-à-vis branded medicines and, to some extent, how it affects uptake of generic medicines (Quick et al., 1997; Igbinovia, 2007; WHO, 2011; Hasali et al., 2012; Patel et al., 2012; PwC, 2012; Colgan, 2015, WHO, 2016). There is no study, however, that has explored inferentially the interaction between perception and uptake of generics. No study exists on the effect of communication, pharmacy personnel knowledge or consumer preference on the uptake of generics, much less on the relationship between communication and either pharmacy personnel knowledge or consumer preference and the uptake of generic medicines either. Thus, where generics are involved, a methodological gap exists in reviewed literature with evidence of only descriptive statistics used to study the variables of interest.

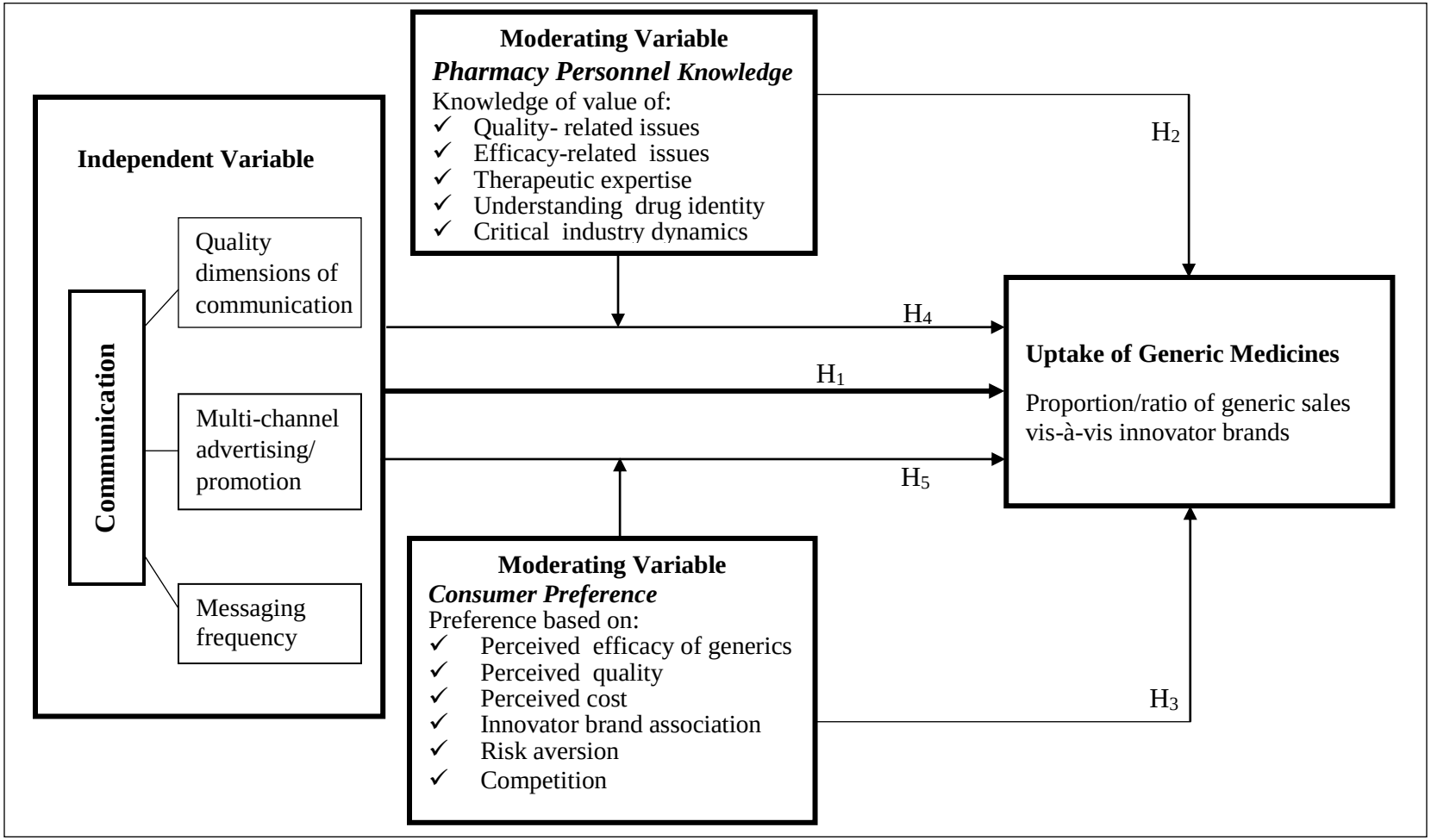
Accordingly, none of the studies reviewed attempts to test inferentially the statistical significance and effect size attributable to a given factor or combination of factor(s) on the uptake of generics. They fail to show therefore the predictive value of salient communication variables (and other relevant associated factors) in health communication contexts. This study adopts a novel way of statistically computing composite scores for the attitudinal scale items and converting them into the latent factors before testing their interaction through one-way and factorial ANOVA.

2.4 Conceptual Framework

This study is anchored on basic logical depictions of relationships between variables of interest in form of a conceptual framework illustrating the interplay of communication, pharmacy personnel knowledge, consumer preference and uptake of generic medicines. Figure 2.4 is the conceptual framework that guided the study.

Figure 2.4

Conceptual Framework



Source: Researcher (2021

The conceptual framework in Figure 2.3 depicts an interplay of four latent variables (with respective indication), namely communication, pharmacy personnel knowledge, consumer preference and uptake of generic medicines.

Communication is the focal independent variable postulated to have a relationship with uptake of generic medicines, the dependent variable. The variable, which is based on an ordinal scale, is measured in terms of quality dimensions of communication, multichannel advertising/promotion and messaging frequency.

There are two other variables—moderators or confounders, namely pharmacy personnel knowledge and consumer preference.

Pharmacy personnel knowledge is indicated as understanding of the value of quality-related issues, efficacy-related issues, therapeutic expertise, and understanding of the value of knowing the identity of generics, and critical market dynamics. It is measured on an ordinal scale.

Consumer preference is conceptualised as pharmacy personnel's understanding of the affinity for either innovator brands or medicines by consumers based on perceived efficacy, quality, cost, and self-reported willingness, innovator brand association, quality-related risk aversion and competition. It is based on an ordinal scale.

Uptake of generic medicines, the dependent variable, is measured in terms of proportion/ratio of sales of generics (vis-à-vis innovator brands) and based on an interval/ratio scale.

An arrow ($\longrightarrow$) and letter "H" with a subscript (H_n) represent the postulated relationship or hypothesis.

H_1 represents the relationship between communication and uptake of generic medicines in Njiru Sub-County Nairobi.

H_2 represents the effect of pharmacy personnel knowledge on the uptake of generic medicines in Njiru Sub-County, Nairobi.

H_3 represents the effect of consumer preference on the uptake of generic medicines in Njiru Sub-County, Nairobi.

H_4 represents the interaction effect of communication and pharmacy personnel knowledge on the uptake of generic medicines in Njiru Sub-County, Nairobi.

H_5 represents the interaction effect of communication and consumer preference on the uptake of generics in Njiru Sub-County, Nairobi

2.5 Summary of Chapter

This chapter has looked at the theoretical and empirical literature apposite to the study and determined and presented the theoretical and methodological gaps. It has also presented the theoretical basis of the study, discussing the constructs and applications of Diffusion of Innovations Theory and TPB. Lastly, it has provided a conceptual framework with the postulated relationships as hypotheses, where communication, pharmacy personnel knowledge and consumer preference, respectively, interacts with uptake of generics. The framework also provides for the moderation effect of pharmacy personnel knowledge and consumer preference on the relationship between communication and uptake of generics.

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 Introduction

This chapter provides an outlay of the research methodology applicable to the study. It looks especially at philosophical paradigm, study design, study site, research approach, research method, population, sampling procedure and data collection, data presentation, validity and reliability, and ethical considerations.

3.1 Philosophical Paradigm

Paradigm refers to a particular way of conceptualising or thinking about the world, or a worldview (Mackenzie & Knipe, 2006). It makes up the beliefs and principles that influence a researcher's perception of the world, and the resulting interpretation of that world and the actions (Kivunja & Kuyini, 2017). While some paradigms are suitable for either quantitative approach or qualitative approach, others are applicable to both, that is, mixed methods approach (Atieno, 2009).

The underpinning philosophy for this study is positivist, which is set in realism, that is, the belief in the existence of an objective reality discoverable through empirical observation followed by analysis of relationships between variables leading to an objective description and theory formulation. Accordingly, it forms the foundation for the quantitative approach and survey method thus adopted. Based on the paradigm, a study can measure a phenomenon and adduce evidence to support it (Hammersley, 2013 cited in Pham, 2018).

Using this paradigm made it possible to have an objective discovery of the relationship between a quantitatively measured independent and dependent variable. The paradigm facilitated the understanding of the uptake of generics across levels of communication, pharmacy personnel knowledge and consumer preference through computation of parametric and non-parametric tests. The relevant study variables were conceptualised and operationalised. Hypotheses were then developed and objectively tested through statistical tests with the aim of inference making and generalisation. The interplay of communication and the uptake of generic medicines, taking into account the moderation effect of pharmacy personnel knowledge and consumer preference has

therefore been studied in an objective and value-free manner. Hence, the findings are appropriate for inference making and are generalisable to the entire population.

3.2 Research Design

Research design is the procedural plan a researcher adopts in order to provide objective, accurate, economical and valid answers to questions (Kumar, 1999; Malhotra 2004). Its essence is a detailed plan of how a study is to be accomplished, including operationalising the relevant variables for measurement, selecting a sample, collecting data and analysing the results (Thyer, 1993). It therefore provides the overall organisation and alignment of an investigation, including the framework of data collection and analysis (Bryman & Bell, 2007).

This study was a cross-sectional descriptive survey that used a quantitative approach to gather the requisite data to facilitate the description of the relevant phenomenon under study, the relationship between communication and the uptake of generics in Njiru Sub-County, Nairobi (Creswell & Clark, 2011; Nachmias, Nachmias & de Waard, 2014). The design, in particular the survey, was deemed appropriate for two reasons. One, it allowed for the description of the variables by providing explanations of the situations and conditions as stated by Patrick (1987).

The study sought to provide an apt description of how the relationship between communication and uptake of generic medicines is affected by the presence of pharmacy personnel knowledge and consumer preference. This overarching objective then provided a basis for a descriptive design. Accordingly, a clearer understanding and appreciation was envisaged of what was being studied, besides clarification of relevant issues and pertaining problems.

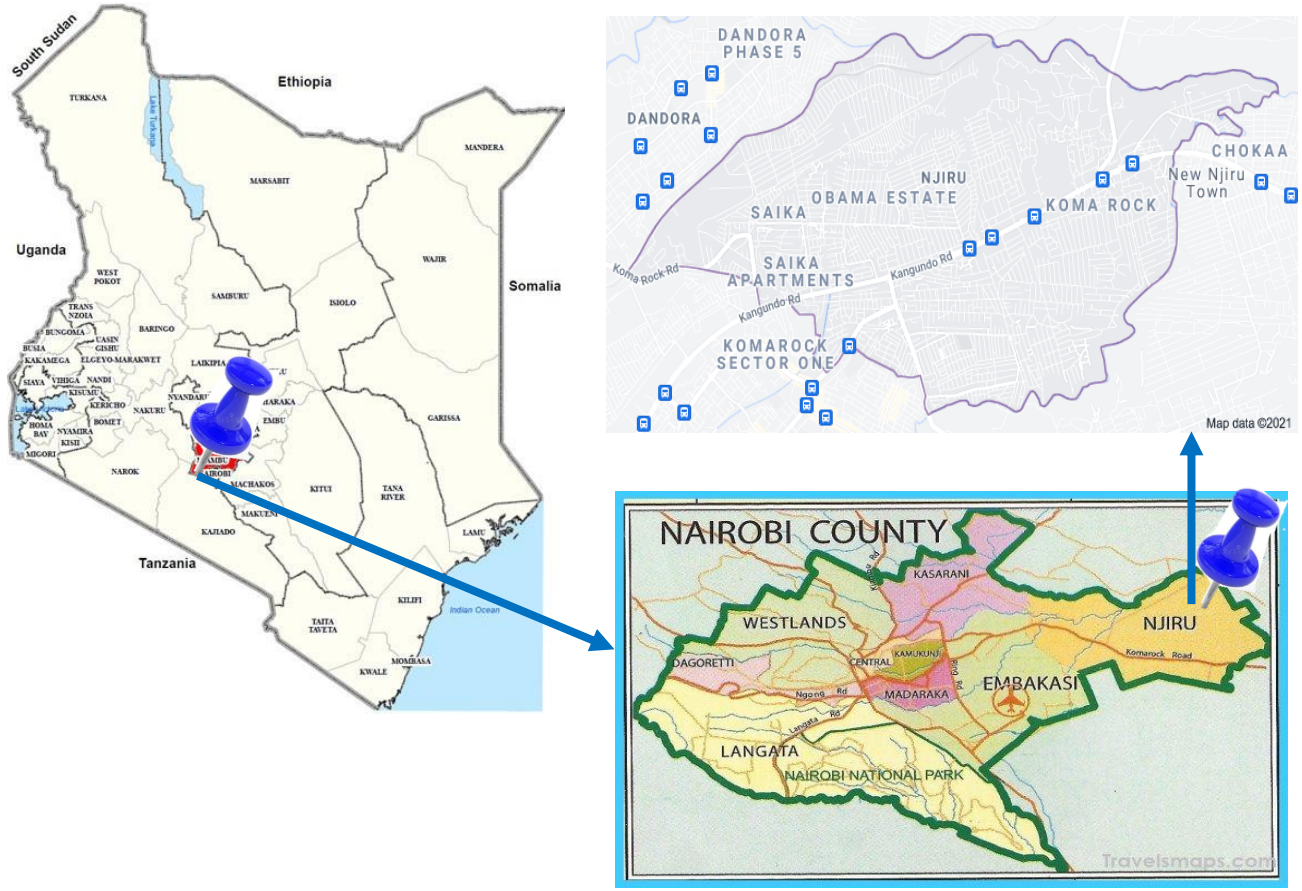
Two, a descriptive survey marks an attempt to highlight current conditions or attitudes within a specific context (Wimmer & Dominick, 1987; Kerlinger & Lee, 2000). As a result, it enables the exploration of new ideas and creates room for further discussion on emergent ideas, along the same lines of thought (Peil, 1995).

3.2.1 Study Site

The study was a sub-county survey of retail pharmacies in Njiru Sub-County, Nairobi. The site had 121 retail pharmacies spread across eight locations in the sub-county. The locations included Civo, Dandora, Saika, Umoja, Kariobangi North, Kariobangi South, Kayole Junction and Mowlem. The LMI feature of the site suited the study's need for valid data for parameter estimation. Figure 3.1 shows the map of the study site.

Figure 3.1

Map of Kenya and Nairobi showing the Study Site, Njiru Sub-County



Njiru Sub-County Coordinates

Latitude: 1.25 South
Longitude: 36.94 East
Altitude: 1557.00m/5108.27ft)

Note. Map adjusted to show coordinates. Adapted from *Njiru*, by Google, 2020 (https://www.google.com/search?q=google+map+of+njiru+kenya&ei=SL6LYbC-ILSBhbIPzPySwA4&oq=google+map+of+njiru&gs_)

3.2.2 Research Approach

Research approach is the plan that flows from the broad assumptions to the methods of data collection, analysis, and interpretation (Creswell, 2016). The study was based on a quantitative approach, which meant the collection of quantitative data on attitudinal items relating to communication, pharmacy personnel knowledge, consumer preference and the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi to aid in the description of the relationship between these variables. The objective was to measure the variables and determine certain set population parameters based on the five hypotheses formulated.

The approach was informed by positivist philosophical assumptions brought to bear on the study, on the research design (cross-sectional survey) and specific quantitative-based method of data collection, as well as analysis through descriptive and inferential statistics, and appropriate interpretation. It involved collecting, utilising and analysing numerical data using statistical techniques (parametric and non-parametric—ANOVA and Fisher's Exact Test [FET], respectively).

The aim was to test and describe the moderation effect of pharmacy personnel knowledge and consumer preference on the relationship between communication and uptake of generics in retail pharmacies in Njiru Sub-County, Nairobi—the phenomenon under study—and, of course, the socio-economic and demographic variables (Leedy & Omrod, 2001; Apuke, 2017). Accordingly, it involved the collection of data on a determinate tool, a questionnaire, leading to statistical data (Creswell, 2003; Williams, 2011).

3.2.3 Research Method

This study is a quantitative survey, which refers to a social scientific research focusing on people, their vital facts and beliefs, opinions, attitudes, motivations and behaviour (Kerlinger, 1973). The survey involved the collection of data from a sample of pharmacies in Njiru Sub-County using a questionnaire.

The method was considered suitable and advantageous in this study for its cost-efficiency; because large amounts of data were to be collected from the population and

because it would generally provide a good response rate (Mathuyazhagan & Nandan, 2010; FAO, 2020). It also allowed for both rapid data collection and anonymity (FAO, 2020).

The survey followed a number of elaborate steps including statement of the problem, sampling, data collection, data coding (assignment of relevant numerical categories), data analysis and report writing (Mathuyazhagan & Nandan, 2010). Data coding (in Statistical Package for Social Sciences [SPSS® 20.0]) was an integral part of the survey flow design and involved categorising data from the questionnaire for ease of analysis. It therefore provided a set of rules to make it possible to render answers into numbers to facilitate data analysis.

Coding was done following uni-dimensionality (definition of only one concept) and un-ambiguity criteria (Mathuyazhagan & Nandan, 2010). The study developed a coding frame, a set of codes for answers on a variable, to take care of each of the questions or variables. The frame was automatically self-determining with the number of options and the expected statistical test determining the codes assigned the questions (Rao &Yadagiri, 1984).

Numeric codes from one to the nth value corresponding to the number of options in a coding frame were used to represent the responses on the socio-economic and demographic variables, and communication, pharmacy personnel knowledge and consumer preference — the variables tested in the hypotheses. Gender variable, for example, was a binary of code one and two, while code 1-5 was used to designate the opinion ratings on the likert scales (also for the likert-type questions).

FET, through cross-tabulation, was used to determine the difference in the expected and observed counts in the contingency tables of the socio-economic and demographic variables, and the three variables relating to theories applied, and promotional activities, the association, if any. Spearman's Rank Correlation Coefficient (*Rho*) was used to measure the association between the variable pairs. ANOVA (and F-Statistic) tested and showed the significance of the relationship between the predictor variables and the dependent variable, with Eta squared (η^2) and Partial Eta Squared (η^2_p)

indicating the effect size as was appropriate. Cohen's *f* was used to show the statistical power.

3.2.4 Data Needs, Types and Sources

Primary and secondary data were used in this study, with primary data coming from a survey of the respondents and secondary data from empirical sources, (documentary review) including World Bank documents on prices, availability and affordability of key medicines in the Kenyan pharmaceutical sector, which were necessary for comparison purposes. Further, the data collected were quantitative, obtained using ordinal and ratio/interval scale measurement, meaning that they were counts, aggregates and averages of attitudinal items in the latent variables of communication, pharmacy personnel knowledge and consumer preference, and proportion of generic sales (Chandran 2004; Williams, Freeman & Shoesmith, 2010). The data were cross-sectional, having been collected at the same point in time to provide information on the prevailing socio-economic and demographic structure of the retail pharmacies in Njiru Sub-County, Nairobi, and information on the four key study variables—communication, pharmacy personnel knowledge and consumer preference and the uptake of generics.

3.3 Population, Sampling Procedure and Data Collection

3.3.1 Sampling Procedure

The study used probability sampling to obtain a sample of pharmacy personnel from the target population of retail pharmacy personnel in Njiru Sub-County. Specifically, it used stratified random sampling. The technique had the advantage of overcoming the deficiencies of simple random sampling by grouping the population based on characteristics that were observable from the sample frame (Crammer & Howitt, 2004), such as physical location of a pharmacy in relation to other pharmacies. The effect was sampling from eight administrative location-based strata.

The greater homogeneity of a Location (stratum) compared to the entire population, Sub-County, meant it was easier to get estimates that were more precise. As a

result, better estimates could be made of the whole population and more detailed information obtained from stratified than would have been possible in simple random sampling. From each stratum, proportionate stratified random sampling was used to select the final sample size. This sampling technique meant that the sample size of each subset or stratum was proportionate to the total population of the stratum. The technique was preferred because aside from capturing the main characteristics in the sample, it was also likely to lead to a smaller error in estimation and greater precision compared to simple random sampling technique.

Selection of the sample depended on a number of factors of which the purpose of the study, population size, risks of collecting a non-representative sample and the acceptable sampling error were fundamental. The sample for this study was selected in a manner that controlled for selection bias. Every retail pharmacy in the county had an equal chance of being included in the sample.

The level of precision or sampling error for this study was ±5; and the confidence or risk level 95%, which is widely acceptable within social sciences (University of Florida, 1992; Kothari, 2004) and finds basis in the Central Limit Theorem (repeated sampling of a population leads to a statistic that is similar to the true population parameter).

Sample size

The following formula (Daniel, 1999) was used to calculate the sample size, taking into consideration Finite Population Correction (FPC).

$n = \frac{N*X}{X+N-1}$ (FPC applied)

Where $X = Za/2^2$ *P*(1-P)/MOE^2

$Za/2^2$ = Critical value of the normal distribution, 1.96, for confidence interval of 95% and $\alpha = 0.05$.

MOE = Margin of error, 0.05(5%)

P = Sample proportion (0.5)

N = Population

$$\frac{1.96^2 * 0.5(1-0.5)}{0.05^2}$$

$$X = \frac{3.8416 * 0.25}{0.0025} = 384.16$$

$$n = \frac{175 * 384.16}{384.16 + (175-1)} = \frac{67228}{558.16} = 120.5 = 121$$

The survey distributed the sample of 121 proportionally to eight strata, Locations of Njiru Sub-County, such that each one contributed a number of subjects to the final sample, according to the respective population weight hence ensuring precise estimates. A proportionate stratified random sample was calculated using the formula:

$$\left(\frac{S_1}{P}\right) S_2$$

Where S_1 = Sample Size (no. of pharmacies sampled = 121); P = Population (no. of pharmacies in Njiru Sub-County = 175); S_2 = Stratum Size (pharmacies in each location)

1. Civo $\left(\frac{121}{175}\right) 7 = 5$
2. Dandora $\left(\frac{121}{175}\right) 26 = 18$
3. Saika $\left(\frac{121}{175}\right) 40 = 28$
4. Umoja $\left(\frac{121}{175}\right) 30 = 21$
5. Kariobangi North $\left(\frac{121}{175}\right) 14 = 10$
6. Kariobangi South $\left(\frac{121}{175}\right) 17 = 12$
7. Kayole Junction $\left(\frac{121}{175}\right) 26 = 18$
8. Mowlem $\left(\frac{121}{175}\right) 13 = 9$

Table 3.1 shows the distribution of the sample across the eight locations (strata) that make up Njiru Sub-County.

Table 3.1

Distribution of Sample by Location

Location	Population	Pharmacies	Sample	% of Pharmacy Population
Civo	25,888	7	5	4.1
Dandora	93,196	26	18	14.9
Saika	144,971	40	28	23.1
Umoja	108,728	30	21	17.4
Kariobangi North	51,775	14	10	8.3
Kariobangi South	62,130	17	12	9.9
Kayole Junction	93,196	26	18	14.9
Mowlem	46,598	13	9	7.4
Total	626,482.00	175	121	100.0

Source: KPPBP (2020)

3.3.2 Population

The number of pharmacies in Nairobi County constituted the total population and the target population all the retail pharmacies in Njiru Sub-County. There were 175 pharmacies in Njiru Sub-County, Nairobi County (KPPB, 2020). The low- and middle-income (LMI) features of this population suited the focus of this study in terms of its need for valid cross-sectional data for determination and description of the existence of the targeted socio-economic and demographic characteristics, and the other variables pivotal for testing the hypotheses. Since it was affected by concerns of limited access to and the burden of OOP expenditure on medication, the data on the variables would enable valid parameter estimation.

3.3.3 Data Collection

The study utilised a self-administered questionnaire, considered advantageous for its low cost (Leady, 2002) and comparative versatility (Kirakowski, 1998). That is besides the ease of accessibility to the subjects, who even had the opportunity of filling an online copy of the questionnaire and mailing it back to the researcher, without having to handle a hard copy. A questionnaire was also considered appropriate for data

collection because it enabled the collection of large amounts of data within a short time. The questionnaire had only closed-ended questions to limit the responses to target factual data without the burden of explanation to the respondents.

The questionnaire had nine sections (see Appendix 1)—A, B, C, D, E, F, G, H and I. Section A was about socio-economic and demographic characteristics of the sample (categorical nominal variables). Section B dealt with characteristics of innovations (categorical nominal variable using ordinal, likert-type questions); Section B, change adoption patterns (categorical ordinal, likert-type questions); Section D, attitudes, perceptions, norms/standards and drug preference, using categorical ordinal, likert-type questions; and Section E, promotional advertising activities (categorical nominal variable). The remaining four (4) sections, F-I, were used to provide data on the four key study variables—communication (19 indicators), pharmacy personnel knowledge (12 indicators), consumer preference (9 indicators), and uptake of generic medicines in the retail pharmacies in the preceding one year, respectively.

Communication, pharmacy personnel knowledge and consumer preference were measured on a categorical ordinal likert scale. Uptake of generic medicines comprised interval/ratio variable, proportion/ratio of sales of generic medicines vis-à-vis innovator brands in percentage.

Data collection was in two phases. Phase one involved administering five pre-test questionnaires for subsequent analysis and improvement of the instrument before the actual survey data collection exercise in the second phase. The survey procured the services of a research assistant, who was trained before the commencement of data collection.

3.3.4 Data Analysis and Presentation

Data Analysis

Data analysis is the reduction of raw data into systematic categories (Kothari, 1985). At the onset, the questionnaires were sorted and each case edited to ensure it was complete and the responses consistent. Two stages were necessary for data analysis.

Stage one entailed editing, coding entry and cleaning (in the software) of the collected data in preparation for analysis (Kothari, 1985), while stage two was the computation of the relevant parametric and non-parametric tests to derive meaningful information.

SPSS® 20.0 and Microsoft (MS) Excel 2013 were used for data management, that is, coding, entry, cleaning and analysis. They are also widely used in social science circles for academic research and for proprietary and professional purposes. The software were therefore suitable for running statistical tests necessary to determine relationships between the variables of interest and to provide summaries of different sets of categorical data.

The study used descriptive and inferential statistics to analyse the data before interpreting them and making inferences. Descriptive statistics was applied to generate summaries of the data in tabular, numerical, or graphical forms. Inferential statistics was useful in the parametric and non-parametric statistical tests, extending the capability of the study beyond description to inference making and predictions.

Both parametric and non-parametric tests were conducted to determine inter-variable relationships. The tests were computed based on a number of criteria, including conformity with the assumptions of parametric tests (ANOVA). All the tests were two-tailed and assessed at .05 alpha level.

Frequencies and percentages of the relevant variables were presented in either tables, graphs or plots as a disaggregation, where necessary, for subsequent analysis.

Two non-parametric tests were performed. FET was used to determine the difference in the expected and observed counts, particularly in the cross-classification (in two-way contingency tables) of socio-economic and demographic variables and the three variables relating to theories applied, and promotional activities. In addition, Spearman's *Rho* was used to test the association between the predictors and outcome variable (each respective pair). The test used *Rho* and p-value (probability value) to show the magnitude and significance of the relationship of the variable pairings.

ANOVA (one-way and factorial), a parametric test, was used to test the hypotheses. Global F-Test (overall F-Test of significance) was used to test the postulated

relationships to determine whether the respective means were all equal, as expressed in the null hypothesis. A corresponding alternate was also provided for each null hypothesis, based on the assumption of unequal means across the levels of the independent variables or factors.

The value of η^2 and η^2_p, and p-value were used to show the effective size (ratio of variation) and significance of the relationship of each respective variable pair, in that order. Cohen's f was used to indicate the statistical power. The section "Assumptions of ANOVA" and "Tests of Hypotheses" tackles extensively this parametric test.

Conversion of Ordinal Data into Composite Scores (and Back)

The attitude scores on the items forming each of the three latent variables (communication, pharmacy personnel knowledge and consumer preference) were each transformed into composite, numeric ratio/interval scores. These scores were then turned into respective ordinal level variables. This was done through the compute variable function in SPSS, stated as SUM (Var1, Var2…Var_n), where Var1 = the first item/indicator variable; Var2, the second item/indicator variable; and Var_n = the number of items/indicators in the list for which composite scores are computed. Hence, an aggregated (composite) score was obtained from the mean score of each of the indicators of the respective latent variables—communication, pharmacy personnel knowledge and consumer preference. The mean scores were then converted into the ordered categories of the three latent variables, forming likert-type items (Boone & Boone, 2012), after calculating the mean, range and standard deviation.

The criterion, uptake of generics, was measured at an interval/ratio level and so did not need any transformation.

Assumptions of ANOVA

Before computing most statistical tests, especially parametric tests, certain assumptions must be met (Osborne & Waters, 2002). This is important because it leads to a valid estimation of the population parameters. For one-way ANOVA, six assumptions must be met for a valid result. One, interval/ratio level measurement for the dependent

variable. The uptake of generics (proportion of generic medicine sales vis-à-vis innovator brands), dependent variable, was measured at interval/ratio level, as a percentage.

Two, the independent variable had to have two or more categorical, independent groups. Communication, pharmacy personnel knowledge and consumer preference each comprised five independent groups (Strongly Disagree, Disagree, Neutral, Agree and Strongly Agree).

Three, need for independence of observations. Each category, from Strongly Disagree to Strongly Agree, had mutually exclusive participation**.** No participant was in more than one group.

Four, no significant outliers in the data. There were no outliers in the data. Five, the dependent variable should be approximately normally distributed. The data were normally distributed, and so ANOVA test was tenable. Six, there is assumed homogeneity (equality) of variance, which assumption was violated, and so Welch ANOVA, which is robust to this violation, was used (see Appendix 2). Besides, for post hoc test, Games-Howell was used, again, for its being robust to the cited violation.

Tests of Hypothesis

ANOVA was used to test one-way effect of communication on the uptake of generics and two-way interaction between communication—the focal independent variable—and two factors, pharmacy personnel knowledge and consumer preference.

One-way Welch ANOVA (with Games-Howell post hoc test), through Compare Means option, was used to test hypothesis 1 (Communication has no statistically significant effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.).

Hypothesis 2, pharmacy personnel knowledge has no statistically significant effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi, was tested through one-way Welch ANOVA (with Games-Howell post hoc test).

Hypothesis 3, consumer preference has no statistically significant effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi, was also tested using one-way, Welch ANOVA, and the associated post hoc test.

Hypothesis 4, communication and pharmacy personnel knowledge have no statistically significant interaction effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi, was tested using General Linear Model, obtaining a two-way (factorial) ANOVA.

Hypothesis 5, communication and consumer preference have no statistically significant interaction effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi, was tested using General Linear Model, obtaining a factorial ANOVA.

Eta^2 (η^2) and Partial Eta^2 (η^2_p) were used to check the effect size of the predictor variables or their interactions (for factorial ANOVA) on the dependent variable. F-Statistic was used to determine the overall level of significance (p-value) of each of the relationships stated in the hypotheses. Pairwise multiple comparisons was used to compare every group (category) mean against every other. Games-Howell post hoc test (for one-way ANOVA) and Tukey post hoc (for factorial ANOVA) were used for this purpose.

For all the tests (parametric and non-parametric), the level of significance, p-value, was set at .05, corresponding to 95% confidence level and applicable to two-tailed tests of hypothesis. For hypothesis 1-3, Bonferroni Correction was specified for adjusted p-values according to the number of pairwise comparisons, although eventually the non-significant comparisons did not warrant it.

Data Presentation

Tables and figures (graphs and plots) were used to present the results, which were then interpreted accordingly. There were tabular summaries of relative percentages and relative frequency distributions, as well as mean, standard deviation and range. Cross-tabulation of data summaries in two-way tables was particularly useful in understanding the relationship between the categorical socio-economic and demographic variables. Bar

graph and means plots, that is, Estimated Marginal Means (EMM) plots were also used for data presentation to provide a clear summarised visual impression of the results. In addition, there were correlation (*Rho*) and ANOVA test statistics (η^2, η^2_p, F-Statistic, p-value and Cohen's f).

3.4 Validity and Reliability

Validity refers to the ability of the research instrument to measure what it is intended to measure (Harper, 2002), or the "'best available approximation to the truth or falsity of a given inference, proportion or conclusion'" (Cook & Campbell, 1979 cited in Portland State University, 2020, p. 1). Reliability, on the other hand, has to do with how relevant or appropriate the questions are.

The study tested face and content validity. These were checked by subjecting the instrument to expert analysis (supervisor and peers) to ensure the suitability of all the ideas being tested; that the items measured exactly what they were supposed to measure. Where there were concerns with particular items in the instrument, appropriate revisions were made before applying them on the study sample. Moreover, construct validity—convergent and discriminant validity—was assessed using bivariate correlation technique. Intra-construct correlation coefficients (R) for the pairings of the indicators of communication, pharmacy personnel knowledge and consumer preference were checked against a .3 - .7 limit and all found to be within the limit, implying convergent validity of each construct.

Similarly, a computation of inter-construct correlation coefficients of the three variables showed divergence, with all the coefficients being below .3. Thus, related indicators, showed convergence around the same construct and diverged from each other for unrelated constructs; thus, the three scales were valid.

Reliability of the survey instrument was determined by pilot-testing it on a sample of five private pharmacies drawn from Ruaraka Constituency, Nairobi County, which was different from the target population. Pre-testing the questionnaire enabled the researcher to obtain and take note of feedback and adopt necessary corrective measures.

The data were checked through a reliability test to determine the suitability of the scale items (inter-item correlation), with a Cronbach's Alpha coefficient range of .7 - .8 being considered for reliable scale items (Nunnally, 1978; Osborne & Christensen, 2001). Caution had to be applied with regard to the test, though. Cronbach's alpha coefficients tend to increase correspondingly to the number of scale items, up to a certain threshold, and as such, a test of few items might return a comparatively lower coefficient than a test of many items (Drost, 2011). Further, acceptability of consistency may be a function of the relationship between the length of a test and the reliability. Few items, therefore, most probably show low alpha coefficients, which should be accepted, and the results considered good for interpretation and thus valid (Schmitt, 1996).

Variables with items returning a coefficient below the .70 cut-off point and therefore having adverse effects on the reliability statistic were either refined or dropped altogether. Moreover, the instrument was subjected to expert evaluation and peer review.

The final reliability statistics showed an alpha coefficient of .87 for communication (19 indicators), .86 for pharmacy personnel knowledge (12 indicators), and .84 for consumer preference (nine indicators). The average reliability coefficient was .84. These statistics show that the items in each of the three latent variables met the .70 reliability threshold, suggesting the scale items were internally consistent.

A couple of confounder variables were controlled for because of their potential to impact negatively the interaction between the predictor and outcome variable. These included duration of service and licensing status of the pharmacy. The control was done through inclusion-exclusion criteria—including only those pharmacies that had existed at least two years and the licensed ones.

3.5 Ethical Consideration

Ethics are the rules that guide human conduct thus distinguishing what is right from what is wrong (Parveen & Showkat, 2017). Research ethics therefore denotes doing what is morally right and acceptable in research. Ethics was a matter upheld throughout the research, meaning that the study adhered to all tenets of acceptable conduct for the entire process. It was anchored on the morality criterion, which relates to participants'

understanding of the purpose of the study, voluntary participation and confidentiality. The standard of true and honest reporting and interpretation of the findings was also upheld.

It was important for the participants to understand what it really meant to take part in the study, that is, the permission they were granting the researcher to involve them in the study, and what it entailed exactly. Accordingly, the researcher adequately informed the participants of the purpose, methods, demands, risks, inconveniences, discomforts and possible outcomes of the research, including whether and how the results would be disseminated.

Generally, it was crucial for the researcher to negotiate for and obtain consent from all the entities whose permission was necessary before proceeding with the research; and these included offices and commissions. A Letter of Introduction and Certificate of Fieldwork, permission to conduct the research, were obtained from the office of the Director of the DoJMC. Besides, a research permit was obtained from National Commission for Science, Technology and Innovation (NACOSTI), which was then signed by the Nairobi County Commissioner. Another authorisation letter was obtained from the Ministry of Education (MOE).

The respondents gave their consent to the survey before being asked to provide the data. The purpose of the study and the subsequent dissemination plan for the results was adequately communicated to them.

The researcher then ensured confidentiality of the data provided, which were subsequently used only in an aggregate format without making specific reference to the subjects.

The whole data management process (data collection, data entry and analysis, and data presentation) was transparent and devoid of any practice that might have compromised the validity of the results. Specifically, the subjects' views as collected from the field were utilised in the analysis and reflected in the results without any manipulation. Where there was a procedure done to improve the validity of the data, for instance, computation of composite scores and application of a more robust alternative to

conventional ANOVA (and its corresponding post hoc test) the rationale for the procedure and outcome were clearly explained. Only authorised software (SPSS and MS Excel) were used to analyse the data.

All sources of information were duly acknowledged and the similarity index checked against 15% upper limit. The principles of privacy, accuracy, property and accessibility were therefore properly observed.

3.6 Summary of Chapter

This chapter has looked at research methodology focusing on the philosophical paradigm; research design (study site, research approach, research method, data needs, types and sources); population, sampling procedure, data collection, and data analysis and presentation; validity and reliability; and ethical considerations made in the study. It has also described the specific tests for the postulated relationships and the results of the preliminary tests, including reliability and validity tests, and ANOVA assumptions. The next chapter deals with data presentation and analysis of the findings, and interprets the findings.

CHAPTER FOUR: DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.0 Introduction

This study focused on the moderation effect of pharmacy personnel knowledge and consumer preference on the relationship between communication and the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

This chapter highlights the response rate and the results of the analysis of the socio-economic and demographic variables. Particularly, it presents cross-tabulations of age, level of education, duration of service, annual turnover, and two Diffusion of Innovations theory-related variables—characteristics of innovations and change adoption patterns. It also presents results of respective distribution of attitudes, perception, norms/standards (related to TPB) and drug preference across levels of the cited socio-economic and demographic variables.

Advertising/promotion of generic medicines is also cross-tabulated with specific socio-economic and demographic variables, and the results presented and interpreted.

There are also five tests of hypotheses. Analysis of the findings accompanies the presented data in each subsection. Finally, there is a presentation and analysis of the key findings.

4.1 Response Rate

This study was a cross-sectional survey targeting 121 potential respondents in retail pharmacies in Njiru Sub-County, 69.1% of the total population. One-twenty one questionnaires were duly filled out and returned, marking a 100% response rate, which far exceeds the recommended 60% threshold (Fowler, 1984), and thus provides a firm basis for the validity of the findings.

4.2 Socio-Economic and Demographic Characteristics of the Retail Pharmacies

The relevant socio-economic and demographic characteristics of the respondents were analysed using descriptive statistics and presented in tabular and graphical formats in the following respective sub-sections.

4.2.1 Gender, Age, Level of Education and Title

Gender and age are important determinants of both education and title in most occupations. The survey collected information on gender and age for each retail pharmacy personnel. Table 4.1 presents the percentage and frequency distribution of level of education and title/position by characteristics of gender and age.

Table 4.1

Level of Education and Title Distribution by Gender and Age

Variable	Level of education						Total		Position						Total	
	Certificate		Diploma		Bachelor's Degree				Pharmacist		Pharmacy technologist/ Technician		Pharmacy assistant			
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Gender																
Male	2	1.7	63	52.1	7	5.8	72	59.5	7	5.7	62	51.2	3	2.5	72	59.5
Female	2	1.7	45	37.2	2	1.7	49	40.5	2	1.7	38	31.4	9	7.4	49	40.5
Total	4	3.3	108	89.3	9	7.4	121	100.0	9	7.4	100	82.6	12	9.9	121	100.0
Age																
Below 20 years	1	0.8	-	-	-	-	1	0.8	-	-	1	0.8	-	-	1	0.8
21-30 years	3	2.5	61	50.4	8	6.6	72	59.5	8	6.6	53	43.8	11	9.1	72	59.5
31-40 years	-	-	42	34.7	1	0.8	43	35.5	1	0.8	41	33.9	1	0.8	43	35.5
41-50 years	-	-	5	4.1	-	-	5	4.1	-	-	5	3.1	-	-	5	4.1
Total	4	3.3	108	89.3	9	7.4	121	100.0	9	7.4	100	82.6	12	9.9	121	100.0

Note: FET was performed to check the association.

[a]Gender and Level of Education—FET, $p = .517$; [b]Gender and Title— FET, $p = .028$; [c]Age and Level of Education—FET, [d]Age and Title—FET,

Source: Primary Data (2021)

The results in Table 4.1 show that the respondents comprised 59.5% males and 40.5% females, indicating that more males than females were in the pharmaceutical retail business in Njiru Sub-County, which is consistent with the prevailing trend in the Kenyan job market where more males tend to join the medical profession compared to their female counterparts.

The age structure indicates a youthful population, with the majority, 85.1%, aged between 21 and 40 years. Majority of the respondents, 89.1%, had a Diploma, while Certificate qualification was the least represented across gender at 1.7% apiece. More males, however, had the highest percentage of Bachelor's Degree at 5.7%, compared to 1.7% for females. Though the association between gender and level of education was not statistically significant, FET, $p = .517$, the distribution is typical of literacy patterns in Kenya where males tend to have higher education qualification than females. Women tend to have limited access to education opportunities (Suda, 2002).

Distribution of title across gender showed more pharmacy technologist/technician compared to either pharmacy assistant or pharmacist at 82.6%, 9.9% and 7.4%, respectively. The highest position, pharmacist, follows a similar pattern to that of the spread of education qualification across gender, with the ratio of males to females occupying the position at 7:2, or 5.7% and 1.7%, respectively. The association between the two variables was statistically significant, FET, $p = .028$.

The results are indicative of the prevailing trend where more males tend to occupy higher and more specialist positions in various professions. This is consistent with the findings of a study that women's limited access to formal education and lower adult literacy rates undermine their capacity to participate in the formal and informal labour market on an equal basis with men (Suda, 2002), with the consequence that they remain under-represented in top management and policy-making positions.

Most of the Diploma holders, 50.4%, were in the 21-30 age bracket, while nearly all the Degree holders were aged 21-30, showing that young people were opting to get into self-employment soon after graduation as opposed to being employed. Age and level of education also had a statistically significant association, FET, $p = .033$.

Regarding the spread of title across age category, notably, the pharmacists tended to be the youngest, with nearly all of them, 88.9% (8 out of 9), being aged 21-30. Just one

was aged 31-40. This contrasts starkly to the pharmacy technologist/technician category where 3.1% (5) were in the 31-40 age bracket. The association between age and title was not statistically significant, FET, $p = .087$.

These results suggest a situation in which pharmacists set up pharmaceutical retail business 5-10 years after graduation, which could be explained, at least partly, by the high rate of unemployment in the country where lack of job opportunities has driven many into self-employment.

4.2.2 Age of Pharmacy and Annual Turnover

Age of operation can be an important determinant of profitability of the type of medicine stocked and a pharmacy's overall profitability. Medicine stocked and annual turnover were cross-tabulated with age of operation of pharmacy and the results presented in Table 4.2.

Table 4.2

Age of Pharmacy and Annual Turnover

Age of Operation	Annual Turnover (KES)						Total	
	Below 1,000000		1,000000 - 2,000000		2,000001-3,000000			
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*
2-5 years	32	33.7	11	11.6	-	-	43	45.3
6-9 years	19	20.0	27	28.4	1	1.1	47	49.5
10 year and above	3	3.2	1	1.1	1	1.1	5	5.3
Total	54	56.8	39	41	2	2.2	95	100.0

Note. FET was performed to check the association, $p<.01$.

Source: Primary Data (2021)

The results in Table 4.2 show that most pharmacies, 49.5%, had operated for 6-9 years. The least percentage, 5.3, had operated for 10 years and above. KES 2,000,001-3,000,000 was the least represented annual turnover category across age of operation at 1.1% in the 6-9 years and 10 years and above cluster apiece. No pharmacy in the 2-5 years age of operation category had a turnover of 2,000,001-3,000,000.

The results show better spread of turnover in the 6-9 years category, with the category having 20.0%, 28.4% and 1.1% scores for below KES 1,000,000; 1,000,001-

2,000,000; and 2,000,001-3,000,000 annual turnover brackets, respectively. While those pharmacies with 2-5 years in service had the highest percentage in the below KES 1,000,000 category, those that had operated for 6-9 years had the highest percentage, 28.4%, in the KES 1,000,000-2,000,000 turnover. Further, an FET result showed a significant association between the age of operation and annual turnover, $p<.01$.

Overall, majority of the pharmacies, 56.8%, had an annual turnover of below KES 1,000,000. These results suggest that the longer the age of operation, the higher the annual turnover, which is consistent with general relative profitability of older retail businesses due to longer exposure and traction in the market and consequent growth. This result is consistent with the findings of several studies that firm age has a strong relationship with performance and profitability (Pervan, Pervan & Ćurak, 2017; Mallinguh, Wasike & Zoltan, 2020).

4.2.3 Age of Operation and Medicine Stocked

The duration for which a pharmacy has been in operation can be an important factor determining the type of medicine stocked, since older, more established pharmacies are likely to stock and sell a variety of medicines because they understand better the dynamics of demand. Table 4.3 cross-classifies medicine stocked by age of operation.

Table 4.3

Age of Operation and Medicine Stocked

Age of Operation	Type of Medicine Stocked				Total	
	Conventional		Both Specialty and Conventional			
	n	*%*	*n*	*%*	*n*	*%*
2-5 years	17	21.5	16	20.3	33	41.8
6-9 years	7	8.9	34	43.0	41	51.9
10 year and above	3	3.8	2	2.5	5	6.3
Total	27	34.2	52	65.8	79	100.0

Note. FET was performed to check the association, $p <.01$.

Source: Primary Data (2021)

The results in Table 4.3 show uneven distribution of the population of pharmacies across age of operation and type of medicine stocked. While majority of the pharmacies (65.8%) stocked both specialty and conventional medicine regardless of the age of operation, notably, those that had operated for 6-9 years had the highest proportion (43.0%) that stocked both specialty and conventional medicine.

The results reveal significant differences in the proportion of pharmacies that had specialty and conventional medicine or just conventional medicine by age of operation. The proportion of pharmacy personnel who stocked medicine differed significantly by age of operation, FET, $p = .002$.

The implication is that age of operation determined largely the type of medicine pharmacy personnel stocked, which could mean that a pharmacy's level of understanding of the dynamics of demand is a function of time. A number of pharmacies did not indicate the type of medicine stocked.

4.2.4 Characteristics of Innovations by Gender

Five characteristics of innovations constitute the constructs of Diffusion of Innovations theory. The constructs, considered the main factors of adoption of an innovation, include Relative Advantage, Compatibility, Complexity, Trialability, and Obervability. Characteristics of Innovations were cross-tabulated with gender and an FET performed to check the association. Table 4.4 shows the distribution of characteristics of innovation, each stratified by gender.

Table 4.4

Characteristics of Innovation by Gender

X-tics of Innovations	Gender																		Total	
	Male										Female									
	Not at all		To some extent		Neutral		To a great extent		To a very great extent		Not at all		To some extent		Neutral		To a great extent		To a very great extent			
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Relative advantage[a]	3	2.5	15	12.4	6	5.0	28	23.1	20	16.5	3	2.5	9	7.4	3	2.5	25	20.7	9	7.4	121	100.0
Compatibility[b]	-	-	6	5.0	6	5.0	37	31.1	22	18.5	-	-	6	5.0	1	0.8	26	21.8	15	12.6	119	100.0
Complexity[c]	-	-	5	4.1	2	1.7	40	33.1	25	20.7	1	0.8	4	3.3	2	1.7	26	21.5	16	13.2	121	100.0
Trialability[d]	1	0.8	13	10.7	5	4.1	27	22.3	26	21.5	1	0.8	10	8.3	2	1.7	14	11.6	22	18.2	121	100.0
Observability[e]	-	-	7	5.8	9	7.4	32	26.4	24	19.8	-	-	7	5.8	8	6.6	19	15.7	15	12.4	121	100.0

Note. FET was performed to check the association.

[a]Relative advantage and gender—FET, $p = .625$; [b]Compatibility and gender-FET, $p = .758$; [c]Complexity and gender—FET, $p = .517$; [d]Trialability and gender— FET, $p = .864$; [e]Observability and gender—FET, $p = .778$.

Source: Primary Data (2021)

The results in Table 4.4 indicate that on "Relative Advantage" (advantage of generics over innovator brands), there are no marked differences between males (23.1%) and females (20.7) % in terms of the extent to which the advantage of an innovation tended to influence the adoption of the practice of prescribing generics.

For example, 23.1% of males indicated that it affected the practice "to a great extent" compared to the females at 20.3%. On the extreme opinion, 16.5% of males felt it contributed "to a very great extent," while 7.4% of females did, the apparent difference being accounted for partly by the slightly higher proportion of males in the sample compared to the females. An FET showed no significant association between the opinion ratings on the variable and gender, FET, $p = .625$.

On "Compatibility" (acceptability of generic alternatives in the healthcare industry), most of the pharmacy personnel's opinion ranged from "a great extent" "to very great extent" across gender, with the proportion of males at 31.1% and 18.5% females, respectively. This trend is also reflected in the female category, with their opinion ranging from 21.8% and 12.6%, "to a great extent" and "to a very great extent," respectively.

The results showed no significant association between the opinion ratings on this variable across gender, FET, $p = .758$.

Regarding "Complexity" (ability to determine quality of generics observed from patient response), 33.1% males felt it determined prescription of generics "to a great extent" compared to 21.5% females who registered similar opinion. Similarly, more males (20.7%) than females (13.2%) felt it counted "to a very great extent."
There was no significant association between the opinion ratings on this variable across gender, FET, $p = .517$.

In respect of "Triability," i.e., the ability to test-prescribe a given medicine to a patient, the opinion of males was almost evenly split between "to great extent" (22.3%) and "to a very great extent" (21.5%). The trend was also evident among the females who considered the factor important either "to a great extent" (11.3%) or "to a very a great extent" (18.2%).

There was no significant association between the opinion ratings on this variable across gender, FET, $p = .864$.

"Observability"(how possible it is to observe the outcome of a treatment) elicited similar opinion rating to the other characteristics across gender, with 26.4% and 19.8% males indicating that it mattered "to a great extent" and "to a very great extent," respectively. The dominant opinion was largely similar among the females, who felt also that the factor mattered "to a great extent" (15.7%) and "to a very great extent" (12.4%).

There was no significant association between the opinion ratings on this variable across gender, FET, $p = .778$.

The results imply that all the five factors (constructs) play a role in the adoption of the practice of prescribing generic alternatives to innovator brand of medicine. There are no significant variations across gender, though. Thus, the results are consistent with the theory of diffusion of innovations, which also does not indicate that characteristics of any adopter category follow gender lines (Rogers, 1995; Rogers, 2003).

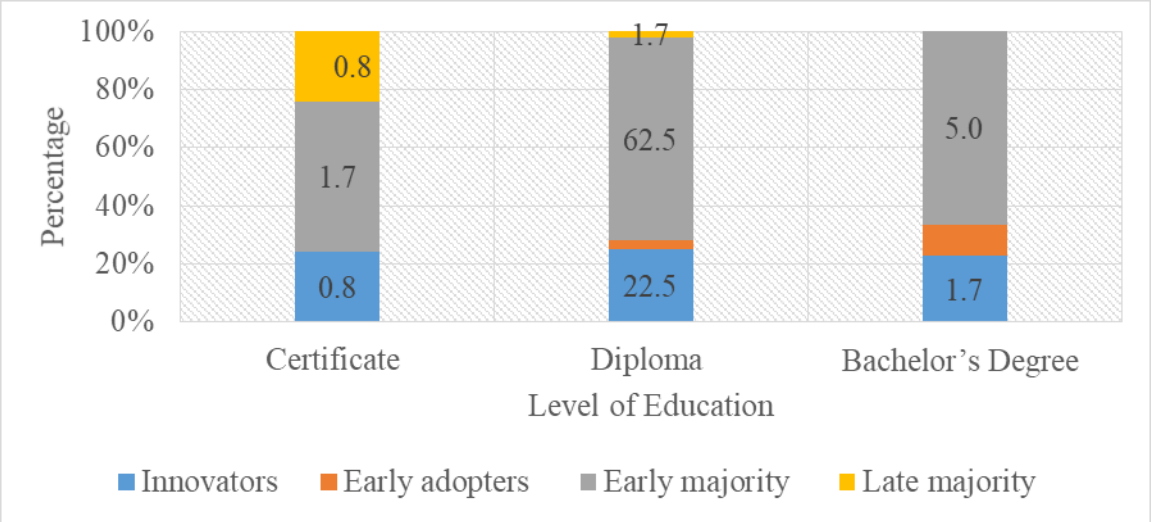
The findings are at variance, however, with those of other studies that point to heterogeneity of patterns of adoption of innovations across gender, adding that it is more challenging to reveal how gender makes an impact when it is hidden within processes, organisations and systems (Alsos, Hytti & Llungren, 2013). The authors aver that often there are complex relationships between gender and involvement in industry innovation, for instance.

4.2.5 Change Adoption Pattern by Level of Education

Level of education is a socio-economic indicator that can significantly determine the acceptability of change in a given population, because it reflects its level of knowledge and understanding of a given innovation, and the availability of skills necessary to utilise it. Change adoption pattern categorised as Innovators, Early Adopters, Early Majority, Late Majority and Laggards, was cross-tabulated with the level of education and an FET conducted to test the association. Figure 4.1 is the distribution of change adoption pattern in respect of level of education.

Figure 4.1

Change Adoption Pattern by Level of Education



Note. FET was performed to check the association, $p = .210$.

Source: Primary Data (2021)

The results in Figure 4.1 show that adoption of change (innovation) does not follow any particular pattern, although Early Majority category is dominant in all the levels of education, Diploma, 62.5%; Bachelor's Degree, 5.0%; and Certificate, 1.7%. Overall, Early Majority accounted for 69.2% of all the respondents. There were no significant differences between the adopter categories in respect of level of education, FET, $p = .210$.

One major implication is the inconsistency with a counterfactual in that the theory of Diffusion of Innovations (Rogers, 1995; Rogers, 2003) uses education as a major distinguishing factor of change adoption category, due to the import of knowledge and skills in the acceptance and utilisation of any innovation. Apparently, level of education did not affect the current results.

The results may not paint an entirely accurate picture of the association between level of education and change adoption, however, because of the rather uneven spread of education qualification in the sample population (89.2% diploma, 7.5% Bachelor's Degree, and 3.3% Certificate). The results may have to be interpreted with a bit of caution.

4.2.6 Change Adoption Pattern by Annual Turnover

The category of adoption of innovation, the theory of Diffusion of Innovations holds, can be determined by the wealth of individuals (or organisations). This study sought to determine the distribution of the pharmacy personnel population in respect of change adoption across levels of annual turnover through cross-tabulation and to check and describe any significant patterns. Table 4.5 presents the results, including the result of FET conducted to test the association.

Table 4.5

Distribution of Change Adoption Pattern by Annual Turnover

Adopter Category	Annual Turnover						Total	
	Below 1,000,000		1,000,000-2,000,000		2,000,001-3,000,000			
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Innovators	19	15.8	11	9.2	-	-	30	25.0
Early Adopters	2	1.7	2	1.7	-	-	4	3.3
Early Majority	42	35.0	39	32.5	2	1.7	83	69.2
Late Majority	3	2.5	-	-	-	-	3	2.5
Total	66	55.0	52	43.3	2	1.7	120	100.0

Note. Source: FET was performed to check the association, $p = .508$.

Source: Primary Data (2021) .

Table 4.5 reveals that the distribution of turnover across adopter category did not show any particular pattern but was uneven. Most of the pharmacy personnel (55.0%) were in the Below KES 1,000,000 turnover bracket, with the least representation being in the 2,000,001-3,000,000 bracket. There were no significant differences between the adoption categories in respect of level of education, FET, $p = .508$. Thus, the results showed that adopter category did not determine annual turnover, which seems to contradict the notion of wealth usually as a determinant of the adopter category, a reality that differs from the observation by Everett Rogers (Rogers, 1995; Rogers, 2003). The author identified financial status as one of the markers of the adopter categories,

especially innovators and early adopters, whom he claimed tend to have high financial status.

4.2.7 Change Adoption Pattern by Age

Age can be a determinant of the willingness to embrace change with the consequence that young people sometimes tend to be more susceptible (or amenable) to change than the relatively older folks as they tend to be eager to try out new industrial or technological innovations. Adopter category was cross-tabulated with age to show the pattern of distribution, if any, and FET conducted to test the association. The results are shown in Table 4.6.

Table 4.6

Change Adoption Pattern by Age

Age Bracket	Adopter Category								Total	
	Innovators		Early adopters		Early majority		Late majority			
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Below 20 years	-	-	-	-	1	0.8	-	-	1	0.8
21-30 years	15	12.5	4	3.3	51	42.5	1	0.8	71	59.2
31-40 years	13	10.8	-	-	29	24.2	1	0.8	43	35.8
41-50 years	2	1.7	-	-	2	1.7	1	0.8	5	4.2
Total	30	25.0	4	3.3	83	69.2	3	2.5	120	100.0

Note. FET was performed to check the association, $p = .200$.

Source: Primary Data (2021)

The results in Table 4.6 indicate notable differences within category of adoption across age. For example, most of the innovators (15%) were in the 21-30 years category, as were the early majority (51%). Overall, early majority was the most widely distributed of the adopter categories across age. There were no significant differences across age, FET, $p = .200$, though.

The results imply that most of the pharmacy personnel age clusters tended to adopt the prescription of generics long after the more highly educated peers in the industry—innovators and early adopters—had done so.

Moreover, most Innovators tended to be young, implying that confronted with the prospect of generic substitution the younger pharmacy personnel were likely to be more responsive and ready to make a novel prescription. The proportion in the next category, early adopters, does not compare well to the dominant, early majority category, contrary to Rogers (1995) and Rogers (2003) density curve, which puts these two adjacent categories at 34% apiece.

Given the age distribution of the population, which is predominantly young, it is inferable also that their change adoption pattern does not demonstrate opinion leadership. Instead, they would be expected to wait for their more experienced and highly educated peers to adopt the practice of generic substitution before adopting the practice themselves as a matter of course. These results are in line with the thinking in the theory of diffusion of innovations (Rogers, 1995; Rogers, 2003), which also does not include age as one of the determinants of adopter category.

4.2.8 Change Adoption Pattern by Duration of Service

The duration for which pharmacy personnel has worked is a factor that can contribute to one either accepting or failing to accept an innovation based on experience. In this case, duration was considered as a possible classifying variable for change adoption pattern. Accordingly, the two variables were cross-tabulated and an FET done to check if there was any association between them. Table 4.7 presents the results.

Table 4.7

Change Adoption Pattern by Duration of Service

Duration of service	Adopter Category								Total	
	Innovators		Early adopters		Early majority		Late majority			
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Below 1 year	-	-	-	-	1	0.9	-	-	1	0.9
1-2 years	2	1.7	1	0.9	13	11.3	2	1.7	18	15.7
3-4 years	11	9.6	2	1.7	37	32.2	-	-	50	43.5
5-6 years	2	1.7	-	-	1	0.9	-	-	3	2.6
Above 6 years	13	11.3	1	0.9	28	24.3	1	0.9	43	37.4
Total	28	24.3	4	3.5	80	69.6	3	2.6	115	100.0

Note. FET performed to check the association, $p = .243$.

Source: Primary Data (2021)

The distribution in Table 4.7 shows that most of the pharmacy personnel (43.5%) had worked for 3-4 years, while just one pharmacy personnel had worked for less than one year. Early majority was the most dominant (69.6%) and well spread of the adopter categories across duration of service. Notably, most innovators (13.3%) had worked for more than 6 years, which could be because of experience, which enables them to embrace new ideas and therefore confidently make decisions, particularly those relating to generic prescription and substitution.

Additional results showed no significant differences in the adopter category for duration of service, FET, $p = .243$.

The results seem to be at variance with Diffusion of Innovations theory (Rogers, 1995; Rogers, 2003), particularly on the role of time as one of the four elements of innovation adoption process. The theory considers the process to be a function of time.

4.2.9 Attitudes, Perception, Norms/Standards and Drug Preference, and Level of Education

Based on the TPB, a question was asked to determine the extent to which the respondents felt attitude, perception and norms/standard (derived from the main constructs of the theory) affected a consumer's drug choice—whether innovator or generic. The variable was then cross-tabulated with level of education to check the distribution. Table 4.8 shows the results.

Table 4.8

Attitude, Perception, Norms/Standards and Drug Preference, and Level of Education

Level of Education	Extent of Effect on Preference								Total	
	To some extent		Neutral		To a great extent		To a very great extent			
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Certificate	1	0.8	2	1.7	-	-	1	0.8	4	3.3
Diploma	39	32.2	5	4.1	55	45.5	9	7.4	108	89.3
Bachelor's Degree	3	2.5	1	0.8	3	2.5	2	1.7	9	7.4
Total	43	35.5	8	6.6	58	47.9	12	9.9	121	100.0

Note. FET was performed to check the association, $p = .013$.

Source: Primary Data (2021)

Table 4.8 indicates no particular differences in the opinion scores across level of education. The dominant opinion was that it affected drug preference "to a great extent" at 47.9%, while the next ranking opinion, 35.5%, showed that it counted "to some extent" as a determinant of choice. The least proportion, 6.6%, had no opinion on the question.

An FET was performed to check for possible association between the variables, with the results indicating an association, FET, $p = .013$.

In effect, attitude and norms/standards, which are the main constructs in the TPB (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980), influence the willingness of the pharmacies to prescribe generic drugs. Such willingness also differs by level of education.

4.2.10 Attitudes, Perception, Norms/Standards and Drug Preference, and Duration of Service

Duration of service determines the period of exposure to what happens in the pharmaceutical retail business to be able to understand how different factors interact to determine preference for different drug types. It determines the extent to which attitude, perceptions and industry norms and standards affect pharmacy personnel's motivation and ability to prescribe generic drugs. The variable was cross-tabulated with duration of service.

The results in Table 4.9 indicate the distribution of opinion rating of the extent to which attitude, perception and norms/ standards affect perceptions of drug **o**f drug quality, safety and cost, and industry standard and cultural context (and related factors) affect drug preference among consumers of retail pharmacies, across duration of service.

Table 4.9

Effect of Attitude, Perception, Norms/ Standards on Drug Preference and Duration of Service

Duration of Service	Extent of Effect on Preference								Total	
	To some extent		Neutral		To a great extent		To a very great extent			
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Below 1 year	-	-	-	-	-	-	1	0.9	1	0.9
1-2 years	4	3.4	2	1.7	9	7.8	3	2.6	18	15.5
3-4 years	19	16.4	2	1.7	23	19.8	7	6.0	51	44.0
5-6 years	1	0.9	1	0.9	1	0.9	-	-	3	2.6
Above 6 years	17	14.7	3	2.6	22	19.0	1	0.9	43	37.1
Total	41	35.3	8	6.9	55	47.4	12	10.3	116	100.0

Note. FET was performed to check the association, $p = .134$.

Source: Primary Data (2021)

Table 4.9 shows there were no major, notable differences across duration of service for the opinion ratings of the extent of effect of attitude, perception and norms/ industry standards on drug preference. The dominant opinion is that it affects drug preference “to a great extent” (47.4%) among consumers. Within category distribution, 3-4 year duration had the highest representation at 19.8%, while above 6 years had a 19.0% share. The proportion of those who felt that it affected drug preference “to some extent” also showed highest proportion in the two duration of service categories at 16.45% and 14.7%, respectively.

Further, an FET showed that the differences were not significant ($p = .134$). There is no notable pattern in the distribution of opinion rating across duration of service.

The results imply that the there is no association between the duration of service and attitudes, perception, norms/standards and drug preference, and so the observed differences are entirely due to chance. These results would appear to differ from the general sense of TPB (Fishbein & Ajzen, 1975; Ajzen & Fishbein,1980), since it would be expected that attitudes, behavioural intent, subjective norms, social norms, perceived

power, perceived behavioural control are constructs that could be determined by and become stable over time.

4.2.11 Advertising/Promotion of Generic Drugs and Duration of Service

The length of stay in the industry can be a critical factor in the decision to advertise or promote a product since cost implications may prevent the undertaking of an advertising or promotional initiative. Extended experience would likely expose pharmacy personnel to knowledge about the necessity to advertise or promote a given drug, especially new entrants into the market.

The survey asked the respondents to indicate on a five-point scale the extent to which their pharmacy advertised or promoted generics. The results were then cross-tabulated with duration of service to determine the distribution of the population of pharmacy personnel across the variable and an FET computed to test the association. The results are presented in Table 4.10.

Table 4.10

Extent of Advertising/Promotion of Generics by Duration of Service

Duration of Service	Extent of Advertising/Promotion of Generics								Total	
	Not at all		To some Extent		Neutral		To a great extent			
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Below 1 year	-	-	-	-	1	0.9	-	-	1	0.9
1-2 years	1	0.9	10	8.6	2	1.7	5	4.3	18	15.5
3-4 years	14	12.1	34	29.3	3	2.6	-	-	51	44.0
5-6 years	1	0.9	1	0.9	1	0.9	-	-	3	2.6
6 years & above	29	25.0	11	9.5	-	-	3	2.6	43	38.8
Total	45	38.8	56	48.3	7	6.0	8	6.9	116	100.0

Note. FET was performed to check the association, $p<.01$.

Source: Primary Data (2021)

While the results in Table 4.10 show that most pharmacy personnel had engaged in promotion of generics only "to a small extent" (48.3%), notably, a large proportion (38.8%) did not engage in the practice at all. Most of those who had advertised or promoted their generic drug offerings had worked for 3-4 years (29.3%). Those who had

more than 6 years of service were most represented in the category that had not advertised at all at 25.0%.

What these results mean is that there are differences in the extent to which the pharmacy personnel advertised or promoted generics across duration of service. The differences were also significant, FET, $p<.01$, and not just due to chance. These results suggest that the extent of advertising/promotion was very strongly associated with how long pharmacy personnel had worked. Duration of service thus might have predisposed him or her to engage in the practice, because of little or increased understanding of the trends of consumption of generic alternatives among the consumers, whatever the case might have been.

4.2.12 Extent of Advertising/Promotion of Generics and Age of Operation

The duration for which a business has been in operation can be a determining factor in the ability to meet the cost of advertising/promotion of products and services. The survey therefore sought information on the extent to which the respondents advertised or promoted generic medicines, which was then cross-tabulated with age of operation. The results in Table 4.11 show the distribution of pharmacy population classified by age of operation.

Table 4.11

Extent of Advertising/Promotion of Generics by Age of Operation

Age of Operation	Extent of Advertising/Promotion of Generics								Total	
	Not at all		To some extent		Neutral		To a great extent			
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
2-5 years	8	8.4	28	29.5	4	4.2	3	3.2	43	45.3
6-9 years	28	29.5	16	16.8	1	1.1	2	2.1	47	49.5
10 years & above	3	3.2	1	1.1	-	-	1	1.1	5	5.3
Total	39	41.1	45	47.4	5	5.3	6	6.3	95	100.0

Note. FET was performed to check the association, $p = .001$.

Source: Primary Data (2021)

The results in Table 4.11 reveal significant differences in the extent of advertising/promotion by the pharmacies across duration of existence, with those 2-5 years old having the highest proportion of "some extent" of advertising/promotion at 29.5%. The 10 years and above category had the least proportion of advertising/ promotion expenditure at 1.1%. The association between the two variables was also statistically significant, FET, $p = .001$.

The results imply that the relatively newer pharmacies tended to employ some degree of marketing communication, that is, advertising/promotion of generic medicines in stock to gain traction in the market compared to their older counterparts. Age of operation is therefore a predictor of the extent to which a pharmacy advertises or promotes generic medicines.

4.2.13 Advertising/Promotion of Generics and Annual Turnover

Advertising carries cost implications and as such, a pharmacy that engages in the practice must be prepared to incur the cost. Therefore, the survey considered annual turnover to be a factor in the extent of advertising/promotion of generics, and presented the distribution of the pharmacy personnel population in terms of this variable in Table 4.12.

Table 4.12

Extent of Advertising/Promotion of Generics by Annual Turnover

Annual Turnover (KES)	Extent of Advertising/Promotion of Generics								Total	
	Not at all		To some extent		Moderate		To a great extent			
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Below 1,000000	19	15.7	38	31.4	6	5.0	4	3.3	67	55.4
1,000000-2,000,000	27	22.3	21	17.4	1	0.8	3	2.5	52	43.0
2,000,0001-3,000,000	1	0.8	-	-	-	-	1	0.8	2	1.7
Total	47	38.8	59	48.8	7	5.8	8	6.6	121	100.0

Note. FET was performed to check the association, $p < .015$.

Source: Primary Data (2021)

Table 4.12 shows significant differences across annual turnover. Those with an annual turnover below KES 1,000,000 represented the highest proportion (31.4%) of those who did some degree of advertising/promotion of the drugs, followed by the KES 1,000,000-2,000,000 category at 17.4%. Across turnover category, the least proportion of the population engaged in advertising "to a great extent," below KES 1,000,000, 3.3%; KES 1,000,000, 2.5%; and KES 2,000,000, 0.8%. Overall, most of the pharmacy personnel had engaged in some form of advertising (48.8%), with 5.8% engaging in it "to a moderate extent" and 6.6% "to a great extent," meaning that 60.2% of them either advertised or promoted generics. The association between these two variables was statistically significant, FET, $p = .019$.

The results confirm findings of studies that underscored the value of communication in the adoption of medicines in general, for example, the PwC (2007) study findings that between 1996 and 2005, pharmaceutical promotions rose from US$11.4 billion to US$29.9 billion in the US. Further, the pharmaceutical sector is rife with direct-to-consumer advertising and detailing by company representatives, which enable suppliers of branded medicines to increase prices (Brekke & Kuhn, 2005).

4.2.14 Advertising/Promotion of Generics and Level of Education

Level of education is a major socio-economic variable that has potential to influence greatly pharmacy personnel's understanding of the need to promote generic substitutes. Accordingly, extent of advertising/promotion of generics was cross-tabulated with level of education to determine the distribution of the pharmacy personnel population across this variable. The distribution appears in Table 4.13.

Table 4.13

Level of Education by Extent of Advertising/Promotion of Generics

Level of Education	Extent of Advertising/Promotion of Generics								Total	
	Not at all		To some extent		Neutral		To a great extent			
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Certificate	-	-	2	1.7	1	0.8	1	0.8	4	3.3
Diploma	44	36.4	54	44.6	4	3.3	6	5.0	108	89.3
Bachelor's Degree	3	2.5	3	2.5	2	1.7	1	0.8	9	7.4
Total	47	38.8	59	48.8	7	5.8	8	6.6	121	100.0

Note. FET was performed to check the association, $p<.05$.

Source: Primary Data (2021)

Table 4.13 reveals that most (44.6%) of those who advertised/promoted generic medicines, at least "to some extent," were Diploma holders, with this category also having the highest proportion of those who did it to "a great extent," at 5.0%.

Overall, the respondents, regardless of their education level, advertised or promoted generics "to some extent." The differences in the categories were only marginally statistically significant, FET, $p = .027$. Evidently, level of education was not effective in predicting the extent of advertising/promotion of generics in the pharmacies. There were no previous studies on similar or parallel parameters for cross-validation owing to the novel nature of this study.

4.2.15 Channels of Advertising/Promotion and Gender

Gender disparities sometimes exist in the use of media channels due to the communication needs of each. Table 4.14 shows the distribution of channels of advertising/promotion of generics by gender.

Table 4.14

Distribution of Channels Advertising/Promotion by Gender

Media Channel	Gender				Total	
	Male		Female			
	n	*%*	*n*	*%*	*n*	*%*
Social media networks (e.g., Google+, Instagram, Pinterest, Facebook, Twitter)[a]	1	0.6	-	-	1	0.6
Interpersonal Communication (e.g., Face-to-face interaction, focus groups)[b]	39	25.3	35	22.7	74	48.1
Customised brochures, pamphlets, etc[c]	-	-	3	1.9	3	1.9
Cross-selling options (specific information on specific generic alternatives on receipts and invoices)[d]	47	30.5	29	18.8	76	49.4
Total	87	57.8	67	42.2	154	100.0

Note. FET was performed to check the association.

[a]FET, $p = .547$; [b]FET, $p = .169$; [c]FET, $p = .089$; [d]FET, $p < .01$.

Source: Primary Data (2021)

From the results in Table 4.14, it is evident that most of the respondents used either cross-selling options with specific information on specific generic alternatives on receipts and invoices (49.4%) or interpersonal communication (48.1%) to promote generics. The least proportion, just 0.6% (1), used social media networks (e.g., Google+, Instagram, Pinterest, Facebook, Twitter) for the same purpose. Further stratification of the results reveals that more males (30.5%) than females (18.8%) used cross-selling options.

This trend is similar in the case of interpersonal communication where 22.5% males compared to 22.7% females used the channel. Evidently, gender disparities in the application of the channels were less obvious or largely non-existent.

Additionally, with the exception of cross-selling options (FET, $p<.01$), the results show that there was no association between the variables and gender: social media networks, FET, $p = .547$; interpersonal communication, FET, $p = .169$; and customised brochures, pamphlets, etc., FET, $p = .089$.

These results suggest that there was overutilisation of more direct and less costly means of passing information on the availability of generic drug substitutes as opposed to

those that are cost-intensive like traditional media and internet-based options like social media networks.

The implication is that a number of channel alternatives remain underutilised for advertising/promotional purposes. This finding is at variance with the considered importance of social media platforms such as facebook, Tencent'sQQ/WeChat in marketing and promotion of retail products and services (PwC, 2017; Kangondu, 2018), with facebook being able to supply customers with real-time information about what is in stock, hence encouraging the would-be consumer to make an order (PwC, 2017).

4.2.16 Channels of Advertising and Age

In this survey, channel of advertising/promotion was cross-tabulated with age to show patterns of distribution, especially seeing as utilisation of communication channels often differ by age in the general population. The results are in Table 4.15.

Table 4.15

Distribution of Channels of Advertising by Age

Channel	Age								Total	
	Below 20 years		21-30 years		31-40 years		41-50 years			
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
[a]Social media networks (eg., Google+, Instagram, Pinterest, Facebook, Twitter)	-	-	-	-	1	0.6	-	-	1	0.6
[b]Interpersonal Communication (eg., Face-to-face interaction, focus groups)	1	0.6	53	34.4	16	10.4	4	2.6	74	48.1
[c]Customised brochures, pamphlets, etc.	-	-	1	0.6	1	0.6	1	0.6	3	1.9
[d]Cross-selling options (specific information on specific generic alternatives on receipts and invoices)	-	-	46	29.9	29	18.8	1	0.6	76	49.4
Total	1	0.6	100	64.9	47	30.5	6	3.9	154	100.0

Note. FET was performed to check the association.

[a]FET, $p = .405$; [b]FET, $p < .01$; [c]FET, $p = .185$; [d]FE

Source: Primary Data (2021)

Table 4.15 shows that majority, 69.4%, of those who had used one channel or the other to advertise or promote generics were aged 21-30 years. Moreover, this age bracket constituted most (34.4%) of those who had used interpersonal communication channels to advertise/promote generics. Overall, cross-selling options was the most dominant channel (49.4%) for all age brackets, while interpersonal communication was the most well distributed channel across the age categories. Social media networks was the least represented at 0.6% (1) in the 31-40 age bracket. Although traditional media (TV, Radio, and Newspaper/Magazine) was one of the options, none of the respondents had used it to advertise or promote the sale of generics.

The test of association computed for these variables showed that there was a significant association only between age and interpersonal communication channels, FET, $p < .01$. There was no association between age and social media networks, FET, $p = .185$; age and customised brochures and pamphlets, FET, $p = .185$; and age and cross-selling options, FET, $p = .092$.

The results imply that regardless of the age bracket of the pharmacy personnel, cross-selling options and interpersonal communication were the most widely used channels to pass information on the available generic medicines and possibly persuade the consumers to buy them. Besides, the lower pharmacy personnel age brackets tended to advertise/promote the generics more than the other, higher age brackets, perhaps because of the need to gain more traction in the market and their tendency to be more creative, and proneness to risk-taking.

There were no previous studies on similar or parallel parameters for cross-validation owing to the novel nature of this study.

4.2.17 Channel of Advertising/Promotion and Level of Education

Education is a major variable for classifying the channels people use to communicate since literacy level can determine what channel one prefers to pass important information. The distribution of channel of advertising was checked against education and the results presented in Table 4.16.

Table 4.16

Channel of Advertising/Promotion by Level of Education

Channel	Level of Education						Total	
	Certificate		Diploma		Bachelor's Degree			
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Social media networks[a]	-	-	1	0.6	-	-	1	0.6
Interpersonal Communication[b]	4	2.6	67	43.5	3	1.9	74	48.1
Customised brochures, pamphlets, etc.[c]	-	-	3	1.9	-	-	3	1.9
Cross-selling options[d]	1	0.6	69	44.8	6	3.9	76	49.4
Total	5	3.2	140	90.9	9	5.8	154	100.0

Note. FET was performed to check the association.

[a]Social media networks include Google+, Instagram, Pinterest, Facebook, Twitter (FET, $p = 1.000$)

[b]Interpersonal communication include face-to-face interaction, focus groups (FET, $p = .100$)

[c]Customised brochures, pamphlets, etc. (FET, $p = .072$)

[d]Cross-selling options mean specific information on specific generic alternatives on receipts and invoices (FET, $p = .323$).

Source: Primary Data (2021)

Table 4.16 indicates that cross-selling options and interpersonal communication, respectively, were the best-distributed channels across education level and most dominant at 49.4% and 48.1%, respectively. Although representing a small proportion at 3.9% (6), cross-selling options represented majority of the respondents in the Bachelor's Degree category, or 66.7 9%.

FET showed no significant association between any of the channels of communication variables and level of education. For example, no association was found between social media networks and level of education, FET, $p = 1.000$; interpersonal communication and level of education, FET, $p = .100$. Similarly, there was no association

between customised brochures and pamphlets, and level of education, FET, $p = .072$; and cross-selling options and level of education, FET, $p = .323$.

The results have two main implications; first, that Degree holders tended to prefer providing information on receipts and invoices, probably because their relatively high level of education enabled them to design and disseminate such messages. At least one Diploma holder used a media cannel, which could be explained by their high representation in the sample, and so there is need to interpret the result with some level of caution. Level of education, therefore, does not seem to predict the type of channel used to advertise/promote generic medicines.

Although it makes intuitive sense that use of media in general would be determined by level of education since understanding and application of various channels depend on literacy level, the uniqueness of this study meant there were no specific previous studies on the parameters of interest for cross-validation purposes.

4.2.18 Channel of Advertising/Promotion and Duration of Service

Duration for which a pharmacy personnel has worked can be a big predisposing factor in the choice of media channel to use to reach potential customers with information on generic medicines; this is because the exposure or lack of it may determine what is considered an effective channel, and what is not. Table 4.17 shows the distribution of the pharmacist population by duration of service.

Table 4.17

Duration of Service and Channel of Advertising/Promotion

Channel	Duration of service										Total	
	Below 1 years		1-2 years		3-4 years		5-6 years		6 years & above			
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Social media networks[a]	-	-	-	-	-	-	1	0.7	-	-	1	0.7
Interpersonal Communication[b]	-	-	12	8.2	37	25.3	1	0.7	21	14.4	71	48.6
Customised brochures, pamphlets, etc.[c]	1	0.7	-	-	-	-	-	-	2	1.4	3	2.1
Cross-selling options[d]	-	-	8	5.5	35	24.0	3	2.1	25	17.1	71	48.6
Total	1	0.7	20	13.7	72	49.3	5	3.4	48	32.9	146	100.0

Note. FET was performed to check the association.

[a]Social media networks include Google+, Instagram, Pinterest, Facebook, Twitter (FET, $p = .034$)

[b]Interpersonal Communication include face-to-face interaction, focus groups (FET, $p = .052$;)

[c]Customised brochures, pamphlets, etc. (FET, $p = .015$;)

[d]Cross-selling options mean specific information on specific generic alternatives on receipts and invoices (FET, $p = .132$).

Source: Primary Data (2021)

The results in Table 4.17 reveal that most (25.3%) of those who preferred interpersonal communication had worked for 3-4 years, same as those who preferred cross-selling options (specific information on specific generic alternatives on receipts and invoices) at 24.0%. Interpersonal communication and cross-selling options were the best represented channels across duration of service at 48.6% apiece. One person who had worked for less than 1 year, and two people who had worked for 6-9 years used customised pamphlets and brochures, representing an almost negligible proportion of 0.7% and 1.4%, respectively.

Mixed results were evident for the channels' association with duration of service. For example, there was an association between customised brochures and pamphlets and duration of service, FET, $p = .015$. There was no association, however, between interpersonal communication methods and duration of service, FET, $p = .052$; between cross-selling options and duration of service, FET, $p = .132$, and no significant differences were noted in the application of media channel across duration of service. The apparent statistically significant association between social media and duration of service, FET, $p = .034$, however, is irrelevant because there was only one observation across the categories of duration of service.

The results have two main implications. One, duration of service can predict whether someone will use a customised brochure or pamphlet or not. Two, the variable does not determine interpersonal methods or cross-selling options. There were no previous studies on the variables and/or the parameters of interest for cross-validation purposes.

4.2.19 Annual Turnover and Channel

As a socio-economic variable, annual turnover may imply wealth and therefore be a predisposing factor for the use of a given channel of advertising/promotion as it determines what is affordable and what is not. Annual turnover was used to classify media channel used for disseminating information on generics in the respective pharmacies. Table 4.18 presents the distribution of channel across annual turnover

Table 4.18

Distribution of Channel by Annual Turnover

Channel	Annual Turnover (KES)						Total	
	Below 1,000,000		1,000,000-2000000		2,000,001-3,000,000			
	n	%	*n*	%	*n*	%	*n*	%
Social media networks[a]	1	0.6	-	-	-	-	1	0.6
Interpersonal Communication[b]	47	30.5	26	16.9	1	0.6	74	48.1
Customised brochures, pamphlets, etc.[c]	1	0.6	2	1.3	-	-	3	2.0
Cross-selling options[d]	42	27.3	33	21.4	1	0.6	76	49.4
Total	91	59.1	61	39.6	2	1.3	154	100.0

Note. FET was performed to check the association.

[a]Social media networks include Google+, Instagram, Pinterest, Facebook, Twitter (FET, $p = 1.000$)

[b]Interpersonal communication include face-to-face interaction, focus groups (FET, $p = .045$)

[c]Customised brochures, pamphlets, etc. (FET, $p = .601$)

[d]Cross-selling options mean specific information on specific generic alternatives on receipts and invoices (FET, $p = 1.000$).

Source: Primary Data (2021)

The results in Table 4.18 indicate that interpersonal communication methods and cross-selling options had the best representation across annual turnover category. Advertising/promotion was concentrated in the Below KES 1,000,000 (30.5%) and KES 1,000,000-2,000,000 (16.9%) category. Similarly, cross-selling options was concentrated in the Below KES 1,000,000 (27.3%) and KES 1,000,000-2000000 (21.4%), respectively. Thus, most advertising/promotion was in the two categories at 59.1% and 39.6%, respectively.

There was no statistically significant association between any of the variable pairings with annual turnover. Specifically, there was no association between social

media networks and annual turnover, FET, $p = 1.000$. The association between interpersonal communication methods and annual turnover was statistically significant, FET, $p = .045$.

No association existed between customised brochures and pamphlets and annual turnover, FET, $p = .601$; and between cross-selling options and annual turnover, FET, $p = 1.000$.

That advertising/promotion was concentrated in the lower turnover bracket suggests that those who were less wealthy endeavoured to advertise/promote the generic medicines to boost sales and profit. The originality of this study meant there were no previous studies on similar variables and/or parameters of interest for cross-validation purposes.

4.3 Descriptive Statistics (Independent & Dependent Variables)

Descriptive statistics, range (*R*), mean (*M*) and standard deviation (*SD*) were computed for the composite scores of the four variables, communication, pharmacy personnel knowledge and consumer preference and uptake of generics. The results are presented in Table 4.19.

Table 4.19

Descriptive Statistics for Communication, Pharmacy Personnel Knowledge, Consumer Preference and Uptake of Generics

Variable	*R*	*M*	*SD*
Communication	1.00	4.71	.26
Pharmacy Personnel Knowledge	1.75	4.68	.30
Consumer Preference	1.33	4.65	.27
Uptake of Generics	1.00	3.98	.16
Overall Mean Score		4.50	.244

Source: Primary Data (2021)

The results in Table 4.19 indicate that the highest mean for the composite scores of the variables is for communication, 4.71, $SD = 0.26$. The other means are, pharmacy personnel knowledge, 4.68, $SD = 0.30$; consumer preference, 4.65, $SD = 0.27$; and uptake

of generics, 3.98, *SD* = 0.16. On variability, the largest range was for the scores of pharmacy personnel knowledge (1.75), while communication (1.00) and uptake of generics (1.00) had the smallest, implying that the data did not have outliers. The largest standard deviation was for the scores of pharmacy personnel knowledge (0.30), while the lowest was for those of uptake of generics (0.16). From the results, it can be inferred that the three variables were important factors in the uptake of generic medicines in the pharmacies. Besides, there was less variation in the data; they did not deviate too much from the mean. They were generally well spread.

4.4 Correlations

Bivariate Correlation (Spearman's *Rho*) was computed for communication, pharmacy personnel knowledge, consumer preference and uptake of generics to test if there were any significant correlations that could reveal any associations between the three predictors and the criterion. Table 4.20 shows the results of the correlation test.

Table 4.20

Correlation Analysis of Communication, Pharmacy Personnel Knowledge, Consumer Preference and Uptake of Generics

Variable	*n*	*1*	*2*	*3*	*4*
Communication[a]	121	-			
Pharmacy Personnel Knowledge	121	.47**	-		
		.000			
Consumer Preference[c]	121	58**	.55**	-	
		.000	.000		
Uptake of Generics[d]	121	.19*	.20 *	.150	-
		.038	.025	.099	-

[a]Composite scores of Communication
[b]Composite scores of Pharmacy Personnel Knowledge
[c]Composite scores of Consumer preference
[d]Uptake of Generics, 1 = 1-20%; 2 = 21-40%; 3 = 41-60%; 4 = 61-80%; 5 = 80-100% (mean proportion of sales of generics for 2019-2020)

*p<.05

**p<.01

Source: Primary Data (2021)

The correlation results in Table 4.20 indicate a small, positive statistically significant correlation between communication and uptake of generics (*Rho* = .19, $p<.05$). There was a small, positive statistically significant correlation between pharmacy personnel knowledge and uptake of generics (*Rho* = .20, $p<.05$). A small, positive non-statistically significant correlation existed between consumer preference and uptake of generics (*Rho* = .15, $p = .099$). The positive and statistically significant association between communication, pharmacy personnel knowledge and uptake of generics suggests that increase in the value of these two variables affect the extent to which pharmacy personnel prescribes generics. The relationship is not very strong in each case, though. Moreover, surprisingly, the association between consumer preference and uptake of generics is not significant and may need to be assessed using a different test, including in an interaction with another variable.

Comparatively, a marginally stronger relationship was observed between pharmacy personnel knowledge and uptake of generics than between either communication or consumer preference and the uptake of generics, suggesting that this is a very important factor in the sale and utilisation of generics in the pharmacies. This is very likely because in many communities today, pharmacy personnel have taken the role of prescribers, and have often been observed to swap prescriptions because of cost and other therapeutic considerations. Since the difference is only marginal, there was need for other tests to determine the effect of the variable.

The positive correlation between communication, pharmacy personnel knowledge, consumer preference and uptake of generics is also borne out by other studies that found communication, pharmacy personnel knowledge and consumer preference to be important factors for adoption of generics (Gaither et al., 2001; PwC, 2012; Mukherji, 2012; Patel et al., 2012; Bateman, 2014; PwC 2017; McKinsey, 2018).

No study has tested the connection between communication and uptake of generics. The results corroborate findings by Fill and Jamieson (2014) that the right mix of communication strategies is needed to deal with the lingering societal perceptions of generic medicines being of low quality in many places on the African continent (WHO, 2011).

4.5 Tests of Hypothesis

The broad objective of this study was to establish the moderation effect of pharmacy personnel knowledge and consumer preference on the relationship between communication and uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

The basic assumption was there was no difference in the means of uptake of generics for differing levels of communication (its perceived value), none for either pharmacy personnel knowledge or consumer preference, and none for the combination of communication and pharmacy personnel knowledge or the combination of communication and consumer preference.

Hence, five postulations were made, namely that one, there was no statistically significant relationship between communication and uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

Two, pharmacy personnel knowledge has no statistically significant effect on the uptake of generics. Three, consumer preference has no statistically significant effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

Four, communication and pharmacy personnel knowledge have no statistically significant interaction effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

Lastly, communication and consumer preference have no statistically significant interaction effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

Tests of hypothesis were computed and the statistical significance of each result checked at .05 alpha and 95% confidence level, meaning that the expected precision for the point estimate (s) was 5%.

4.5.1 Communication and Uptake of Generics

The first objective of the study was to establish the relationship between communication and the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi. Communication comprised three indicators, quality communication (nine items), multichannel advertising/promotion (five items), and frequency of

communication (five items). Uptake of generics was measured based on average proportion/ratio of sales of generics vis-à-vis innovator brands. Information on the extent to which communication affected uptake of generics was obtained through a five-point ranking scale ranging from "Strongly Disagree" to "Strongly Agree." The relationship was tested using the following hypothesis (null with alternate):

H_0: Communication has no statistically significant relationship with the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

H_1: Communication has a statistically significant effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

One-way Welch ANOVA test was performed to test the hypothesis, with the relevant post hoc test, Games-Howell. The test was useful because it is more robust to violation of homogeneity (equality) of variance compared to the conventional ANOVA. Under the condition of the violation, Games-Howell was a suitable alternative to Levene's Test of Equality of variance.

The F-Statistic was computed based on the assumption that there was no difference in the means of uptake of generics for differing levels of pharmacy personnel knowledge, with the significance checked at .05 alpha level. The effect size was tested through η^2 function. Table 4.21 and Figure 4.2 present the results.

Table 4.21

ANOVA Test Results for Communication and Uptake of Generics

Descriptive statistics, ANOVA & post hoc test

Descriptive Statistics

Measure	*n*	*M*	*SD*	*SE*	*95% CI for M*		*Min*	*Max*
					LCL	*UCL*		
Neutral	2	3.50	0.71	0.50	-2.85	9.85	3.00	4.00
Agree	26	3.96	0.20	0.04	3.88	4.04	3.00	4.00
Strongly Agree	93	3.99	0.10	0.01	4.00	4.01	3.00	4.00
Total	121	3.98	0.16	0.01	4.00	4.00	3.00	4.00

ANOVA[a]

	SS	*Df*	*MS*	*F*	*p*	*η2*
Between Groups	.48	2	0.24	11.43	<.01	.16
Within Groups	2.45	118	0.02			
Total	2.93	120				

Multiple Comparisons[b]

(I) Communication	*(J) Communication*	*MD (I-J)*	*SE*	*p*
Neutral	Agree	-.46	.50	.719
	Strongly Agree	-.49	.50	.698
Agree	Neutral	.46	.50	.719
	Strongly Agree	-.03	.04	.769
Strongly Agree	Neutral	.49	.50	.698
	Agree	.03	.04	.769

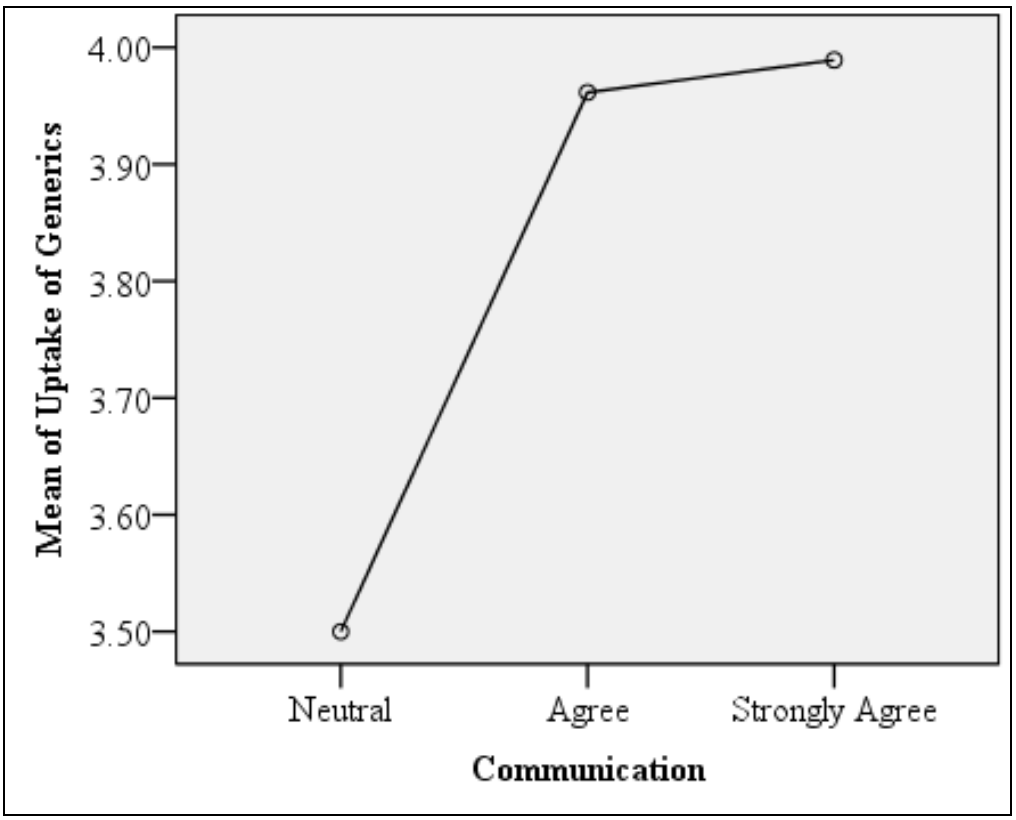
Note. Table combines descriptive statistics, and one-way ANOVA and post hoc test results

[a]ANOVA—overall significance test
[b]Post hoc test results for communication and uptake of generics

Source: Primary Data (2021)

Figure 4.2

Means Plot of Communication and Uptake of Generics



Note. Uptake of generics = mean proportion of generic sales for the period 2019-2020
Source: Primary Data (2021)

The results in Table 4.21 reveal a statistically significant relationship between communication and uptake of generics, determined by ANOVA (F 2, 118) = 11.43; p<.01). The category Strongly Agree had the highest mean uptake of generic sales at 3.99 (79.8%). Neutral had the least mean at 3.50 (70.0%), but much higher standard deviation (0.71). The mean uptake of generics for the Agree category is 3.96 (79.2%). From the results, it is evident that different categories of communication correspond to different proportions of uptake of generics. The differences in the mean uptake of generics ranging from 3.50 to 3.99 are statistically significant.

Looking at the differences in the means of the proportion of the four communication categories, none of the differences in the category pairings is statistically significant, revealed by a Games-Howell post hoc test. Neutral and Agree (p = .719),

Neutral and Strongly Agree (p = .698), Agree and Strongly Agree (p = .769). The effect of communication on the uptake of generics is large (η^2 = .16), equaling 16.0%.

Figure 4.2 indicates that the categories of the respondents who agreed or strongly agreed with attitudinal statements relating to communication had higher proportion of generic medicines sold than the other categories.

These findings point to a relationship between communication and uptake of generics, with the added implication that quality multi-modal and frequent communication considerably positively affect the uptake of generics by consumers.

The findings corroborate other studies that also found a strong relationship between communication and health outcomes (Oh et al., 2001; Laidlaw et al., 2008; Fill & Jamieson, 2014). They are also consistent with other studies that indicated a proportional effectiveness of messages in respect of the number of media channels in use (O'Sullivan et al., 2003). Besides, they support the findings by Zizka (2014) that frequency of communication significantly affects the person who receives the message, especially in terms of the gratification he or she receives.

The findings also confirm TPB's six constructs, namely attitude, behavioural intention, subjective norms, social norms, perceived power and perceived behavioural control (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980), which constructs provided the guideline for the operationalisation of communication in the three basic dimensions of quality communication, multichannel advertising/promotion options and messaging frequency, and further presented in the different attitudinal statements forming component's respective indicators. They even support the main idea in Diffusion of Innovations theory—innovation as an idea, practice, or object that is perceived to be new by an individual or other unit of adoption, which is also communicated through certain channels over time among the members of a social system (Rogers, 1995; Rogers, 2003). To the extent then that multichannel advertising/promotion and messaging frequency have parallels in channel and time, the data collected on these variables and significant findings therefrom support the theory.

The null hypothesis that communication has no statistically significant effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi, is therefore rejected. Conversely, the alternate hypothesis that communication has a

statistically significant effect on the uptake of generics in retail pharmacies in Njiru Sub-County, Nairobi, is supported.

4.5.2 Pharmacy Personnel Knowledge and Uptake of Generics

The second objective was to assess the effect of pharmacy personnel knowledge on the uptake of generics in retail pharmacies in Njiru Sub-county, Nairobi. Pharmacy personnel knowledge was comprised of twelve indicators relating to the perceived value of such knowledge as pharmacy personnel possess. Uptake of generics was measured based on proportion/ratio of sales of generics vis-à-vis innovator brands. Information on the level of agreement with the effect of pharmacy personnel knowledge on the criterion was obtained through a five-point ranking scale ranging from "Strongly Disagree" to "Strongly Agree." The following hypothesis (null with alternate) was formulated:

H_0: Pharmacy personnel knowledge has no statistically significant effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

H_2: Pharmacy personnel knowledge has a statistically significant effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

The hypothesis was tested using one-way Welch ANOVA, with the relevant post hoc test, Games-Howell. The F-Statistic was computed based on the assumption that there was no difference in the means of uptake of generics for differing levels of pharmacy personnel knowledge, with the significance checked at .05 alpha level. The effect size was tested through η^2 function. The results are presented in Table 4.22 and Figure 4.3.

Table 4.22

ANOVA Test Results for Pharmacy Knowledge and Uptake of Generics

Descriptive statistics, ANOVA & post hoc test

Descriptive Statistics

	n	*M*	*SD*	*SE*	*95% CI for M*		*Min*	*Max*
					LCL	*UCL*		
Neutral	3	3.67	0.58	0.33	2.23	5.10	3.00	4.00
Agree	24	3.96	0.20	0.04	3.87	4.05	3.00	4.00
Strongly Agree	94	3.99	0.10	0.01	3.97	4.01	3.00	4.00
Total	121	3.98	0.16	0.01	3.95	4.00	3.00	4.00

ANOVA[a]

	SS	*Df*	*MS*	*F*	*p*	n^2
Between Groups	.31	2	0.16	7.02	.001	.11
Within Groups	2.61	118	0.02			
Total	2.93	120				

Multiple Comparisons[b]

(I) Pharmacy personnel knowledge	*(J) Pharmacy personnel knowledge*	*MD (I-J)*	*SE*	*p*
Neutral	Agree	-.29	.34	.706
	Strongly Agree	-.32	.33	.660
Agree	Neutral	.29	.34	.706
	Strongly Agree	-.03	.04	.753
Strongly Agree	Neutral	.32	.33	.660
	Agree	.03	.04	.753

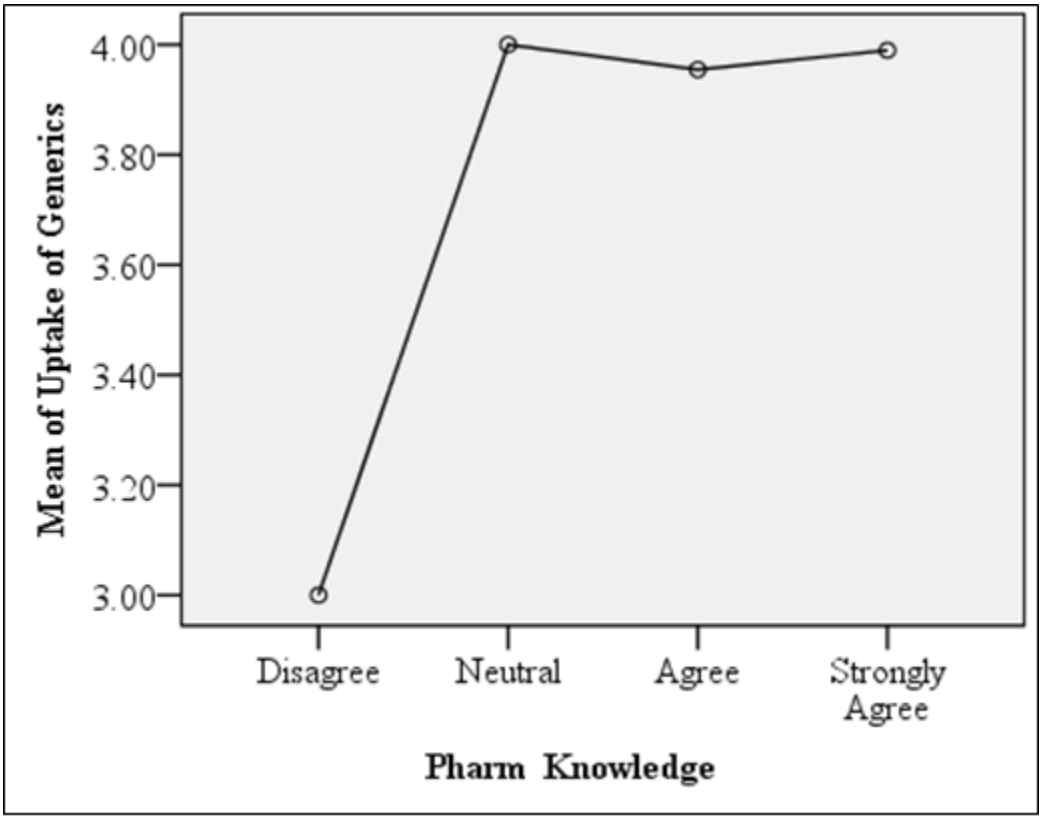
Note. Table combines descriptive statistics, and one-way ANOVA and post hoc test results. Dependent variable is the uptake of generics.

[a]ANOVA—overall significance test
[b]Post Hoc test results for Pharmacy personnel knowledge and uptake of generics

Source: Primary Data (2021)

Figure 4.3

Means Plot of Pharmacy Personnel Knowledge and Uptake of Generics



Note. Uptake of generics = mean proportion of generic sales for the period 2019-2020

[a]Pharm Knowledge represents pharmacy personnel knowledge

Source: Primary Data (2021)

The results in Table 4.22 reveal a statistically significant relationship between pharmacy personnel knowledge and uptake of generics (F 2,118) = 7.02; p<0.01). The category Strongly Agree had the highest mean uptake of generics at 3.99 (79.80%). Neutral had the least mean at 3.67(73.3%), but much higher standard deviation at 0.58. The mean uptake for the Agree category is 3.96 (79.20%).

From the results, it is evident that different categories of pharmacy personnel knowledge correspond to different proportions of uptake of generics. The differences in the mean uptake of generics ranging from 3.67 to 4.00 were statistically significant.

The means of the proportion of the four pharmacy personnel knowledge categories show that none of the differences in the category pairings was statistically significant. Neutral and Agree (p = .706), Neutral and Strongly Agree (p = .660), Agree and Strongly Agree (p = .753). The effect of pharmacy personnel knowledge on the mean uptake of generics was medium (η^2 = .11), which equals 11.00%.

Figure 4.3 also indicates that the categories of the respondents who agreed or strongly agreed with the attitudinal statements relating to the value of pharmacy personnel knowledge had higher proportion of generic medicines sold than the other categories.

These findings point to a relationship between pharmacy personnel knowledge and the uptake of generics, with the practical implication that pharmacy personnel knowledge affects uptake of generics. They hold true to the observation by Mukherji (2012) and PwC (2017) that pharmacy personnel's understanding of the industry dynamics or the dynamics of business generally, including his or her customers is important for retail business in general [and pharmaceutical business in particular]. Apart from other critical factors, pharmacy personnel's understanding of cost differential of innovator and generic medicines is particularly important for other studies have shown some of the innovator brands to be widely available despite being priced very highly.

Additionally, knowledge and appreciation of the role of therapeutic expertise in the adoption of generics implies that retailers who are equipped with real-world data on their products and are ready to disseminate the information as and when it is requested for or required potentially create demand for generics (PwC, 2012).

The findings also validate TPB's six constructs, from attitudes, behavioural intention, subjective norms, social norms, perceived power to perceived behavioural control (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980)—constructs from which the indicators of pharmacy personnel knowledge were derived. The quality- related issues, efficacy-related issues, therapeutic expertise, and understanding of drug identity and critical industry dynamics refer back to and are particularly aligned to the theory's core hypothesis that behavioural achievement, in this case the prescription of a generic medicine, is a function of both motivation (intention) and ability (behavioural control).

The null hypothesis that pharmacy personnel knowledge has no statistically significant effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi, is therefore rejected. The alternate hypothesis, pharmacy personnel knowledge has a statistically significant effect on the uptake of generics in retail pharmacies in Njiru Sub-County, Nairobi, is supported.

4.5.3 Consumer Preference and Uptake of Generics

The third objective was to assess the moderation effect of consumer preference on the relationship between communication and uptake of generics in Njiru Sub-County, Nairobi. Consumer preference consisted of nine indicators relating to what the pharmacy personnel felt was the value of consumer preference in the uptake of generics. Uptake of generics was measured based on proportion/ratio of sales of generics vis-à-vis innovator brands. Information on the level of agreement with the effect of the independent variable on the criterion was obtained through a five-point ranking scale ranging from "Strongly Disagree" to "Strongly Agree." Subsequently, the following hypothesis (null with alternate) was formulated:

H_0 Consumer preference has no statistically significant effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

H_3 Consumer preference has a statistically significant effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

One-way Welch ANOVA test was performed to test the hypothesis, with the relevant post hoc test, Games-Howell. The F-Statistic computed was based on the assumption that there was no difference in the means of uptake of generics for differing levels of consumer preference, with the significance checked at .05 alpha level. The effect size was tested through η^2 function. Table 4.23 and Figure 4.4 present the results.

Table 4.23

ANOVA Test Results for Consumer Preference and Uptake of Generics

Descriptive statistics, ANOVA & post hoc test

Descriptive Statistics

	n	*M*	*SD*	*SE*	*95% CI for M*		*Min*	*Max*
					LCL	*UCL*		
Neutral	6	3.83	0.41	0.17	3.41	4.26	3.00	4.00
Agree	30	3.97	0.18	0.033	3.9	4.04	3.00	4.00
Strongly Agree	85	3.99	0.11	0.01	3.97	4.01	3.00	4.00
Total	121	3.98	0.16	0.01	3.95	4.00	3.00	4.00

ANOVA[a]

	SS	*Df*	*MS*	*F*	*p*	η^2
Between Groups	.14	2	0.07	2.91	.059	.05
Within Groups	2.8	118	0.024			
Total	2.93	120				

Multiple Comparisons[b]

(I) Consumer Preference	*(J) Consumer Preference*	*Mean Difference (I-J)*	*SE*	*p*
Neutral	Agree	-0.13	0.17	.727
	Strongly Agree	-.0155	0.17	.648
Agree	Neutral	0.133	0.17	.727
	Strongly Agree	-0.02	0.04	.816
Strongly Agree	Neutral	0.16	0.17	.648
	Agree	0.02	0.04	.816

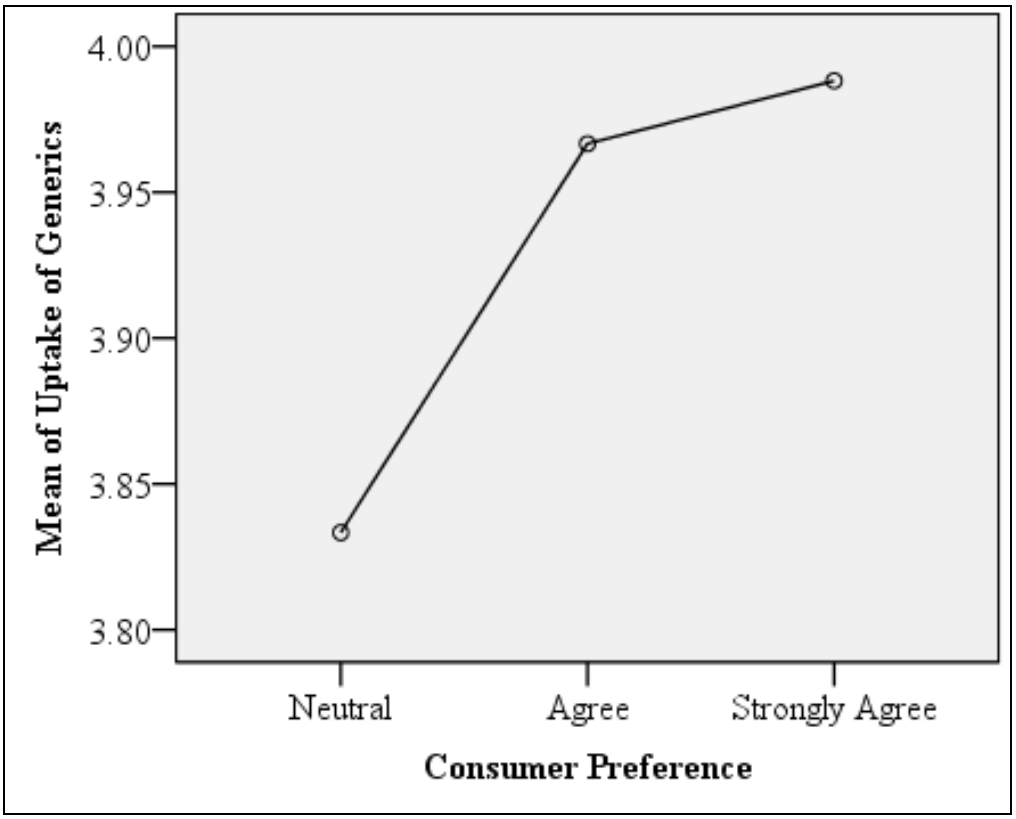
Note. Table combines descriptive statistics, and one-way Welch ANOVA and post hoc test results. Dependent variable is the uptake of generics.

[a]ANOVA—overall significance test
[b]Post hoc test results for consumer preference and uptake of generics

Source: Primary Data (2021)

Figure 4.4

Means Plot of Consumer Preference and Uptake of Generics



Note. Uptake of generics = mean proportion of generic sales for the period 2019-2020

Source: Primary Data (2021)

The results in Table 4.23 reveal no statistically significant relationship between consumer preference and uptake of generics (F 2, 118) = 2.91; p = 0.059), but it is close. The category Strongly Agree had the highest mean at 3.99 (79.80%). Neutral category had the least mean at 3.83 (76.60%), but much higher standard deviation at 0.41. The mean uptake for the Agree category is 3.97 (79.0%). From the results, it is evident that different categories of communication correspond to different proportions of uptake of generics. The differences in mean uptake of generics ranging from 3.83 to 3.99 were not statistically significant, although the insignificance is marginal.

The means of the proportion of the four consumer preference categories show that none of the differences in the category pairings was statistically significant. Neutral and Agree (p = .727), Neutral and Strongly Agree (p = .648), Agree and Strongly Agree

(p = .816). The effect of consumer preference on the uptake of generics is small (η^2 = .05), which equals 5.0%.

Figure 4.4 indicates that the categories of the respondents who agreed or strongly agreed with the attitudinal statements relating to the significance of consumer preference had higher proportion of generic medicines sold than the other categories.

These findings point to a relationship between consumer preference and uptake of generics. Thus, consumer preference affects uptake of generics, which means that where an upward shift in consumer preference occurs, it considerably positively affects the uptake of generics. The practical implication of this result is that consumer preference, which is determined by a number of factors including cost, perception of safety and quality, affects uptake of generics, but it is a rather marginal, comparatively small effect.

The current findings validate several related studies that have looked at patient preferences for generics and highlighted prevailing negative perceptions concerning safety, efficacy and cost of generics, as well as patient self-reported willingness to use generic medication (Carroll & Wolfgang, 1988; Gaither et al., 2001). Thus, consistent with these studies, utilisation of generic medicines can be affected greatly by the preference that consumers often have for branded medicines, besides other determinants such as prescription and information asymmetry (WHO, 2011; Patel et al., 2012; Bateman, 2014), which this study did not factor in, though.

Bateman (2014) finding that adoption of generic medicines has grown in South Africa, from 35% to 60% over a decade, following a shift in perception and the realisation of its cost-saving benefits, provides specific empirical corroboration of a linear relationship between consumer preference and uptake of generics.

The findings validate the five constructs of diffusion of innovations theory (characteristics of innovations), from relative advantage to compatibility to complexity to trialability to observability as operationalised in the attitudinal items comprising the latent variable, consumer preference. The items, which included perceived efficacy of generics, perceived quality, perceived cost, innovator brand association, risk aversion, and competition, all relate to the characteristics of innovations as factors that determine the prescription of generic medicines. To the extent that the variable consumer preference has only a marginally insignificant effect on the uptake of generics there is proven

theoretical validation. The large effect size sufficiently validates and show congruence with the theory of diffusion of innovations. They also validate TPB (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980).

The hypothesis that consumer preference has no statistically significant effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi, is therefore supported, if only marginally.

4.5.4 Communication, Pharmacy Personnel Knowledge and Uptake of Generics

The fourth objective was to assess the interaction between communication and pharmacy personnel knowledge on the uptake of generics in Njiru Sub-County, Nairobi. Subsequently, the following hypothesis (null with alternate) was formulated:

H_0: Communication and pharmacy personnel knowledge have no statistically significant interaction effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

H_4: Communication and pharmacy personnel knowledge have a statistically significant interaction effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

Two-way ANOVA was used to test the hypothesis. The two factors, communication and pharmacy personnel knowledge, were entered into a General Linear Model and an interaction term created and tested with the dependent variable. The F-Statistic computed was based on the assumption that there was no difference in the means of uptake of generics for differing levels of communication and pharmacy personnel knowledge individually or in an interaction, with the significance checked at .05 alpha level. The effect size was tested through η^2_p function. The aim was to check if the effect of communication on the uptake of generics was influenced by pharmacy personnel knowledge. The influence is said to have occurred if the interaction tern is statistically significant. Table 4.24 and Figure 4.5 present the results.

Table 4.24

ANOVA Results for Communication, Pharmacy Personnel Knowledge and Uptake of Generics

Descriptive statistics				
Communication	Pharmacy personnel knowledge	*M*	*SD*	*n*
Neutral	Agree	3.50	0.71	2
	Total	3.50	0.71	2
Agree	Disagree	3.00	.	1
	Neutral	4.00	0.00	2
	Agree	4.00	0.00	10
	Strongly Agree	4.00	0.00	13
	Total	3.96	0.20	26
Strongly Agree	Agree	4.00	0.00	10
	Strongly Agree	3.99	0.11	83
	Total	3.99	0.10	93
Total	Disagree	3.00	.	1
	Neutral	4.00	0.00	2
	Agree	3.96	0.21	22
	Strongly Agree	3.99	0.10	96
	Total	3.98	0.16	121

Interaction Effect of Communication and Pharmacy Personnel Knowledge and Uptake of Generics[a]

Source	*MS*	*Df*	*M*	*F*	*p*	n^2	f^2
Corrected Model	1.44	6	0.240	18.36	<.01	.49	1.00
Intercept	177.63	1	177.627	13608.96	<.01	.99	1.00
Comm.[b]	0.46	2	0.228	17.43	<.01	.23	1.00
Pharm_Know[c]	0.96	3	0.320	24.54	<.01	.39	1.00
Comm.* Pharm_Know	0.001	1	0.001	0.04	.85	.00	0.05
Error	1.49	114	0.013				
Total	1915.00	121					
Corrected Total	2.93	120					

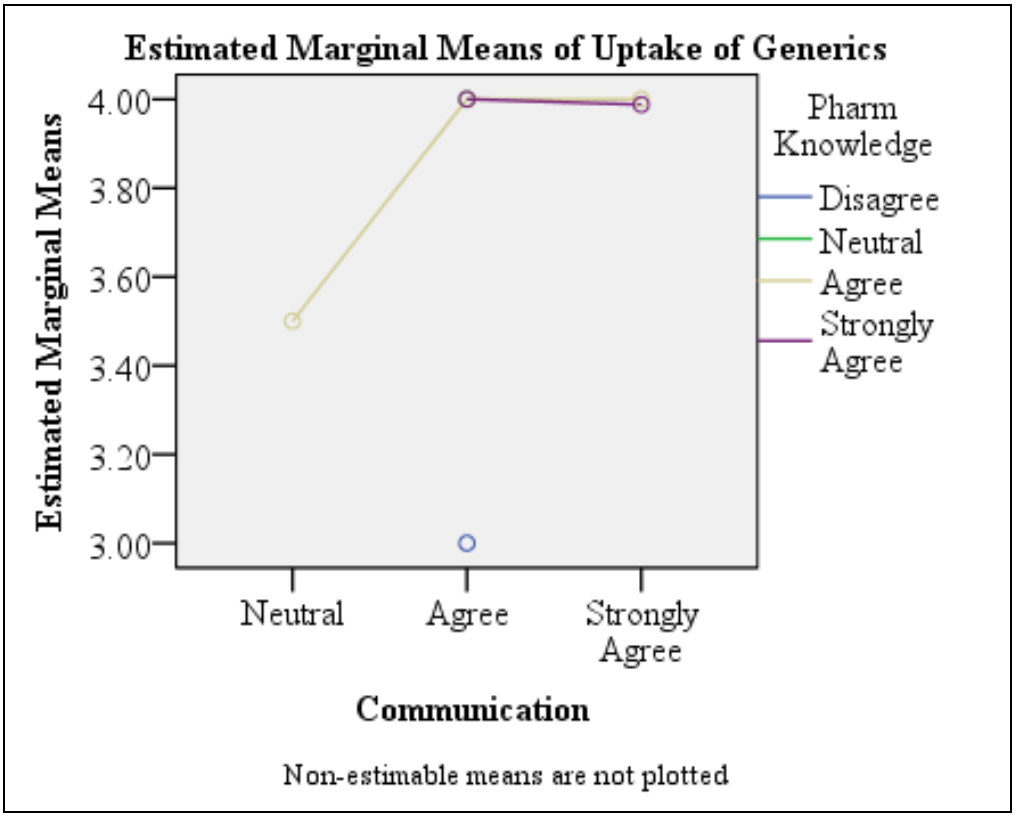
Note. Table combines descriptive statistics, and Two-way ANOVA and post hoc test results. Dependent variable is the uptake of generics.

[a]Interaction effect of Communication, Pharmacy Personnel Knowledge and Uptake of Generics (Tests of Between-Subjects Effects)
[b]Comm. = Communication
[c]Pharm_Know = Pharmacy Personnel Knowledge

Source: Primary Data (2021)

Figure 4.5

Means Plot of the Interaction of Communication, Pharmacy Personnel Knowledge and Uptake of Generics



Note. Uptake of generics = mean proportion of generic sales for the period 2019-2020.
[a]Pharm Knowledge represents pharmacy personnel knowledge

Source: Primary Data (2021)

The means in Table 4.24 indicate notable differences in the means of communication and pharmacy personnel knowledge. The largest differences were in the interaction between Agree and Neutral category, Agree and Agree, Agree and Strongly Agree, and Strongly Agree and Agree.

The ANOVA results in Table 4.24 reveal that the interaction effect of communication and pharmacy personnel knowledge on the uptake of generics was not statistically significant (p = .845). The individual effect of communication on the uptake of generics, however, was statistically significant (p<.01), as was the interaction between pharmacy personnel knowledge and the uptake of generics (p<.01).

The interaction between communication and pharmacy personnel knowledge had no effect on the uptake of generics (η^2_p = .000). The individual variables, however, had an effect on the uptake of generics (communication, η^2_p = .23; and pharmacy personnel knowledge, η^2_p = .39). Accordingly, the individual main effects accounted for 23.0% and 39.00% variation, respectively. The observed power for each of the simple main effects was 1.0 and therefore sufficient to detect the significance of the effects, but the interaction effect indicated insufficient (small) power (.05), which was below .8 threshold.

The means plot in Figure 4.5 shows that an interaction occurred between communication and pharmacy personnel knowledge, for the lines intersect, if only marginally. If there did not exist any interaction, the lines would be approximately parallel. It implies that changes in the uptake of generics with communication depend on pharmacy personnel knowledge and vice-versa.

These findings point to a situation where a shift in the level of pharmacy personnel knowledge downward can potentially neutralise the interaction between communication and the uptake of generics or simply diminish its effect, especially where negative attitude is involved. Inversely, it is likely that sub-optimal or ineffective communication would lead to a diminished effect of pharmacy personnel knowledge however optimal to the extent that it fails to reflect in the information passed on to the consumer resulting in negative consumer perception, disinterest in and hence low uptake of generics by the consumer.

The practical implication of these results is that communication efforts can only amount to much where pharmacy personnel knowledge is accompanied with the right attitude, for shifts upward or downward in attitude can easily render ineffective the application of knowledge to practice particularly in terms of communicating on the various aspects of generics.

Cautious to look at these results only as an interaction effect, it is noted that they are at variance with the position in some literature that pharmacy personnel's understanding of industry dynamics or the dynamics of business, including his or her customers is important for retail business in general [and pharmaceutical business in particular]. Such literature suggest that together with other critical factors, a pharmacy

personnel's understanding of the cost differential of innovator and generic medicines is particularly important for the adoption of generics, since innovator brands were at times widely available and even in demand, notwithstanding the high prices (PwC, 2017).

The results also differ slightly from the notion that considers pharmacy personnel's understanding and appreciation of the issues around generic biosimilarity as having a great effect on the adoption of these drugs (PwC, 2012; Patel & Paras, 2016). Notably, no parallel literature focusing on similar variables or measuring similar parameters existed for direct comparison.

The findings vacate the general assumption in the theory of Diffusion of Innovations theory as represented by the constructs of relative advantage, compatibility, complexity, trialability and observability (Rogers, 1995; Rogers, 2003), to the extent of the lack of an interaction effect; although the main, individual effect of the variables on the uptake of generics has a corroborative value.

The null hypothesis that the interaction between communication and pharmacy personnel knowledge has no statistically significant effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi, is therefore supported.

4.5.5 Communication, Consumer Preference and Uptake of Generics

The fifth objective was to assess the interaction between communication and consumer preference on the uptake of generics in Njiru Sub-County, Nairobi. Subsequently, the following hypothesis (null with alternate) was formulated:

H_0 Communication and consumer preference have no statistically significant interaction effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

H_5 Communication and consumer preference have a statistically significant interaction effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

Two-way ANOVA was used to test the hypothesis. Communication and consumer preference were entered into a General Linear Model and an interaction term created and tested with the dependent variable. The F-Statistic computed was based on

the assumption that there was no difference in the means of uptake of generics for differing levels of communication and consumer preference individually or in an interaction, with the significance checked at .05 alpha level. The effect size was tested through η^2_p function. The aim was to check if the effect of communication on the uptake of generics was influenced by consumer preference. Influence occurs if the interaction term is statistically significant. Table 4.25 and Figure 4.6 present the results.

Table 4.25

ANOVA Results for Communication, Consumer Preference and the Uptake of Generics

Descriptive statistics

Communication	Consumer Preference	*M*	*SD*	*n*
Neutral	Neutral	4.00	.	1
	Agree	3.00	.	1
	Total	3.50	0.71	2
Agree	Neutral	3.80	0.45	5
	Agree	4.00	0.00	14
	Strongly Agree	4.00	0.00	7
Strongly Agree	Agree	4.00	0.00	15
	Strongly Agree	3.99	0.11	78

Interaction Effect of Communication and Consumer Preference on the Uptake of Generics[a]

Source	*SS*	*Df*	*MS*	*F*	*p*	η^2	f^2
Corrected Model	1.14	6	0.190	12.10	<.01	.389	1.00
Intercept	243.85	1	243.85	15554.63	<.01	.99	1.00
Comm.[b]	0.69	2	0.32	20.03	<.01	.26	1.00
CP[c]	0.32	2	0.16	10.08	<.01	.15	.98
Comm.* CP	0.64	2	0.32	20.50	<.01	.27	1.00
Error	1.79	114	0.02				
Total	1915.00	121					
Corrected Total	2.93	120					

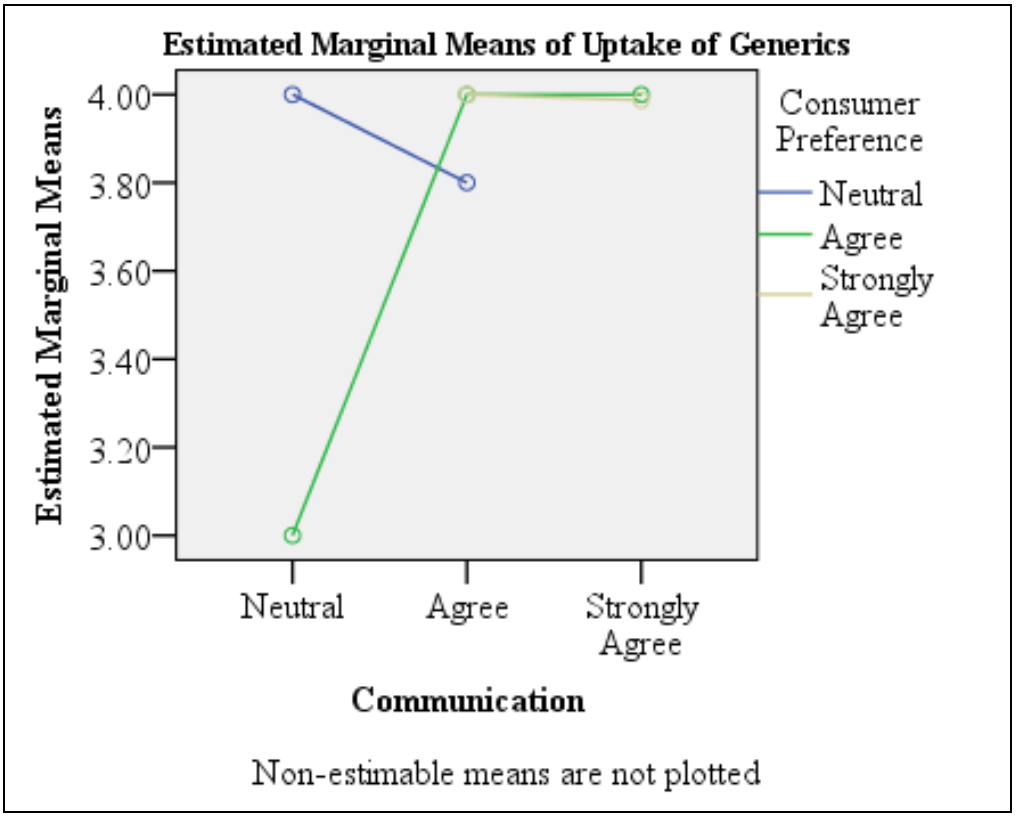
Note. Table combines descriptive statistics, and Two-way ANOVA and post hoc test results. Dependent variable is the uptake of generics.

[a]Interaction effect of Communication, Consumer Preference and Uptake of Generics (Tests of Between-Subjects Effects)
[b]Comm. = Communication
[c]CP = Consumer Preference

Source: Primary Data (2021)

Figure 4.6

Means Plot of the Interaction of Communication, Consumer Preference and Uptake of Generics



Note. Uptake of generics = mean proportion of generic sales for the period 2019-2020

Source: Primary Data (2021)

The means in Table 4.25 indicate notable differences in communication and consumer preference in relation to their effect on the uptake of generics. The largest differences are in the interaction between Neutral and Neutral category, Agree and Agree, Agree and Strongly Agree, and Strongly Agree and Agree.

The ANOVA results reveal a statistically significant relationship between the interaction of communication and consumer preference and uptake of generics (F 2, 2, 2) = 20.50; p<.01.

The interaction between communication and uptakes of generics was statistically significant (η^2 = .260; p<.01), as was the interaction between consumer preference and uptake of generics (η^2_p = .15; p<.01). The overall effect of the interaction between

communication and consumer preference on the uptake of generics was large (η^2_p = .27), and larger than the individual effect of either communication or consumer preference. The interaction between the two variables accounted for 27.0% of the variance, which is higher and therefore apparently more important than the individual main effects for communication (26.0%) or consumer preference (15.0%). The rest of variance, 73.0%, is accounted for by error, which could be some systematic variables not operationalised in the study. The effect size in the relationship between consumer preference and uptake of generics is small.

The observed power for each of the simple main effects and interaction effect was above .8 and therefore sufficient to detect the significance of the effects,

The means plot in Figure 4.6 shows that an interaction occurred between communication and consumer preference, for the lines intersect. Absence of an interaction would have seen the lines run approximately parallel. It can be inferred, therefore, that the changes in the uptake of generics with communication depends on consumer preference and vice-versa.

The findings validate the dominant implied thought in existing literature that both communication and consumer preference would affect the uptake of generics (Carroll & Wolfgang, 1988; Gather & Keeling, 2000; Gaither, et al., 2001; Corcoran, 2007; Voicu, 2008; CRH, 2018; Skarbaliene et al., 2019)—implied thought because none of the studies speaks directly to an interaction between these two variables. Further, the findings are consistent with those of a study by Colgan et al. (2015) that more ordinary people tended to negatively perceive generics compared to either doctors or pharmacists.

The observation by Fill and Jamieson (2014) that consumers have choices to make over numerous offerings, thousands or tens of thousands, puts consumer preference in even sharper focus especially in respect of the current findings whose corroborative value is demonstrated by the statistically significant result. Thus, the preference consumers have for the branded medicines, in light of current findings and previous studies, has affected greatly the utilisation of generic medicines.

The findings corroborate the cumulative value of the theory of diffusion of innovations as represented by the constructs of relative advantage, compatibility, complexity, trialability and observability (Rogers, 2003). The statistically significant

interaction effect of communication and consumer preference on the uptake of generics, together with a large effect size, sufficiently validates and shows congruence with Diffusion of Innovations theory. They also validate TPB (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980) to the extent that the attitudinal items relate to the six constructs of which the theory is comprised.

The null hypothesis that communication and consumer preference have no statistically significant interaction effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi, is therefore rejected. Conversely, the alternate hypothesis that communication and consumer preference have a statistically significant interaction effect on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi, is supported.

4.6 Key Findings

This section highlights the key findings derived from the inter-variable relationships tested through hypotheses. The hypotheses were formulated based on literature available on factors affecting adoption of generics, particularly those relating to communication (quality communication, multimodal communication and frequency of communication). The literature also provided information on pharmacy personnel knowledge (understanding of the value of quality- related issues, efficacy-related issues, therapeutic expertise, drug identity, and critical industry dynamics), and consumer perceptions of quality and efficacy, cost, strong association with an innovator brand, risk aversion and competition.

4.6.1 Relationship between Communication and Uptake of Generics

The findings revealed a positive and significant relationship between communication and uptake of generics in retail pharmacies in Njiru Sub-County, Nairobi. What it implies is that to shore up the uptake of generic medicines in the pharmacies, pharmacy personnel need to make concerted efforts to use communication. Four key dimensions are especially important here, namely quality communication, multimodal communication and frequent communication. Providing relevant, comprehensive, concise

and well-planned objective-based communication to potential consumers on the generics available in the pharmacies has the potential of increasing the uptake of these drugs.

Use of different channels of communication to inform consumers is also important, which channels include cross-selling options like specific information on specific generic alternatives on receipts and invoices, interpersonal communication (e.g., face-to-face interaction, focus group discussions), and customised brochures and pamphlets. Such communication should also be as frequent as possible for repeated communication creates a sense of importance of the message and makes it more memorable.

Communication was measured based on facets of quality communication as stated by Corcoran (2007), CRH (2018) and Skarbaliene et al. (2019), which facets include relevance, accuracy, conciseness and comprehensiveness. The study measured uptake of generics at interval/ratio level, interest being in the extent of their uptake in terms of the proportion/ratio of sales.

The results are consistent with other studies, which, despite not addressing communication as a direct focal factor; indicated that information can be used to bridge the knowledge gap found among pharmacists in Pakistan on the quality of generics (Jamshed et al., 2012). Dissemination of information on the quality of generics could strengthen the pharmacy personnel's willingness to prescribe generics.

There are studies that also found a strong relationship between communication and health outcomes generally (Oh et al., 2001; Laidlaw et al., 2008; Fill & Jamieson, 2014). The findings are also consistent with other studies indicating that the effectiveness of messages increases in proportion to the number of media channels in use (O'Sullivan et al., 2003). Again, they corroborate the findings by Zizka (2014) that frequency of communication has a significant effect on the person who receives the message, especially in terms of the gratification received.

4.6.2 Effect of Pharmacy Personnel Knowledge on the Uptake of Generics

The study showed that pharmacy personnel knowledge had a significant effect on the uptake of generics in retail pharmacies in Njiru Sub-County, Nairobi. It means that the knowledge of pharmacy personnel or general attitude towards generics and pertinent

issues around these medicines, whether positive or negative, influences their uptake. Such knowledge was conceptualised as understanding of the value of quality-related issues, efficacy-related issues, and drug identity-related issues, therapeutic expertise, and critical industry dynamics.

It is important for retail business, generally, that pharmacy personnel understands industry dynamics or the dynamics of doing business, including his or her customers (Mukherji, 2012; PwC, 2017). Understanding of cost differential of innovator and generic drugs is particularly important for other studies have shown that some of the innovator brands were widely available despite being priced very highly. Such dynamics are critical for a retailer's business strategy, whether it is on the innovation-driven strategy or market-driven strategy end of the continuum for market driven strategies focus more on volumes than quality of products, which is aligned to production and sale of generics (PwC, 2012).

Knowledge and appreciation of the role of therapeutic expertise in the adoption of generics implies that retailers who are equipped with real-world data on their products and are ready to disseminate the information as and when it is requested for or required potentially create demand for generics (PwC, 2012). Similarly, Jamshed et al. (2012) also identified, in an empirical study in Pakistan, gap in pharmacy personnel as one of the reasons for low prescription rate of generics.

4.6.3 Effect of Consumer Preference on the Uptake of Generics

The study revealed a non-statistically significant relationship between consumer preference and uptake of generics in retail pharmacies in Njiru Sub-County, Nairobi. The insignificance is only marginal though. Consumer preference comprised preference based on perceived efficacy of generics, perceived quality, as well as cost, strong association with an innovator brand, risk aversion, and competition. The differences in the mean uptake of generics across levels of consumer preference were not statistically significant, although the insignificance was only marginal. Where consumer preference shifts upward, it considerably positively affects the uptake of generics.

Previous studies indicate that prevailing negative perceptions concerning safety, efficacy and cost of generics, as well as patient self-reported willingness to use generic

medication affect consumer preference (Carroll & Wolfgang, 1988; Gaither et al., 2001). Additional studies show that adoption of generics is determined to a great extent by the preference consumers often have for the innovator brands of medicines, besides other determinants, which include prescription and information asymmetry (WHO, 2011; Patel et al., 2012; Bateman, 2014), which this study did not factor in.

Social norms also affect perception of efficacy, safety and quality of generics, resulting in the variation in their uptake. Colgan et al. (2015) found that more ordinary people than either doctors or pharmacists tended to negatively perceive generics based on the above-cited parameters.

Bateman (2014) also found that adoption of generic medicines has grown in South Africa, from 35% to 60% over a decade, due to changed perception of generics and the realisation of their cost-saving benefits. FDA (2021) also reported that generic anti-ulcerants cost US$3 billion instead of the US$24.6 billion that would have been the cost of brand-name medicines. Other sources indicate staggering overall generics-associated cost savings of US$1.67 trillion for the US healthcare system between 2007 and 2016. These specific empirical findings are confirmed, except for the slightly marginal insignificance of the relevant result.

4.6.4 Interaction Effect of Communication and Pharmacy Personnel Knowledge on the Uptake of Generics

The study established no significant interaction between communication and pharmacy personnel knowledge on the uptake of generics in retail pharmacies in Njiru Sub-County, Nairobi. The individual effect in the interaction model is both significant and higher for each variable, nonetheless, as indicated by the p-value and η^2_p. The results should therefore be interpreted with some caution, so as not to underestimate or overestimate the contribution of these variables in an interaction effect.

Pharmacy personnel knowledge of the issues around generic medicines in and of itself does not guarantee that communication on the medicines will be so effective as to increase their uptake. Noteworthy too is that a downward shift in knowledge can potentially neutralise the effect of such communication. Even where the shift occurs upward, lack of a corresponding positive attitude can still reduce the effect of

communication. Equally, ineffective communication would lead to a diminished effect of pharmacy personnel knowledge, regardless of how high and valuable such knowledge may be. Thus, greater uptake of generics hinges on effective communication and proper pharmacy personnel knowledge accompanied with the correct attitude towards these drugs.

Other studies talk of how important communication (by implication) and pharmacy personnel knowledge, as separate factors, are in the uptake of generics (Corcoran, 2007; Mukherji, 2012; PwC, 2017; CRH, 2018; Skarbaliene et al., 2019).

The results of the current study have no existing parallels in reviewed literature; thus, the comparison can only go as far as the individual effects of the two factors. Generally, however, how well pharmacy personnel understands the industry dynamics or the dynamics of business, including his or her customers and cost differential of innovator brands and generics, is important for pharmaceutical business, especially because studies have shown widespread availability and uptake of innovator brands, notwithstanding the high costs (PwC, 2012).

The extent to which pharmacy personnel understands and appreciates the issues around generic biosimilarity affects greatly the adoption of these drugs (PwC, 2012; Patel & Paras, 2016). Additional information is that the apparent non-significant result (the interaction effect) resulted theoretically from lack of inclusion of attitude as a key factor in the interaction between communication and pharmacy personnel knowledge on the uptake of generics.

4.6.5 Interaction Effect of Communication and Consumer Preference on the Uptake of Generics

The study established a significant relationship between communication, consumer preference and the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi, and a large effect size, as indicated by the p-value and η^2_p. It means that consumer preference for innovator brands or generic alternatives affect the uptake of generics by affecting the link between communication and uptake of generics. Consumer preference was conceptualised as preference based on perceived efficacy and quality of

generics, cost, as well as strong association with an innovator brand, risk aversion and competition.

A consumer's perception of how efficacious, safe, costly (or not) a generic drug is affects their willingness to accept it, by extension determining pharmacy personnel's ability to prescribe or substitute it. Several studies exist which the current findings validate, studies which have looked at patient preferences for generics and highlighted varying degrees of perception concerning safety, efficacy and cost of generics as well as patient self-reported willingness to use generic medication (Carroll & Wolfgang, 1988; Gaither et al., 2001). Thus, utilisation of generic medicines is affected greatly by the preference that consumers often have for the branded medicines, besides other determinants that include prescription and information asymmetry (WHO, 2011; Patel et al., 2012; Bateman, 2014), which this study did not factor in.

The existence of a linear relationship between consumer preference and uptake of generics is borne out by the South African case, where Bateman (2014) study showed a 30% growth in the adoption of generic medicines from 35% to 60% over a decade. The growth was a result of shifting perception of generics and the realisation that utilising the drugs lower the cost of medication and healthcare. The US case demonstrates such a relationship too—US$265 billion was saved in 2017 up from US$97.3 billion in 2008 (172.4% growth in savings over a decade) by adopting generics (AAM, 2018).

Social norms also determine the perception of efficacy, safety and quality of generics hence affecting their uptake. These results are consistent with the findings of a study by Colgan et al. (2015) that more ordinary people negatively perceived generics compared to either doctors or pharmacists.

Individual-association-driven preference as a factor in generics acceptance is corroborated also by Voicu (2008) who observed that fully understanding consumer preferences necessitates determining what their demands and desires are about the functional value of the purchase, what emotional results they expect, apart from the subjective norms or standards they use to identify a product as different from others.

Getting a consumer interested in a generic drug therefore requires pharmacy personnel to be deliberate in his or her application of specific communication methods.

There is no choice but to use the right set or mix of relevant communication tools to inform the consumer of the value of generic medicines.

4.7 Summary of Chapter

This chapter has provided the results of the analysis of socio-economic and demographic data, and analysis of the data on the four key variables of communication, pharmacy personnel knowledge and uptake of generics. The latter analysis was done using inferential statistical tests in line with the hypothesised relationships, which results of three hypotheses were statistically significant at $\alpha = .05$, while two were not.

The relationship between communication and uptake of generics was significant. Pharmacy personnel knowledge had a significant effect on the uptake of generics; not so consumer preference, but the insignificance was marginal. The interaction effect of communication and pharmacy personnel knowledge was non-significant, while the interaction effect of communication and consumer preference was significant. The chapter has also presented a discussion of the key findings. The next chapter provides a summary of the findings and conclusion, theoretical implications, recommendations for policy and practice, and highlights suggested areas for further study.

CHAPTER FIVE: DISCUSSION OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

The broad objective of this study was to establish the moderation effect of pharmacy personnel knowledge and consumer preference on the relationship between communication and uptake of generic medicines in Njiru Sub-County, Nairobi. This chapter summarises the major findings of the study, gives conclusions, discusses the theoretical implications, and provides recommendations and suggested areas for further research.

Five specific objectives were formulated for the study. The first objective sought to establish the relationship between communication and the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi. The second objective was to assess the effect of pharmacy personnel knowledge on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

The third objective was to determine the effect of consumer preference on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi. The fourth objective aimed to evaluate the interaction effect of communication and pharmacy personnel knowledge on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi. The last objective was to establish the interaction effect of communication and consumer preference on the uptake of generic medicines in retail pharmacies in Njiru Sub-County, Nairobi.

5.1 Summary of the Findings

The study established that most of the pharmacies surveyed had been in operation for either 6-9 years (49.5%) or 2-5 years (45.3%). Majority (65.8%) of them stocked both conventional and specialty medicines, with 59.1% having a below KES 1,000,000 annual turnover.

All the five constructs (variables) expressed in the Diffusion of Innovations theory play a role in the adoption of the practice of prescribing generic alternatives to innovator brands of medicine. Similarly, attitude and norms/standards, the constructs in

the TPB, influence the willingness of the pharmacies (pharmacists, pharmacy technologists/technicians or pharmacy assistants) to prescribe generic drugs. Such willingness also differed by level of education.

Cross-selling options (specific information on specific generic alternatives on receipts and invoices) was the most commonly used channel to advertise/promote generics, followed by interpersonal communication, and customised brochures and pamphlets.

The pharmacies applied some extent of advertising/promotion of generics, with the relatively younger ones doing more advertising/promotion.

There were positive significant correlations between two of the three tested variable pairs. Communication (quality of communication, multimodal communication and frequency of communication) was significantly correlated with the uptake of generics. Pharmacy personnel knowledge had a significant relationship with uptake of generics. Consumer preference did not have a significant relationship with the uptake of generics, but the relationship was positive. Retail pharmacies as dispensers and sellers of medicine are critical components of healthcare.

The highest correlation was observed in the relationship between communication and uptake of generics, which means that increased appreciation of the value of quality, multimodal and frequent communication could increase the utilisation of generics in retail pharmacies in Njiru Sub-County.

Pharmacy personnel knowledge, measured in terms of knowledge of the value of quality- related issues, efficacy-related issues, therapeutic expertise, understanding of drug identity, and understanding of critical industry dynamics, is important in the uptake of generics, for such knowledge determines pharmacy personnel's attitude and willingness to prescribe or substitute generics as the case may be.

Consumer preference, in this study considered as preference based on perceived efficacy of generics, perceived quality, and perceived cost, strong association with an innovator brand, risk aversion, and competition, was observed to be a key determinant of uptake of generics, too. The overall result was not statistically significant, though.

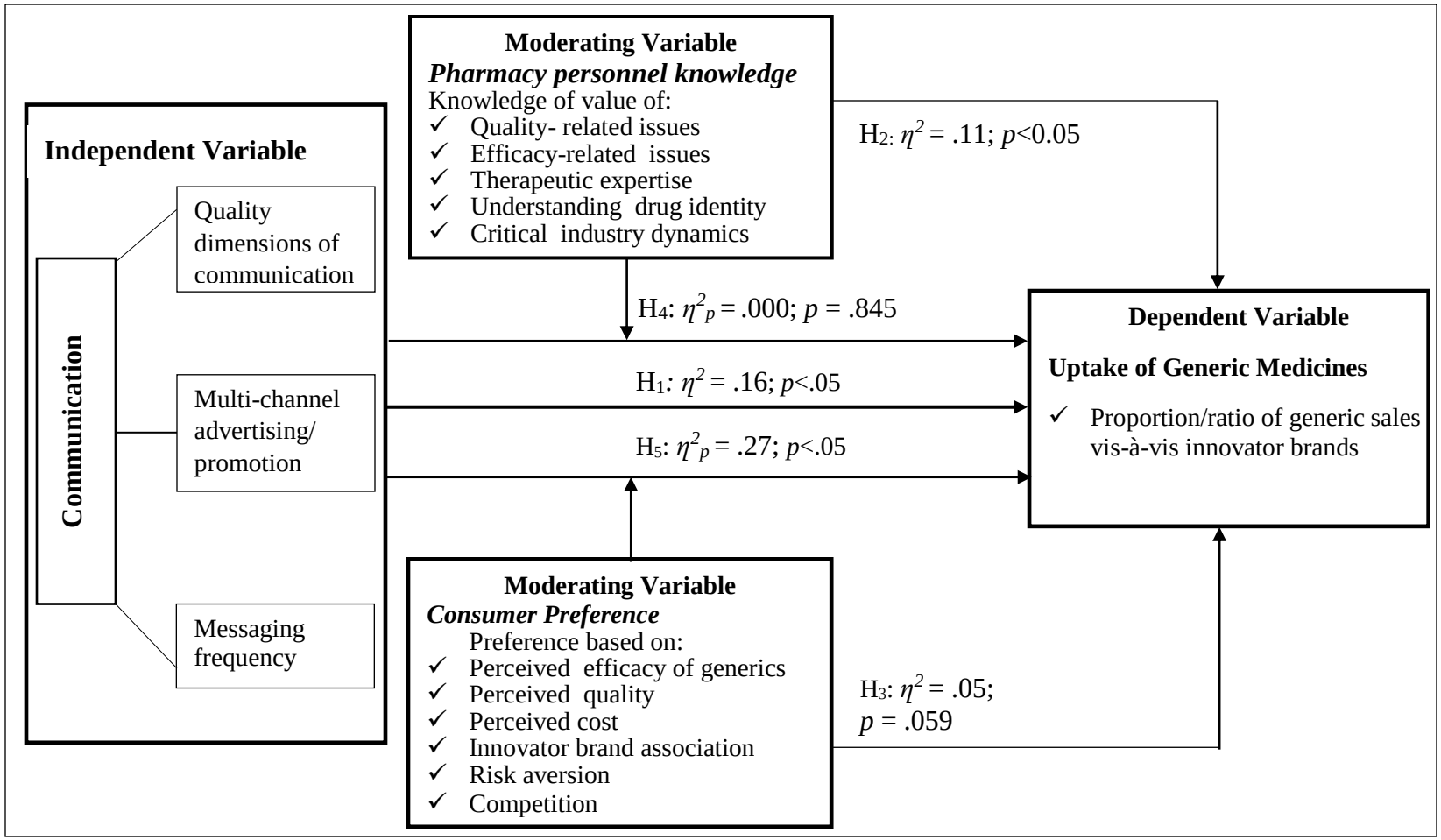
The complementary role of pharmacy personnel knowledge in an interaction effect with communication on the uptake of generics was only partly demonstrated

through the individual main effect but not the overall effect of the interaction term. Consumer preference was notably significant in its interaction effect with communication on the uptake of generics. Interaction effect is considered to have taken place where the result of the multiplicative term is statistically significant.

Based on these results, the conceptual diagram, Figure 5.1, is re-presented to account for each of the effects and significance in the postulated relationships.

Figure 5.1

Conceptual Framework Adjusted for Empirical Findings



Source: Primary Data (2021)

Figure 5.1 indicates statistically significant results for the relationship between communication and uptake of generics, and between pharmacy personnel knowledge and uptake of generics ($p<.05$). The relationship between consumer preference and uptake of generics is not statistically significant, but it is close ($p = .059$).

The interaction effect of communication and pharmacy personnel knowledge on the uptake of generics is not statistically significant ($p = .845$). The interaction effect of communication and consumer preference on the uptake of generics is statistically significant ($p<.05$).

There is also relevant complementary effect size statistic, η^2 / η^2_p. The change (Δ) in effect size (η^2) between the individual effect of communication (.16) and that in its interaction with pharmacy personnel knowledge is -.16 (.000 -.16), while between the individual effect of pharmacy personnel knowledge and its interaction with communication the Δ is - .11 (.000 - .11). The change (Δ) in effect size (η^2_p) between individual effect of communication and that in its interaction with consumer preference is .11 (.27 -.16), while the Δ in effect size (η^2_p) between the individual effect of consumer preference and that in its interaction with communication is .22 (.27 - .05).

5.2 Conclusion

There is a strong indication that communication (quality communication, multimodal communication and frequency of communication) is very closely associated with uptake of generics (proportion of generic sales vis-à-vis innovator brands), and thus a very strong predictor of the same. It predicts uptake of generics individually or in an interaction with either pharmacy personnel knowledge or consumer preference. Pharmacies are making deliberate efforts to communicate with consumers through different channels, and frequently. Such communication is reinforcing or reaffirming their belief in communication as a necessary means of creating interest in generics, and the motivation to purchase; and hence enhancing their willingness and ability to prescribe them.

Consumers have a big say in whatever medications they demand from the pharmacies and must therefore be taken seriously and persuaded on the quality and efficacy of generics so that they can develop more interest in and purchase these medicines for the

obvious advantages, including availability and low cost. Their interest, however, is greatly influenced by pharmacy personnel's knowledge, since in many cases pharmacy personnel act as advisors on prescriptions and even substitute prescriptions hence the slightly less significant result.

Pharmacy personnel's knowledge is immensely valuable, for it determines their disposition, negative or positive, towards generics. Where pharmacy personnel knowledge of the relevant issues of concern on the quality, efficacy and identity of generics goes up, there is high potential to consider generics more favourably. Conversely, lack of understanding of the value of these issues in the context of motivation and intent to prescribe or substitute for generics leads to a negative attitude and inability to prescribe these drugs. Though apparently insignificant where communication is also involved, perhaps due to the latent effect of attitude, pharmacy personnel knowledge is important, for it plays a complementary role in how communication affects consumers' willingness to purchase generic alternatives as opposed to branded medicine.

The constitutive elements in the conceptual framework have been portrayed therefore in their respective hypothesised relationships, with three hypotheses being supported and two rejected. The choice of the elements and the associated postulations is therefore validated.

Communication is significantly linked to uptake of generics. Pharmacy personnel knowledge significantly affects the uptake of generics. The effect of consumer preference on the uptake of generics is not statistically significant, although the insignificance is marginal.

Pharmacy personnel knowledge interacts with communication to affect the uptake of generics, but the effect is not significant. Consumer preference interacts with communication to affect significantly the uptake of generics.

5.3 Theoretical Implications

The postulations in the conceptual framework support the findings in previous literature that communication on the quality and efficacy of generics is important because it has a direct effect on their utilisation by consumers. Lack of communication on these medicines, on the contrary, drives the negative perception that they are of poor quality and less efficacious than innovator brands (Mukherji, 2012; PwC, 2012; PwC, 2017). Although such literature does not look at communication specifically as having a direct link to the uptake of the medicines, lack of it or its underutilisation is implied through the predominantly negative perception of these medicines, despite their biosimilarity to innovator brands. Previous studies have considered dimensions of multi-channel advertising and promotion and messaging frequency as critical to effective communication (Mukherji, 2012; PwC, 2012; Zizka, 2014; Fill & Jamieson, 2014; PwC, 2017).

No previous study suggests the existence of a moderating factor on the relationship between communication and uptake of generic medicines, though. The individual effect of pharmacy personnel knowledge and consumer preference is explored in varied literature. For example, pharmacy personnel's knowledge or their appreciation of the value of understanding of quality-related issues, efficacy-related issues, therapeutic expertise, drug identity, and critical industry dynamics is highlighted as one of the factors driving pharmacy personnel's perception of quality of generics. That it drives their affinity towards prescription or substitution of generics is therefore not in doubt (WHO 2011; Patel et al., 2012; PwC, 2012; Bateman, 2014; Colgan, 2015; PwC, 2017).

Regarding consumer preference, available literature explores such preference in the context of perceived quality, perceived efficacy, cost, as well as strong association with an innovator brand, risk aversion and competition (Carroll & Wolfgang, 1988; Gaither et al., 2001; Bateman, 2014).

The interaction effect of communication, pharmacy personnel knowledge and consumer preference on the uptake of generics is not tested in any previous study, certainly not inferentially. However, they can be inferred from the indirect or implied effects of each one of them firstly on effectiveness of messaging generally, and secondly,

on the adoption of generics (Gather & Keeling 2000; Gaither et al., 2001; Corcoran, 2007; Voicu, 2008; Bateman, 2014; CRH, 2018; Skarbaliene et al., 2019).

The findings of this study thus create new information on the direct effect of communication on the adoption of generics, as well as the moderating effect of pharmacy personnel knowledge and consumer preference on this link. Therefore, the study points to the need for more nuanced conceptualisation of supply- and demand-end factors for the adoption of generics. Importantly, besides adding to what literature exists on perception and adoption of generics, it breaks new ground because it creates an empirical basis for the argument that these three factors are critical in the adoption of generic medicines.

5.4 Recommendations

Health is a pillar in the development agenda of the Kenya government, which has provision of universal health coverage as a key aspiration. Access to healthcare therefore is contiguously linked to access to quality, efficacious, safe and affordable medicine at both public and private health facilities and medicine outlets. Policy makers could help increase the uptake of generics by putting in place demand-side policies whose objective would be to increase positive knowledge and enhance perceptions among physicians/clinicians, pharmacy personnel and patients or their representatives of generics. Practitioners, too, could pick a few points from the current study findings.

Regarding communication, for policy makers, the first thing is to have a plan to aid in the implementation of the existing policy guidelines on advertising and promotion of medicines by creating awareness among pharmacy personnel, and so encourage them to take advantage of the opportunity to advertise/promote generics as a viable cost-saving alternative to innovator brands. Second, there should be training of pharmacy personnel on essentials of therapeutic principles and communication to enhance their ability to apply the right mix of communication strategies to promote the use of generics. Creating awareness on regulation of medicines could be enhanced to make the public trust generic medicines more. Last, there is need for measures to ensure continuous implementing of feedback from generics dispensers by prescribers through an effective communication loop.

For practitioners, especially pharmacy personnel, studies have shown that effective communication is based on a number of essentials, which can be subsumed under quality communication, multimodal communication and frequent communication. The findings of the current study have demonstrated that quality communication measured in terms of planned, relevant, concise, comprehensive, communication can lead to increased adoption of generics. Communication tools such as providing specific information on invoices about generics, and interpersonal communication (e.g., face-to-face interaction, focus group discussions), issuance of brochures and pamphlets, and increasing the frequency of such communication can lead to increased uptake of generics. Putting considerable effort in the use of social media platforms to promote generics is also potentially beneficial, since the mode remains largely underutilised.

On pharmacy personnel knowledge, several previous studies have established a link between practitioner (especially doctor) knowledge and adoption of generics (WHO 2011; Patel et al., 2012; PwC, 2012; Bateman, 2014; Colgan, 2015; Patel & Paras, 2016). None, however, has considered pharmacy personnel knowledge as a factor in the adoption of generics. The current findings indicate that improving pharmacy personnel's knowledge towards generics could increase their uptake. Therefore, it urges for enhanced pharmacy personnel knowledge as a way of cultivating a positive attitude informed by positive perception of quality, efficacy and cost (low cost) of generics as this could potentially increase the prescription and substitution of generics and hence their uptake.

Pertaining to consumer preference, previous literature (WHO, 2011; Patel et al., 2012; Bateman, 2014) has dealt with the factor and its direct effect on adoption of generics. The current study findings show that perception of drug quality, efficacy, cost, strong association with an innovator brand, risk aversion and competition largely inform their preference and affect the adoption of generics.

Therefore, pharmacy personnel should make concerted communication efforts to improve consumer perception. This could greatly improve the uptake of these medicines from the current 30% (in the country) to a more desirable rate. Besides, it would directly empower consumers, most of whom are victims of catastrophic expenditure, to make better choices of pharmaceutical spending through dissemination of information on the

options of medicines available and general cost differential in a data-driven and effective way.

Consumer preference, too, is a key driver of acceptance of generics in retail pharmacies; thus, policies targeting medical insurance schemes could be formulated too to encourage generic substitution by offering incentives to prescribers in both government and private health facilities. This would improve consumer (patient or representative) perception based on the parameters of perceived efficacy, quality, cost and safety. Properly implemented, such evidence-based pro-poor access to medication policy options targeting generics have the benefit of cost-savings and reducing the burden of healthcare financing, especially since the expected government contribution to vaccines, anti-malarial and TB drugs, and ARVs increased from 5% to 20% in 2006 (Njuguna & Wanjala, 2019). The benefit of reduced cost of medication could spill over to other diseases and conditions.

The net effect of the spillover would be an improvement of the health status of the citizens, something that is particularly important because the availability of generic medicines in Kenya, more so from 2001, has driven down the prices of HIV, TB and malaria treatment significantly, cutting it by about 80% (Azavedo, 2017).

With regard to communication and pharmacy personnel knowledge, the study recommends that pharmacy personnel endeavour to enhance their knowledge of issues relating to bioequivalence of generics, for this is crucially important in developing a positive attitude towards prescription and prescription substitution. The result would be knowledge-based, informed communication. Besides, to the extent that pharmacy personnel play a big role in shaping consumer perception by reassuring them of the safety, quality and efficacy of generics, and guiding their decisions, a good understanding of generics (and related issues) is very critical (Hasali et al., 2012). Such understanding relates also to issues that affect the overall acceptability of these drugs by both pharmacy personnel and consumers. Suffice it to say then that insufficient knowledge of issues around bioequivalence of generics can potentially diminish the outcome of communication, however well intended.

Knowledge, as Patel and Paras (2016) observe, corresponds to greater adoption of generics. Knowledge alone is not enough, though. There must be a corresponding shift in

attitude. Further, since the current study shows that pharmacy personnel's knowledge of the issues around generic medicines in and of itself does not guarantee effective communication on the medicines, focus also needs to be on attitude shift towards the positive.

On communication and consumer preference, it is important for pharmacy personnel to understand that consumer preference for brand name or generic medicines can affect the value of what they are communicating. This is especially significant since consumers may have strong association that is not severable with certain brand name medicines. Consequently, they should understand how best to approach these consumers with the information they have on generic alternatives to increase the chances of them opting for such alternatives.

No previous study examines the relationship between communication and uptake of generics, accounting for the effect of consumer preference. The findings of the current study, however, have demonstrated the need for pharmacy personnel to take cognisance of the issues that drive preference for brand-name medicines, including perceived efficacy of generics, perceived quality, perceived cost, association with an innovator brand, and risk aversion. Then, they should communicate to consumers on these issues in a way that allays the concerns they have, while emphasising the value of and encouraging them to adopt generic alternatives.

5.5 Suggested Areas for Further Study

The variables considered in the study did not include prescription and its possible effect on the adoption of generics. Prescription by a healthcare provider is an important determinant of the type of medicine a consumer asks for at a retail pharmacy; thus, it would either directly affect adoption of generics or moderate the effect of any factor on this criterion. Future studies could consider including prescription in a main effect or moderating role.

Conceptualisation of consumer preference from the perspective of pharmacy personnel may not be entirely exhaustive as it focuses only on one side of the demand-end of generic medicines supply chain. Future studies could consider looking at

consumer preference from the point of view of the consumers themselves to provide a different perspective and more insights into the adoption of generics.

Lastly, there is need for future studies to establish the reason for the lack of significance and effect of the interaction of communication and pharmacy personnel knowledge and the insufficient power despite there being a large enough sample size (N = 121).

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APPENDICES

Appendix 1: Questionnaire

Introduction

My name is John Winjah, a postgraduate student of Communication Studies at the School of Journalism and Mass Communication, University of Nairobi. I am doing a study on the *"The Effect of Communication, Pharmacy Personnel Knowledge and Consumer Preference on the Uptake of Generic Medicines in Retail Pharmacies in Njiru Sub-County, Nairobi"* You have been selected to provide data to make this study successful. Therefore, you are requested to fill out this questionnaire to the best of your knowledge and as truthfully as possible.

The data you provide will be handled confidentially and used only academically in aggregate form without any reference to you. Therefore, you are not required to write your name, unless you do so voluntarily, but it will not appear in the final report.

You may ask for the final report once it is ready.

Your cooperation is highly desired and much appreciated.

Important Instructions

1. This questionnaire contains nine (9) sections: A, B, C, D, E, F, G, H & I; please complete all.
2. Kindly use the accompanying instructions to complete each section.

Thank you in advance

SECTION A: SOCIO-ECONOMIC AND DEMOGRAPHIC INFORMATION

Please tick [√] once to respond to each of the questions below

1. Gender: Male [ ] Female [ ]
2. Age bracket: Below 20 years [ ] 21-30 years [ ] 31-40 years [ ] 41-50 years [ ] 51-60 years [ ] Above 60 years
3. Level of Education: Certificate [ ] Diploma [ ] Bachelor's Degree [ ] Masters Degree [ ] PhD [ ]
4. Type of Pharmacist: Clinical Pharmacist [ ] Poisons Pharmacist [ ] Industrial Pharmacist [ ]
5. Position: Pharmacist [ ] Pharmacy Technologist/Technician [ ] Pharmacy Assistant [ ]

6. Duration of service: Below 1 year [ ] 1-2 years [ ] 3- 4 years [ ] 5-6 years [ ] Above 6 years [ ]
7. Type of Pharmacy: Government [ ] Private Pharmacy [ ]
8. Age of operation: 2-5 years [ ] 6-9 years [ ] 10 years and more
9. Type of medicine stocked: Conventional medicine [ ] Specialty medicine[ ] Both conventional and specialty medicine [ ]
10. Annual turnover: Below 1,000,000 [ ] 1,000,001-2,000,000 [ ] 2,000, 001-3,000,000 [ ] 3,000,001-4,000,000[ ] Above 4,000,000 [ ]

SECTION B: CHARACTERISTICS OF INNOVATIONS

11. To what extent does each of following determine your willingness to dispense generic medicines? Tick [√] once for each statement

Innovation Characteristics	Not at all	To Some Extent	Moderate Extent	To a Great Extent	To a Very Great Extent
Innovation's advantage over innovator brands					
Acceptability of alternatives in the healthcare industry					
Ability to determine quality generics determined from patient response					
Ability to evaluate health outcomes with ease					
How possible it is to substitute an innovator brand with a generic					

SECTION C: CHANGE ADOPTION PATTERNS

12. Tick [√] one of the following statements to show how you respond to changes in the pharmaceutical industry
    a) I am always ready to test new generic entrants into the market provided scientific peers have endorsed them [ ].
    b) Although I accept generics as effective, it makes more sense to adopt them only after I have carefully calculated the opportunity cost of doing so [ ].
    c) My adoption of generics largely depends on the evidence of their relative performance in the market, and what people say about their efficacy and safety [ ].

d) I accept generics but wait until nearly the entire community has accepted them before they can make therapeutic sense to me [ ].
e) The quality and safety of generics are often in doubt, and so I will just wait and see; it may not be worth the trouble after all [ ]

SECTION D: ATTITUDES, PERCEPTION, NORMS/STANDARDS & DRUG PREFERENCE

13. To what extent do you think individual attitude and perception of drug quality; safety and cost, industry standard, and cultural context affect the choice between generic and innovator brands? Tick [√] once. Scale ranges from 1= Not at all to 5 = Very Great Extent

1 Not at all	2 Some Extent	3 Moderate Extent	4 Great Extent	5 Very Great Extent

SECTION E: PROMOTIONAL ADVERTISING OF GENERICS

14. To what extent does your pharmacy advertise generic medicines? Scale ranges from 1 = Not at all to 5 = Very Great Extent. Tick [√] once

5 Very Great Extent	4 Great Extent	3 Moderate Extent	2 Some Extent	1 Not at all

15. What channels does your pharmacy use to advertise and promote generic medicines?

Media Channel	Tick [√] as many as apply
Social media networks (e.g. google+, Instagram, Pinterest, Facebook, Twitter)	
Traditional media adverts (TV Adverts, Radio Adverts, Newspaper /Mag Adverts)	
Interpersonal communication methods (e.g., face-to-face interaction, focus groups)	
Customized brochures, pamphlets, etc.	
Cross-selling options (specific information on specific generic alternatives on receipts and invoices)	

SECTION F: COMMUNICATION (PERCEIVED VALUE)

16. Please rate the following statements relating to dimensions of Perceived Value of Communication. Tick [√] once for each statement. The scale ranges from 1 Strongly Disagree to 5 Strongly Agree

Dimensions of Perceived Value of Communication	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Quality Communication Prior planning of the message is appropriate for effectively communicating about generics					
Knowing the objectives of what they are communicating enables pharmacists to arrange the message appropriately					
Well organised & relevant messages help build customer interest in generic medicines					
Completeness of the message makes it possible for the customer/patient to fully understand the message					
Accuracy and relevance is important for the pharmacist to clearly convey the message					
Giving room for feedback makes it possible for the pharmacist to best reach the consumer/patient					
Using appropriate language with clear, simple and unambiguous words aids in effectively communicating to customers on the importance of generic medicines					
It is important for pharmacists to consider the customer's/patient's knowledge, ability to understand, and background to communicate effectively on generic medicines					
The use of appropriate oral or written media that takes into account the receiver's needs, availability of time, cost, receivers ability to understand is critical for communicating messages on generic medicines					
Multichannel Advertising and promotion					
Application of social media networks (e.g., google+, Instagram, Pinterest, Facebook, Twitter) is an important avenue for creating awareness on generic medicines					

Dimensions of Perceived Value of Communication	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Traditional media adverts (Print, TV & Radio) are effective ways of providing information on generic drugs					
Face-to-face interaction holds great potential for increasing the demand for generic medicines					
Use of customised brochures, pamphlets, etc. is a good way of informing customers about the availability of generic medicines in a pharmacy					
Cross-selling options like specific information on specific generic alternatives on receipts and invoices can also aid in communicating about generic medicines					
Frequency of Communication					
Frequently communicating on generic medicines available in the pharmacy helps to spark interest in consumers					
Frequently communicating in traditional media (e.g., radio, television & newspapers) can lead to increased utilisation of generics					
Frequent communication through social media networks (e.g., google+, Instagram, Pinterest, Facebook, Twitter) can create awareness on generic medicines					
Frequently applying cross-selling options like specific information on specific generic alternatives on receipts and invoices can aid in communicating about generics					
Frequent use of customised brochures, pamphlets, etc. is useful for informing customers on the availability of generics					

SECTION G: PHARMACY PERSONNEL/ RETAILER KNOWLEDGE

17. The statements below relate to the extent to which pharmacy personnel knowledge affects the utilisation of generic drugs. Tick [√] once for each statement. Scale: 1 = Strongly Disagree to 5 = Strongly Agree

Dimensions of Pharmacist/Retailer Knowledge	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Pharmacy personnel's understanding of the usefulness of the drug—pharmacological properties of the compound—increases the likelihood of prescribing it.					
Understanding a generic drug's identity and biosimilarity to innovator brand affects a pharmacy personnel's willingness to prescribe generics.					
Prescription of generics leads to a reduction of the overall cost of healthcare.					
A pharmacy personnel's understanding of the unique selling point of a generic drug influences his/her ability to prescribe the drug.					
A pharmacy personnel's understanding of how many other treatment options exist for a patient increases the likelihood of prescribing a generic drug.					
A pharmacy personnel's understanding of the perceived utility of a generic drug among healthcare payers and providers increases the likelihood of prescribing it.					
Application of therapeutic expertise is critical in assessing whether to prescribe branded or generic options.					
A pharmacy personnel's understanding of which generic alternatives to stock is critical for the adoption of these drugs.					
Knowledge of pricing differential of different treatment options and medicines, and the existing social norms affects a pharmacy personnel's willingness to prescribe generic drugs					
A pharmacy personnel's understanding of market dynamics, e.g., market share increases their likelihood of prescribing generic medicine					

A pharmacy personnel's knowledge of the difference between perceived and real drug quality increases their chances of prescribing generic alternatives					
A pharmacy personnel's understanding of the benefits & risks associated with a particular drug or therapy may determine prescription of generics					

SECTION H: CONSUMER PREFERENCE

18. Please rate the following statements relating to dimensions of Consumer Preference. Tick [√] once for each statement. The scale ranges from 1 = Strongly Disagree 5 = Strongly Agree

Dimensions of Consumer Preference	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Consumer perception of the efficacy of a particular generic drug influences pharmacy personnel's ability and willingness to prescribe it.					
Consumer perception of the effectiveness of a particular generic drug influences pharmacy personnel's ability and willingness to prescribe it.					
Consumer perception of the safety of generic drugs affects a pharmacy personnel's ability to prescribe it.					
Consumer perception of the cost of generic drugs influences a pharmacy personnel's ability to prescribe it.					
Consumer self-reported willingness to use a particular generic drug affects the pharmacy personnel's ability to prescribe it.					
A consumer's strong liking for an innovator brand may make it hard to prescribe a generic alternative					
Risk-aversion of particular consumers in relation to perceived quality influences a pharmacy personnel's ability to prescribe a generic drug					
Consumer positive response to brand positioning and advertising affects the preference for generics					

Societal norms affects consumer perception of efficacy, safety and quality and thus the uptake of generics					
Competition between brand-names and generics affects the uptake of generics due to cost differential					

SECTION I: PERFORMANCE, 2019-2020

PROPORTION/RATIO OF SALES OF GENERICS VERSUS INNOVATOR BRANDS (%)

19. Tick [√] one of the options below to indicate the proportion/ratio of sales by percentage generic medicine in your pharmacy in the last one year (calculated vis-à-vis innovator brands sold)

1-20%	21-40%	41-60%	61-80%	81-100%

Appendix 2: Test of ANOVA Assumptions

Additional reporting on the homogeneity of valiance/equality of population variance test for the relationship between communication and uptake of generics, Table A2.1, A2.2 & A2.3

Table A2.1: Communication and Uptake of Generics

Robust Tests of Equality of Means				
Proportion of Generic Medicine				
	Statistic[a]	df1	df2	Sig.
Welch	.568	2	2.580	.624
a. Asymptotically F distributed.				

Table A2.2: Pharmacy Personnel Knowledge and Uptake of Generics

Robust Tests of Equality of Means				
Proportion of Generic Medicine				
	Statistic[a]	df1	df2	Sig.
Welch	.637	2	4.962	.567
a. Asymptotically F distributed.				

Table A2.3: Consumer Preference and Uptake of Generics

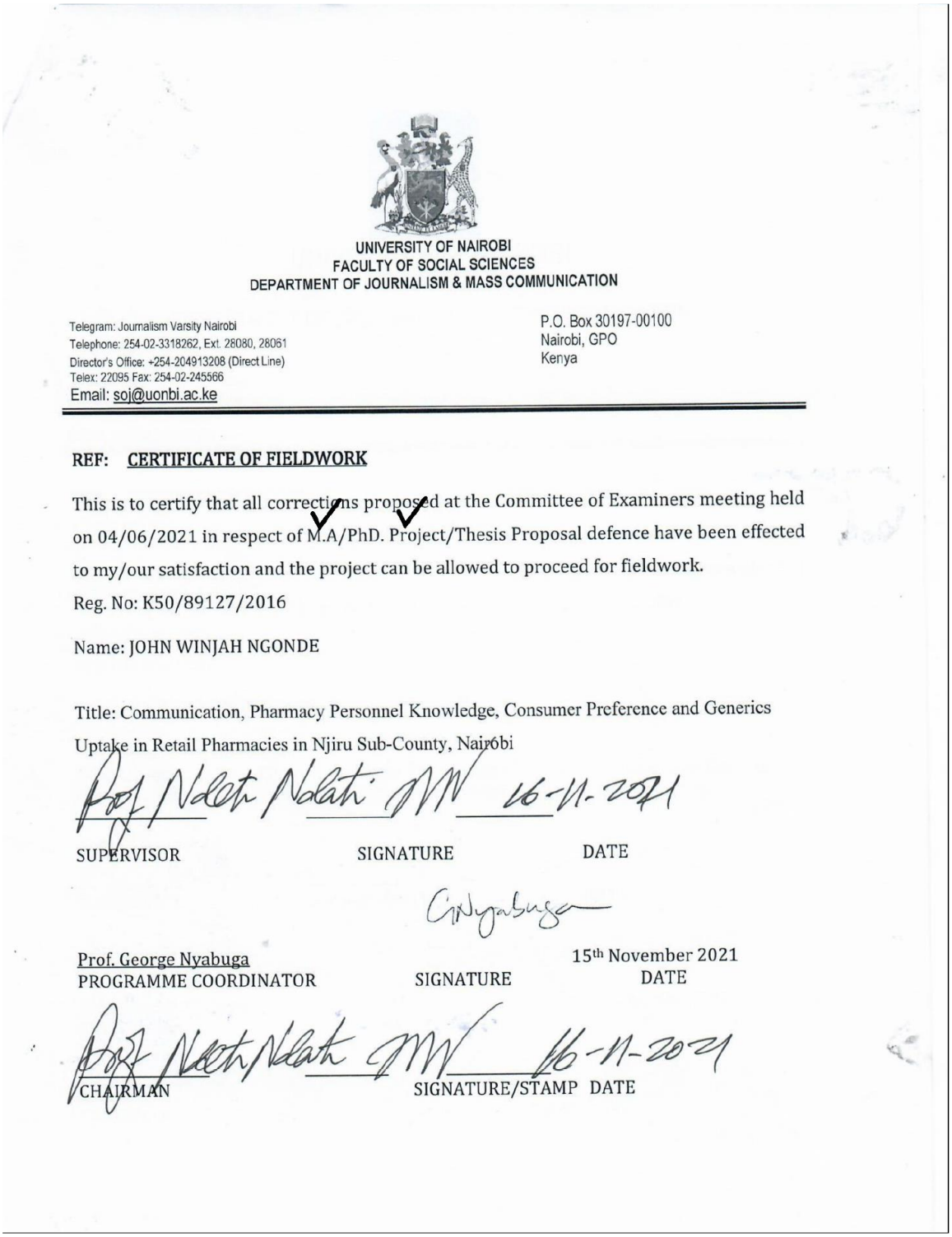
Robust Tests of Equality of Means				
Proportion of Generic Medicine				
	Statistic[a]	df1	df2	Sig.
Welch	.571	2	11.815	.580
a. Asymptotically F distributed.				

Appendix 3: Work Plan

Table A3.1: Activity-Time Breakdown

Activity	Timeline											
	Jan, 2020	Feb, 2020	March, 2020	April, 2020	May, 2020	June, 2020	July, 2020	August, 2020	February, 2021	March, 2021	April-June, 2021	Nov, 2021
Proposal writing												
Proposal Defense												
Data Collection												
Data Cleaning												
Data Entry, Analysis & Interpretation												
Final Defense												
Binding & Submitting Final Copy												

Appendix 4: Certificate of Fieldwork



UNIVERSITY OF NAIROBI
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF JOURNALISM & MASS COMMUNICATION

Telegram: Journalism Varsity Nairobi
Telephone: 254-02-3318262, Ext. 28080, 28061
Director's Office: +254-204913208 (Direct Line)
Telex: 22095 Fax: 254-02-245566
Email: soj@uonbi.ac.ke

P.O. Box 30197-00100
Nairobi, GPO
Kenya

REF: CERTIFICATE OF FIELDWORK

This is to certify that all corrections proposed at the Committee of Examiners meeting held on 04/06/2021 in respect of M.A/PhD. Project/Thesis Proposal defence have been effected to my/our satisfaction and the project can be allowed to proceed for fieldwork.

Reg. No: K50/89127/2016

Name: JOHN WINJAH NGONDE

Title: Communication, Pharmacy Personnel Knowledge, Consumer Preference and Generics Uptake in Retail Pharmacies in Njiru Sub-County, Nairobi

Prof Ndeti Ndati 16-11-2021

SUPERVISOR SIGNATURE DATE

G Nyabuga

Prof. George Nyabuga
PROGRAMME COORDINATOR SIGNATURE 15th November 2021 DATE

Prof Ndeti Ndati 16-11-2021

CHAIRMAN SIGNATURE/STAMP DATE

Appendix 5: Letter of Introduction from the University of Nairobi

UNIVERSITY OF NAIROBI
COLLEGE OF HUMANITIES & SOCIAL SCIENCES
SCHOOL OF JOURNALISM & MASS COMMUNICATION

Telegram: Journalism Varsity Nairobi
Telephone: 254-020-491 0000, Ext. 28080, 28061
Director's Office: 254-020 4913208 Direct Line)
Email: director-soj@uonbi.ac.ke

P.O. Box 30197
Nairobi.
Kenya

OUR REF:
YOUR REF:

DATE: 17th July, 2020

TO WHOM IT MAY CONCERN

RE: NGONDE JOHN WINJAH - K50/89127/2016

This is to confirm that the above named is a bonafide student at the University of Nairobi, School of Journalism and Mass Communication pursuing Master of Arts degree in Communication Studies.

The topic title of the study is "*The Effect of Pharmacist Knowledge and Consumer Preference on the Relationship between Perceived Value of Communication and Uptake of Generic Medicines in Government Pharmacies in Nairobi County*."

Mr. Ngonde has completed his course work and is currently going to collect data for his research project leading to a Master of Arts Degree in Communication Studies.

The data collection exercise is scheduled run from 20th July to 30th September, 2020, and involves collection of survey data from pharmacies in government health facilities in Nairobi County.

Any assistance accorded to him will be highly appreciated.

Wendy Cherono
Senior Administrative Assistant
School of Journalism & Mass Communication

Appendix 6: Research Permit from NACOSTI

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: 294293

Date of Issue: 12/August/2020

RESEARCH LICENSE

This is to Certify that Mr.. John Winjah Ngonde of University of Nairobi, has been licensed to conduct research in Nairobi on the topic: THE EFFECT OF PHARMACIST KNOWLEDGE AND CONSUMER PREFERENCE ON THE RELATIONSHIP BETWEEN PERCEIVED VALUE OF COMMUNICATION AND THE UPTAKE OF GENERIC MEDICINES IN GOVERNMENT PHARMACIES IN NAIROBI COUNTY for the period ending : 12/August/2021.

License No: NACOSTI/P/20/6167

294293

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

COUNTY COMMISSIONER
NAIROBI COUNTY
P. O. Box 30124-00100, NBI
TEL: 341666

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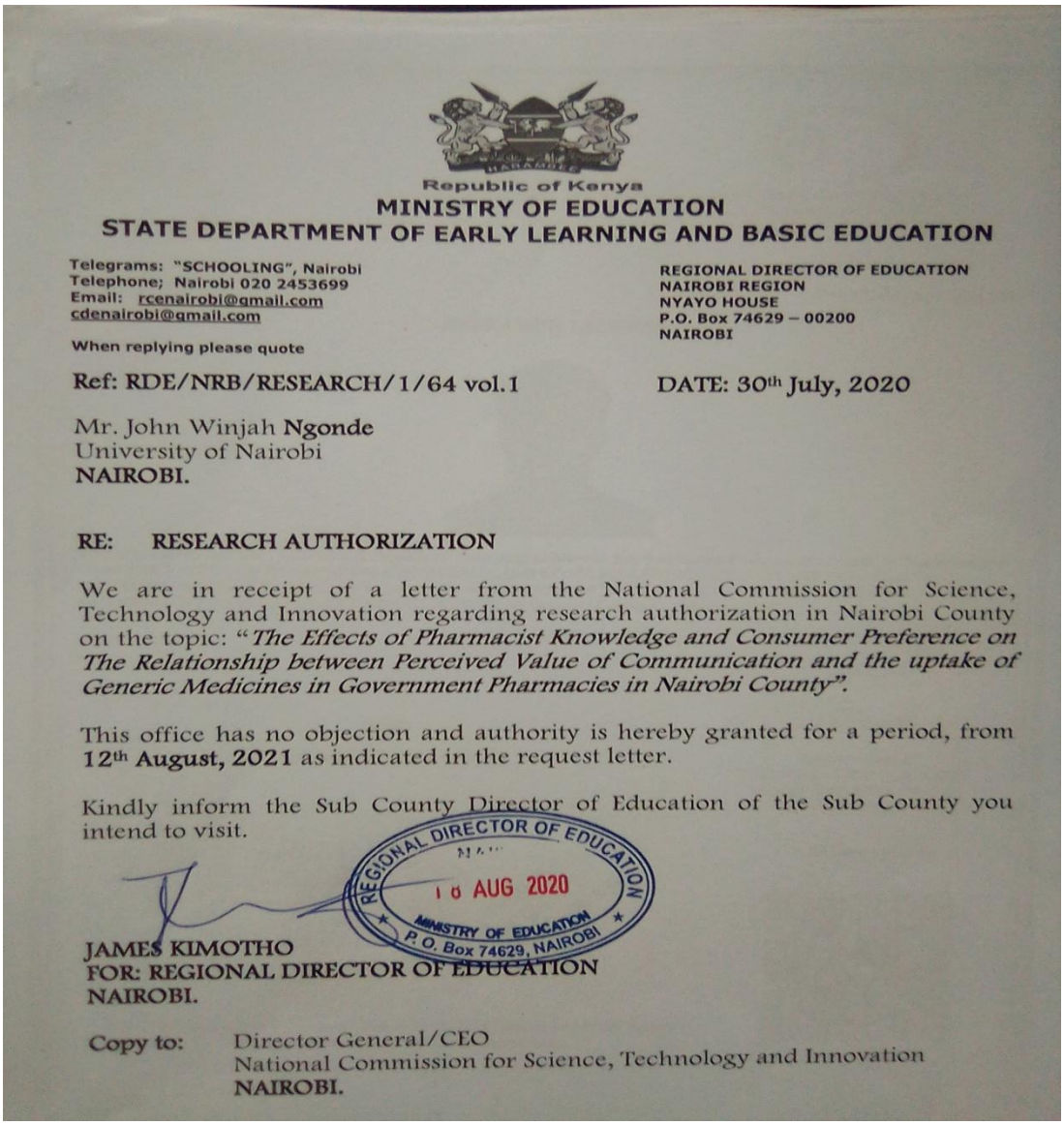
Appendix 7: Letter from the Ministry of Education



Republic of Kenya

MINISTRY OF EDUCATION

STATE DEPARTMENT OF EARLY LEARNING AND BASIC EDUCATION

Telegrams: "SCHOOLING", Nairobi
Telephone; Nairobi 020 2453699
Email: rcenairobi@gmail.com
cdenairobi@gmail.com

When replying please quote

REGIONAL DIRECTOR OF EDUCATION
NAIROBI REGION
NYAYO HOUSE
P.O. Box 74629 – 00200
NAIROBI

Ref: RDE/NRB/RESEARCH/1/64 vol.1

DATE: 30th July, 2020

Mr. John Winjah **Ngonde**
University of Nairobi
NAIROBI.

RE: RESEARCH AUTHORIZATION

We are in receipt of a letter from the National Commission for Science, Technology and Innovation regarding research authorization in Nairobi County on the topic: "*The Effects of Pharmacist Knowledge and Consumer Preference on The Relationship between Perceived Value of Communication and the uptake of Generic Medicines in Government Pharmacies in Nairobi County*".

This office has no objection and authority is hereby granted for a period, from **12th August, 2021** as indicated in the request letter.

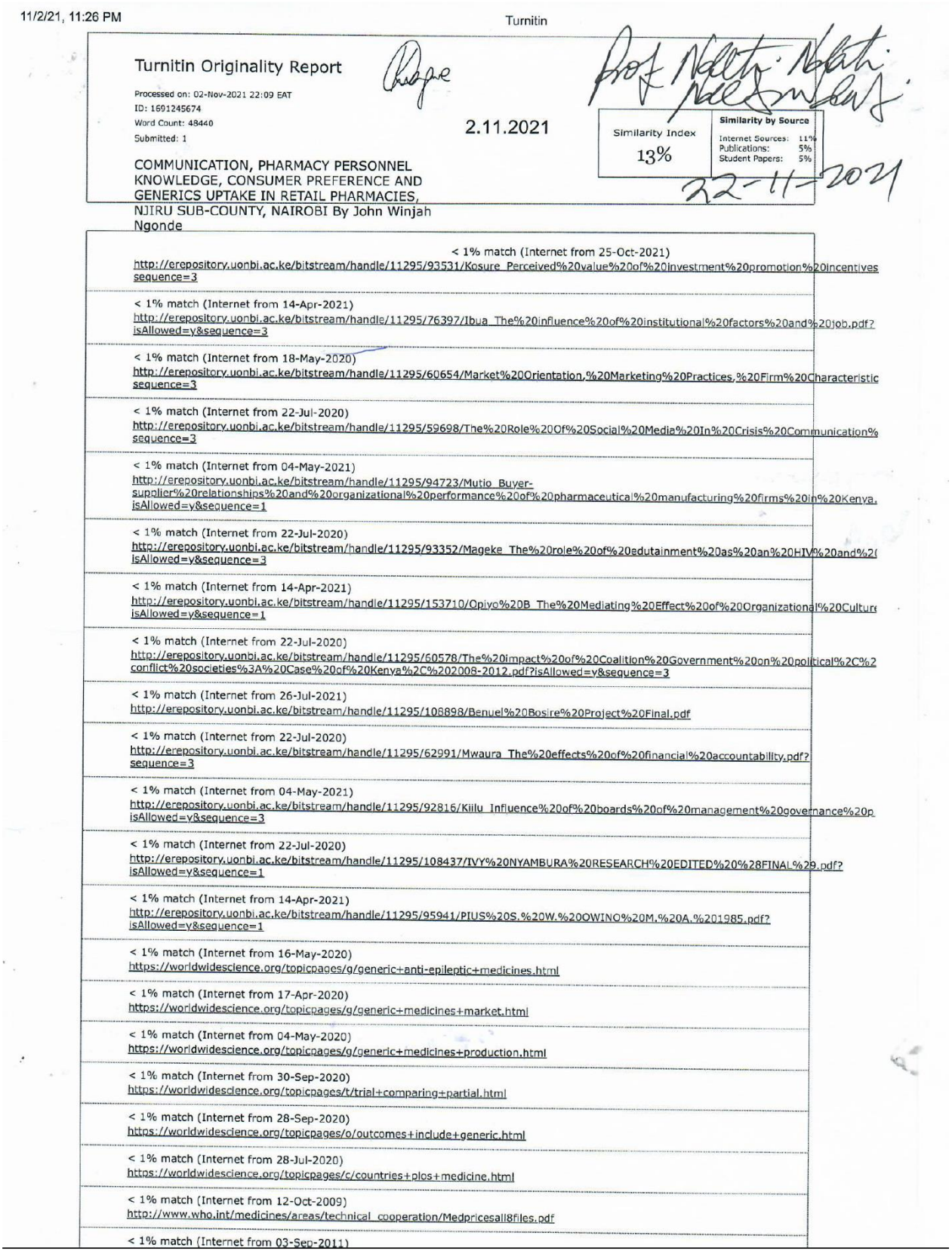
Kindly inform the Sub County Director of Education of the Sub County you intend to visit.

REGIONAL DIRECTOR OF EDUCATION
10 AUG 2020
MINISTRY OF EDUCATION
P. O. Box 74629, NAIROBI

JAMES KIMOTHO
FOR: REGIONAL DIRECTOR OF EDUCATION
NAIROBI.

Copy to: Director General/CEO
National Commission for Science, Technology and Innovation
NAIROBI.

Appendix 8: Turnitin Originality Report



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COMMUNICATION, PHARMACY PERSONNEL KNOWLEDGE, CONSUMER PREFERENCE AND GENERICS UPTAKE IN RETAIL PHARMACIES, NJIRU SUB-COUNTY, NAIROBI By John Winjah Ngonde

2.11.2021

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