

**ADOPTION OF GENERIC MEDICINE: PHYSICIANS'
PRESCRIPTION ATTITUDE AND PERCEIVED DRUG
IMPORTANCE AMONG PATIENTS**

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By

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2026

DECLARATION

I, hereby declared that the presented work in the thesis entitled “Adoption of Generic Medicine: Physicians’ Prescription Attitude and Perceived Drug Importance among Patients” in fulfilment of degree of **Doctor of Philosophy (Ph. D.)** is outcome of research work carried out by me under the supervision of Dr. Ashwani Panesar, working as Associate Professor, in the Department Of Management / Mittal School of Business of Lovely Professional University, Punjab, India. In keeping with general practice of reporting scientific observations, due acknowledgements have been made whenever work described here has been based on findings of another investigator. This work has not been submitted in part or full to any other University or Institute for the award of any degree.



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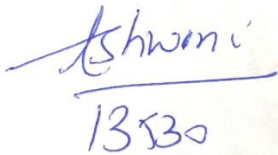
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Punjab, India

CERTIFICATE

This is to certify that the work reported in the Ph. D. thesis entitled “Adoption of Generic Medicine: Physicians’ Prescription Attitude and Perceived Drug Importance among Patients” submitted in fulfillment of the requirement for the award of degree of **Doctor of Philosophy (Ph.D.)** in the Department of Management / Mittal School of Business, is a research work carried out by Tekumalla Aditya Prasad (Registration No. 42100115), is Bonafide record of his/her original work carried out under my supervision and that no part of thesis has been submitted for any other degree, diploma or equivalent course.



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ABSTRACT

The study focused on the adoption of generic medicines, specifically examining the role of physicians' prescription attitudes and patients' perceived importance of these drugs. A descriptive research approach was adopted to address the study's objectives. Data was collected through questionnaires targeting physicians, pharmacists, and patients involved in the generic medicine adoption process. Two-stage systematic random sampling was employed for physicians and pharmacists, while two-stage convenience sampling was used for patient respondents.

The study revealed that knowledge factors significantly influence physicians' attitudes toward prescribing generics. Physicians with greater awareness of bioequivalence and safety standards are more inclined to recommend these medicines. Experience factors also play a crucial role, as personal interactions and patient feedback shape prescribing behaviours. Physicians with extensive hands-on experience and positive patient responses show a stronger preference for generics. Drug-related factors, such as perceived safety, efficacy, and cost-effectiveness, heavily impact physicians' attitudes. When physicians trust generics to be as safe and effective as branded drugs, they are more likely to prescribe them. Marketing factors have some influence; however, physician skepticism toward promotional efforts limits their overall effect. Business factors, including interactions with medical representatives and incentives, are less influential due to widespread skepticism surrounding these engagements.

The study explored the factors influencing the adoption of generic medicines, focusing on physicians, pharmacists, and patients. Physicians' awareness of the availability of generics, the reputation of pharmaceutical companies, and effective communication with medical representatives emerged as key factors. Ethical considerations and perceptions of quality also play a significant role. Physicians' beliefs regarding the safety, efficacy, and cost-effectiveness of generics strongly shape their prescribing behaviours, underscoring the need for thorough clinical and economic evaluations. Practical aspects of clinical practice, such as ease of prescription fulfilment, peer endorsement, and the availability of generics in the market, also influence their adoption. Patient advocacy and positive clinical outcomes further reinforce the use of generics. Knowledge factors, such as access to evidence-based literature and opportunities for continuous education, are crucial for increasing generic prescriptions. Promotional activities, including sponsored events and interactions with sales personnel, impact prescribing decisions; however,

excessive promotion can lead to resistance among physicians. These insights highlight the importance of balanced and credible promotional efforts to support the adoption of generics.

The study also found that business and drug-related factors significantly influence pharmacy operations. Economic and organizational elements, alongside drug characteristics such as safety and efficacy, are pivotal in shaping pharmacists' decisions. Pharmacists' experiences and knowledge are critical in determining their practices, emphasizing the need for ongoing education and training. However, these factors have minimal influence on patients' perceptions of generics, revealing a disconnect between pharmacy practices and patient observations. This gap may be attributed to external influences, such as media coverage and personal beliefs, which shape patients' views on generics. Financial incentives and trust in generic manufacturers are vital for pharmacists in selecting and promoting generic medicines. These incentives enhance the visibility and perceived value of generics. The study also identified the role of visual reminders in pharmacies, which positively impact dispensing behaviours by increasing awareness of generics. Overall, the findings emphasize the interconnected roles of knowledge, practical considerations, and trust in improving the adoption and acceptance of generic medicines among stakeholders.

The study further delved into the socio-demographic and behavioural characteristics of participating patients, revealing significant trends that influence the adoption of generic medicines. The majority of the patients surveyed were private employees, predominantly male, and aged between 21-40 years. These individuals are well-educated, with most holding postgraduate degrees, and primarily reside in urban areas. Their preference for generic medicines is evident, with a substantial proportion earning over Rs. 60,000 per month. This socio-economic profile reflects an intersection of higher education, urban living, and economic stability, all of which shape patients' preferences and behaviours toward healthcare and medication choices. Additionally, patients tend to purchase medicines primarily for acute conditions and rely on private healthcare centers, indicating their reliance on personalized and convenient medical care solutions.

Patient awareness emerged as the most influential factor in determining the perceived importance of generic medicines. Those with greater knowledge about generics are more likely to recognize their benefits, emphasizing the need for targeted educational initiatives. These efforts can address widespread misconceptions about generics and enable informed decision-making. Drug-related factors, including the effectiveness and safety of generics, also play a crucial role in building

patient trust and confidence. Positive personal experiences with generics further reinforce this trust, encouraging continued usage. Although marketing is less impactful compared to awareness and drug factors, it still shapes perceptions, underlining the need for thoughtful and well-targeted educational and promotional campaigns aimed at enhancing patient understanding and acceptance.

The acceptance of generics by patients is primarily driven by key attributes such as safety, affordability, and high-quality packaging, which collectively enhance their perceived value and utility. Recommendations from physicians significantly influence patient preferences, as patients tend to trust medications suggested by their doctors, particularly when their socio-economic conditions align with the cost-effectiveness of generics. Additionally, patients who proactively request cost-effective alternatives exhibit a greater likelihood of adopting generics. Pharmacists also play a vital role in this process by providing recommendations and educating patients about the efficacy and benefits of generics. Informed and proactive pharmacists contribute to building patient confidence, further encouraging the use of generics.

The study underscores the importance of socio-economic factors in mediating the adoption of generic medicines. Factors such as monthly income and occupation emerge as the most significant drivers, highlighting the critical role of economic stability in shaping patient choices. The place of residence also has a moderate impact, reflecting the influence of urban versus rural living conditions on healthcare access and preferences. Conversely, household size was found to have minimal influence on generic medicine adoption. The findings suggest that socio-economic factors have a slightly greater impact on patient decisions compared to physicians' attitudes, although both are crucial.

The study emphasizes the need to foster positive attitudes among physicians while simultaneously enhancing the perceived value of generics for patients and pharmacists. By addressing these factors holistically, healthcare stakeholders can significantly boost the adoption and acceptance of generics. Strategies such as improving awareness, promoting the affordability and quality of generics, and equipping pharmacists with the necessary knowledge can create a more favourable environment for their adoption. Ultimately, integrating these efforts with the socio-economic realities of patients and leveraging the trust they place in physicians can lead to a substantial increase in generic medicine usage.

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First and foremost, I would like to express my deepest gratitude to **Lovely Professional University** for providing me with the opportunity to pursue my Ph.D. and conduct this research on the critical topic of “**Adoption of Generic Medicine: Physicians’ Prescription Attitude and Perceived Drug Importance among Patients.**” The unwavering support and exceptional academic resources provided by the university have been instrumental in the successful completion of this study.

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Tekumalla Aditya Prasad

Ph.D. Research Scholar.

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LIST OF ABBREVIATIONS

ABHA	Ayushman Bharat Health Account
AFDIL	Anglo French Drugs & Industries Limited
AIDS	Acquired Immune Deficiency Syndrome
ANDA	Abbreviated New Drug Application
API	Active pharmaceutical ingredient
AVE	Average variance extracted
AW	Awareness Factors
BDR Pharmaceuticals	Boman Dosabhai Rohinton
BS	Business Factors
CAGR	Compound Annual Growth Rate
CCA	Confirmatory Composite Analysis
CDER	Centre for Drug Evaluation and Research
CFA	Confirmatory Factor Analysis
CPs	Community Pharmacists
CR	Cronbach's alpha or composite reliability
DCGI	Drug Controller General of India
DE	Direct Effect
DG	Drug Factors
DNDi	Drugs for Neglected Diseases initiative
DVs	Dependent variables
EP	Experience Factors
EPL	Emcure Pharmaceuticals Limited
ESG	Environmental, social, and governance
EY	Ernst & Young
FCM	Ferric carboxy maltose
FDA	Food and Drug Administration
FDI	Foreign direct investment
FICCI	Federation of Indian Chambers of Commerce and Industry
GDP	Gross domestic product

GMP	Good Manufacturing Practices
GS	Generic Substitution
HTMT	Heterotrait-Monotrait ratio
IDVs	Independent Variables
IE	Indirect Effect
IP	Indian Pharmacopoeia
IPC	Indian Pharmacopoeia Commission
KW	Knowledge Factors
LATAM	Latin America
LOE	Losing exclusivity
MBBS	Bachelor of Medicine and Bachelor of Surgery
MEA	Middle East and Africa
MK	Marketing Factors
MoU	Memorandum of Understanding
NCDs	Non-communicable diseases
NDA	New Drug Application
NRDL	National reimbursement drug list
OOPS	Outcomes of Pharmaceutical Services
OTC	Over-the-Counter
PBMs	Pharmacy Benefit Managers
PLS-SEM	Partial Least Squares Structural Equation Modelling
TE	Total effect
TSMC	Telangana State Medical Council
USFDA	United States Food and Drug Administration
VIF	Variance Inflation Factor
WHO	World Health Organization

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CHAPTER – I
INTRODUCTION

1.1 Overview of Global Pharmaceutical Landscape

Globally, the pharmaceutical market is anticipated to grow steadily at a value of \$1.5 trillion by 2023 at a compound annual growth rate (CAGR) of 6.4% over the next five years. Although the Major Developed countries, will continue to have the largest share of market sales, the Pharmerging markets will account for over 35% of added global sales growth during the five-year forecast period. Regionally, North America will still represent over \$500 billion of the global market, but regions, such as South-East and East Asia, LATAM, and the Middle East, will contribute greatly to growth due to greater access to medicine with the economic outlook being optimal for growth. The Indian Subcontinent will also have the highest five-year CAGR contributing to the overall growth due to its strong economy, while Japan will uniquely represent the only major market to contribute negatively to global sales growth (*Global Pharmaceutical Market Outlook, 2023-2028*).

Figure – 1.1
Global Pharmaceutical Market 2020-2032



Source: <https://www.acumenresearchandconsulting.com/pharmaceutical-market>

In nearly the last two decades, the pharmaceutical market has exhibited tremendous resilience and consistent growth (*Global Medicines Use in 2020: Outlook and Implications, 2015*) driven by a combination of demographic structural changes, technological advances, and shifting healthcare environments. One of the key drivers of this growth element is a consistent rise in global life expectancy (*Global Health Observatory data: Life expectancy*). As the global population continues to age, its chronic and age-related diseases will increase consequently increasing demand for pharmaceutical options that provide relief, control, or cure. Likewise, stronger healthcare spending in both developed and emerging economies has also driven market growth. Governments and private entities dedicate considerable resources to the healthcare infrastructure (OECD-Health spending), including pharmaceuticals, to meet the increasing needs of growth among populations. The unrelenting desire for scientific innovation and medical advancements (*World Bank-World Development Indicators*) has generated an ongoing pipeline of new pharmaceuticals and therapeutic treatments, from biotechnology advancements to precision drug therapy, which has enhanced patient care while simultaneously developing the market and enhancing competitiveness.

1.1.1. Influential Factors Driving Growth in leading geographic regions:

Forecasts indicate that North America will continue to lead the global pharmaceutical industry with a market share of 45.33 percent in 2023, up from 35.33 percent in 2017. In contrast, Europe is projected to have a market share of 20.24 percent of the global pharmaceuticals market in 2023, down from 20.24 percent in 2017. The Asia Pacific pharmaceuticals market is expected to remain in second place with a market share of 24.07 percent in 2023. It is also predicted that Latin America will hold a 7.53% global pharmaceutical market share in 2023, and the Middle East and Africa (MEA), at 2.96% (*PhRMA- Biopharmaceutical Research Industry Profile, 2019*).

The growth and increase in the populations of large economies are major drivers of this development. According to the UN's World Population Prospects, the global population is anticipated to reach over 9.3 billion by 2050, with an estimated 21% of the population aged 60 years or older. One of the factors fuelling this growth is the increasing interest of pharmaceutical companies in targeting rare and specialty diseases. Other companies outside of the pharmaceutical space have invested in innovations in specialty biologics, nucleic acid therapies, cell therapies,

bioelectronics, and implantable devices, which have spurred growth in the pharmaceutical sector globally.

Figure – 1.2
Global Pharmaceutical Market 2023



Source: Navadhani Market Research Report

Mandates for safer clinical environments for aged care and for sick individuals in isolation also have contributed to a significant increase in compensation for these therapies under public and private payers. This means that medicines will be in high demand across all pharmaceutical markets due to demographic and epidemiological transformations, an aging population, and a rapid increase in the burden of non-communicable diseases (*NAVADHI-2017-24*). The management and prevention of non-communicable diseases, including diabetes, cancer, and cardiovascular disease, will be funded (*World Health Organization, 2016*). The principal established pharmaceutical markets have a history of having first availability to newly developed innovative pharmaceuticals and their forthcoming pipeline products; this will continue (*Pharmaceutical Industry Report*). A greater portion of these pharmaceuticals will be specialty, orphan, biologics, and cancer therapeutics; as a result, the total cost per patient will be expected to increase steadily (*Economic Analysis Report*). Over the forecast period, the continuing economic growth in the Indian Sub-Continent region will continue to be important drivers of pharmaceutical sales growth, with Bangladesh and India noted as experiencing the fastest GDP growth (*Government Statistical*

Report). “The governments’ efforts to expand national health insurance programs, in response to increasing demand as a result of demographic and epidemiological trends are expected to drive healthcare expenditures in Southeast and East Asia.” To limit pharmaceutical costs, some governments in the Middle East are using strategies such as strict negotiations on medicine prices, temporary price cuts, and removing some of the public contracts (*Latwal B & Chandra A, 2021*).

1.1.2. Competitive Landscape of the Global Pharmaceuticals Market:

To enhance their competitive position, suppliers in the highly fragmented global pharmaceuticals industry engage in both organic and inorganic approaches to growth. Businesses are launching new products and initiatives to enhance their equipment offerings to their customers and expand their global scope. To grow market share and grow profits, these industry leaders are increasingly growing their customers in numerous ways, and some businesses are forming creative and intelligent partnerships with start-ups (*Beall et al., 2018*).

A unique feature of the pharmaceutical industry is multinational corporations with for substantial market share and power. The US continues to lead in this field as home to some of the largest and most influential pharmaceutical firms in the world.

Table – 1.1
The list for innovation focused top companies with successful drug approvals and launches, resulting in value creation.

2023	COMPANY	CHANGE	2022
1	Pfizer	-	1
2	Johnson & Johnson	+2	4
3	AstraZeneca	-1	2
4	Roche	+5	9
5	Bristol-Myers Squibb	+6	11
=6	Boehringer Ingelheim	+21	27
=6	Eli Lilly	+13	19
=8	Gilead	+7	15
=8	GlaxoSmithKline	+7	15
10	Moderna	+7	17

Source: 12th Pharmaceutical Innovation Index / BioSpace, reproduced from STAT News

- **Pfizer:**

Pfizer is a prominent multinational pharmaceutical corporation with its headquarters in New York City, USA. Its wide-ranging portfolio encompasses several therapeutic areas, including immunology, oncology, cardiology, and vaccines. Well-known products include Prevnar (pneumococcal vaccine), Lipitor (atorvastatin), and Viagra (sildenafil). Pfizer's reach is global, with sites in many countries and considerable investment and resources for research and development.

- **Johnson & Johnson:**

The multinational organization Johnson & Johnson (J&J) is headquartered in New Brunswick, New Jersey, in the United States. It has three primary lines of business, including consumer health products, medical devices, and pharmaceuticals. The Johnson & Johnson pharmaceutical division has a focus on infectious diseases, cancer, neurology, and immunology, with Well-known products like Imbruvica (ibrutinib), Stelara (ustekinumab), and Remicade (infliximab). Johnson & Johnson has an excellent reputation for being innovative and bringing new therapies into the marketplace.

- **Merck & Co. (known as MSD outside the U.S. and Canada):**

The international pharmaceutical company Merck & Co. is based in Kenilworth, New Jersey, in the United States, and is involved in the research and development, manufacturing, and marketing of a diverse range of pharmaceutical, biologic and healthcare products. Merck has a variety of therapeutic areas including diabetes, cancers, vaccines, and infectious diseases. Noteworthy products include Keytruda (pembrolizumab), Gardasil (human papillomavirus vaccine), and Januvia (sitagliptin). Merck is also known for its commitment to global health improvement and the development of medical knowledge.

- **AbbVie:**

AbbVie is a biopharmaceutical company based in North Chicago, Illinois, in the United States, focusing on the development of innovative new treatments in immunology, oncology, neurology, and virology. AbbVie separated from Abbott Laboratories in 2013 and has a leading product Humira (adalimumab), a leading autoimmune therapy worldwide. AbbVie has made major

investments in research and development to identify solutions for unmet medical needs and has a strong pipeline of innovative products to improve world health conditions.

Due to their broad product portfolios across multiple global markets, high levels of R&D investment, and timely mergers and acquisitions, they will be notable players in the pharmaceutical industry. Their ideas and contributions to global healthcare positively impact many lives across the world.

A study on the pharmaceuticals market indicated that in 2022, anti-infectives were the top therapeutic class by market share. This trend may reflect the continued rise of infectious disease rates and the need for effective treatment options. Further, because of the emergence of drug-resistant bacterial and viral strains, demand for new anti-infective products to address these infectious disease problems has risen significantly. Importantly, the necessity for research and development in this area has been illustrated by global efforts to combat infectious diseases, particularly as the world continues to deal with the recent pandemic related to COVID-19. Examples of new anti-infective drugs, made possible with advancements in biotechnology and molecular scientific research, include antibiotics, antivirals, and antifungals. These advances have proven to be essential in responding to public health emergencies, adding opportunities and choices for the treatment of infectious diseases.

1.1.3 Pharmaceutical Market by Drug Type

- Generic
- Branded

It is anticipated that there will be significant growth in the market for generic medications in the coming years. The expiration of patents on numerous branded drugs is one of the main reasons that there are generic alternatives available in the marketplace. After the expiration of branded drugs patents, generic pharmaceutical companies can manufacture and market these drugs at lower prices, offering patients and the healthcare system more affordable options. The easier access to generics has also fuelled the growth of this market. Growth in the generic market has been fostered by multiple stakeholders, including the government, insurers, and healthcare providers interest in reducing health-care costs. Since generics tend to be less expensive than the branded version, they

provide an attractive alternative for consumers with tighter budgets and the healthcare system to help save costs.

1.1.4. Pharmaceutical Market by Prescription Type

- OTC Drugs
- Prescription Drugs

According to the predictions of the pharmaceutical industry, the over-the-counter medicine sector is expected to experience significant growth in the upcoming years. It is attributed to various factors associated with changes in consumer preferences and health care trends. The primary drivers of this growth are the increasing self-care and consumer empowerment movement in the management of health. Over-the-counter (OTC) medications allow individuals to treat common health conditions and issues without a prescription, which, in turn, creates market growth. Market growth has been further evidenced by providing consumers with more knowledge and education about OTC products and their availability offered to consumers at pharmacy retailers. Over-the-counter (OTC) categories of products include pain relievers, cold and cough medicines, digestive aids, and allergy products.

1.1.5 Current trends in the pharmaceutical industry:

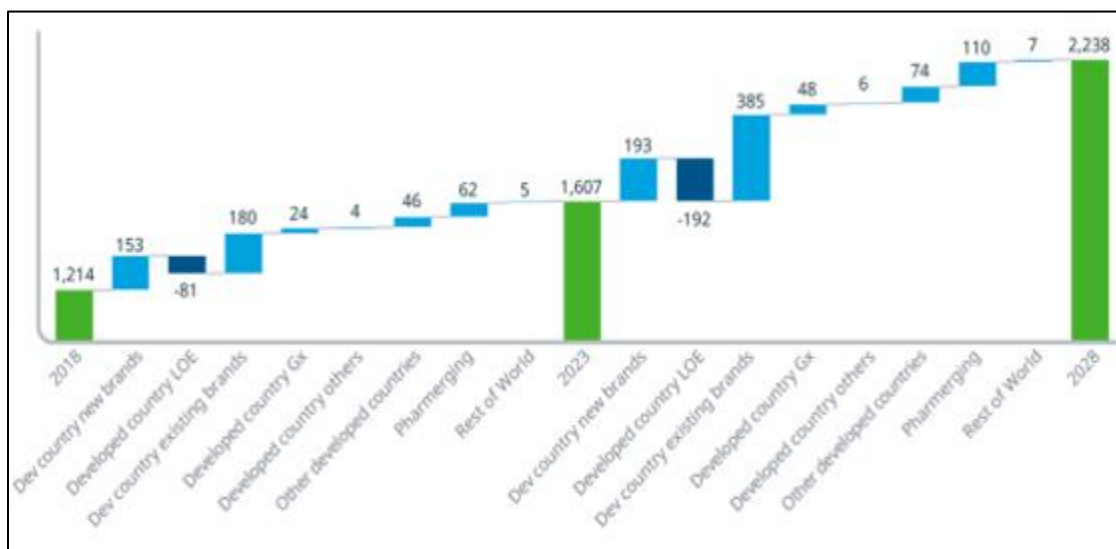
A notable trend is the restructuring of the supply networks. Pharmaceutical production is increasingly globalized, resulting in complex, large-scale supply networks that are at risk of disruption from pandemics, natural disasters, and geopolitical instability. Businesses are reassessing their supply chains in response to concerns regarding supply-chain resilience and shortages, intensified by interruptions caused by COVID-19. This has led to an exploration of manufacturing regionalization and partnerships with regional manufacturers to reduce risks and create a robust supply chain.

Due to cost pressures and the need for innovation, efficiency is emerging as a determinant in the pharmaceutical space. To reduce costs and accelerate the drug development process, pharmaceutical companies are actively looking to enhance research and development (R&D) efficiency. This includes incorporating data analytics, machine learning, and artificial intelligence (AI) to facilitate various aspects of clinical trials, drug development, and drug discovery.

Environmental, social, and governance (ESG) aspects are also gaining prominence in the pharmaceutical industry. Companies are under increasing scrutiny to demonstrate their commitment to social responsibility, sustainability, and ethical corporate practices. Efforts to reduce waste generation, ensure responsible sourcing of materials, minimize carbon emissions, and promote local community development are becoming increasingly prominent priorities on business agendas.

It is expected that global expenditures on pharmaceuticals will grow faster between 2018 and 2028. Most of the growth is expected from higher contributions from existing branded products. What is remarkable is that new brands are predicted to significantly increase spending in the next five years in the top ten developed countries.

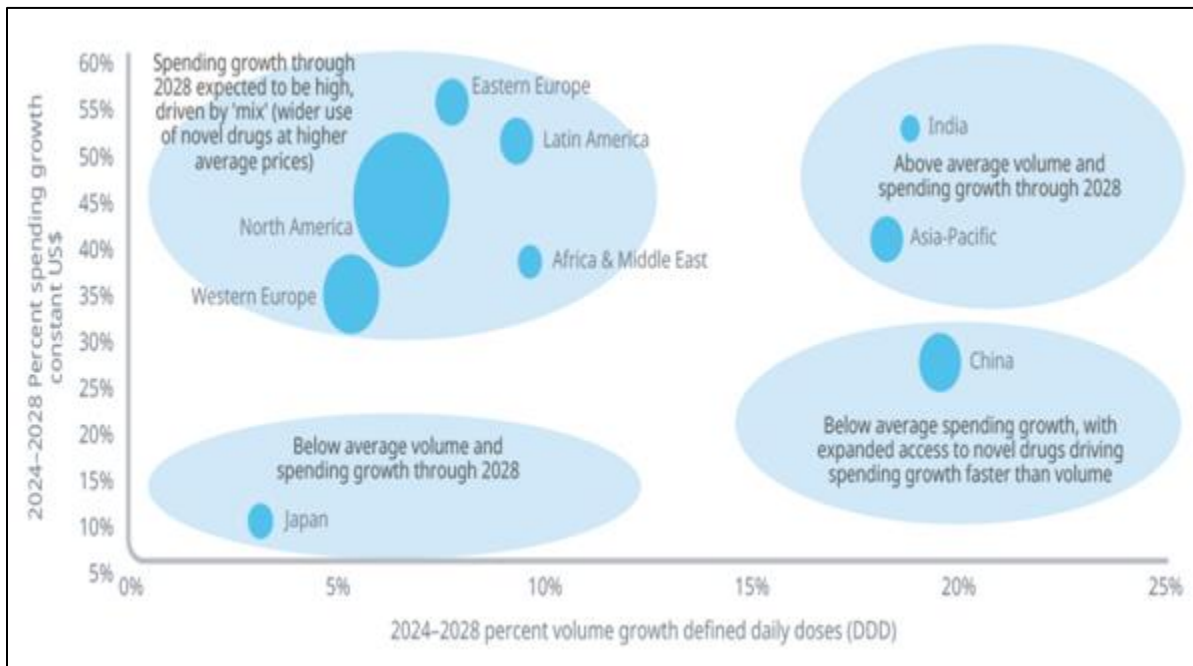
Figure – 1.3
Global Spending and Growth of Medicine



Source: IQMA Market Progress, 2023

New brands are expected to add nearly \$193 billion to growth, a very substantial increase of \$40 billion over the previous five years. Meanwhile, the impact of branded products losing exclusivity (LOE) is anticipated to more than double to \$192 billion. The rise in LOE impact is particularly evident in the area of biologics vs. biosimilars, where consequences have been difficult to quantify. Overall, the projections illustrate a rapidly evolving environment in the pharmaceutical sector involving changing market dynamics, new therapies, the effects of patent expirations, and challenges related to competition from biosimilars.

Figure – 1.4
Spending and Volume Growth of Medicine by Region



Source: IQMA Market Progress, 2023

Regional disparities in pharmaceutical expenditure and volume increase are emerging around the globe. Global spending growth is projected to exceed 30% in regions including Africa & the Middle East, Latin America, Eastern and Western Europe, and North America, as a result of growth in volume driven by populations as well as a definable shift towards more expensive, innovative products. Looking to China, the world's second largest pharmaceutical market, volume is projected to increase by 20% over the next five years while spending growth, rather moderate at 21%, reflects a deliberate effort to increase access to innovative medicines through the national reimbursement drug list (NRDL). These diverging trends demonstrate the dynamic nature of the global pharmaceutical environment, where regions are dealing with different priorities and strategies to address health care needs, expenses, and the promotion of innovation.

The report shows a comprehensive portrait of the global pharmaceutical environment that includes both macroeconomic trends and other regional variations that are shaping the future of the industry. They also demonstrate how the intertwining of factors such as the dynamics of the market, emerging therapeutic option, and regulatory policies drive growth and innovation and present hurdles and opportunities for diverse stakeholders along the pharmaceutical value chain.

1.2 Overview of Global Generic Industry and its Players

Difference Between Generic and Branded Medicine - Pharmaceuticals are classified by the pharmaceutical industry into two categories: generic medications and branded medications. Although both types are intended to offer effective treatment and comfort to patients, they differ in composition, development processes, pricing, and market availability, among other aspects. It is critical that consumers and providers understand these differences to make informed treatment decisions (*Edlin M, 2019*).

Branded medications are referred as pharmaceuticals that went through lengthy research, development, and clinical trials as "innovator" or "originator" treatments. These pharmaceuticals represent the first iterations of a particular drug to market. These drugs are patented, which gives the manufacturer sole rights to produce and sell the product for a certain amount of time, which could be as long as twenty years in some cases. Branded pharmaceuticals often represent long years of scientific research and process to bring to market.

Generic medications are defined as pharmaceuticals with the same active ingredients, dosage form, method of administration, strength, safety profile, and quality as a brand-name product that has already been approved for use. While a generic medication may look different than its branded counterpart, as it may include different inactive ingredients, the generic product is still created to have the same effect on the patient. Almost every socioeconomic status group could afford branded medications if they cost approximately 95% less than branded pharmaceuticals (*USFDA*). The reason for their lower cost is that when the patent expires, a number of companies produce competing generic versions, thus driving down the price.

Authorized generics

An authorized generic is a branded pharmaceutical medication that is identical to a branded drug but marketed to the consumer as a generic medication without the trademark label. The marketing of the products is generally handled by the brand name company or its authorized affiliates (*Global data Healthcare, 2019*). They come in various labels and packaging, and are marketed at a lower price than branded medication. They contain the same active and inactive ingredients as branded drugs and are produced under specifications of the generic drug's first owner which are finalized. As they are identified as therapeutic equivalents of the branded medicine under patent, they do not

appear in the Orange Book. Generally speaking, the NDA applicant may market both the branded and authorized generic version of the medication simultaneously. Authorized generics are not subject to separate non-disclosure agreements. Branded generics and non-branded generics with an ANDA on file are both separate categories; a branded generic with an ANDA filed is different. The Food and Drug Administration (FDA) maintains a current list of approved generics (*Authorized generics mark – global industry analysis and forecast, 2024*). The Office of Pharmaceutical Quality within the FDA/CDER governs reviews of approved generics. The earliest occurrence of their utilization took place in the early 1990s as part of a settlement agreement whereby the generic manufacturer was allowed to market authorized generics without contesting the brand-name patent.

According to the USFDA, approximately 1,200 approved generics are available in the United States (*Berndt E.R. & Mortimer R., 2007*). Against the backdrop of authorized generics being purchased by consumers at about 50% of the cost of branded medications and matching those medications in quality, authorized generics are fuelling market growth in the United States. Due to all the moving parts involved in the argument for authorized generics, the authorized generic market is expected to see significant growth in the United States and worldwide.

The first ANDA (Abbreviated New Drug Application) applicant that challenges a brand-name drug patent with a Paragraph 4 Certification receives 180 days of market exclusivity under the Hatch-Waxman Act. During these 180 days, no other generic company may enter the market with a similar product, and the applicant earns some value towards reimbursing litigation costs. This exclusivity, however, does not apply to authorized generics (*Thomas J.R., 2012*). When an authorized generic is on the market during the 180-day exclusivity period giving rise to competition with the independent generic company, the independent company may not be able to recover the litigation costs during this time (*Hand S., 2017*). Authorized generics give brand-name pharmaceutical companies a way of competing with generic drug manufacturers without lowering the price of brand-name products. Authorized generics may cause independent generic companies to experience lower revenues during this time (*Suryawanshi S.P., 2017*).

Brand-name pharmaceuticals employ a number of life cycle management strategies to delay the launch of generics of their drugs and retain a monopoly of the market for as long as possible. When generics of brand name drugs becomes available, sales for the brand-name drug manufacturers

drop. Some innovator companies engage in "pay-for-delay" arrangements with generic companies to delay the market entry of generic competitors. Thus, the innovators reduce the impact of generics entering the market and mitigate the loss of market share. Consumers are left in a position to only choose between a branded drug or an authorized generic based on the price differential achieved through pay-for-delay agreements (*Lamb, 2008*).

1.2.1. Difference between generic and branded medicine

Table – 1.2

The primary differences between generic and branded medicine

Aspect	Generic Medicines	Branded Medicines
Composition	Same active ingredients as a branded drug; may have different inactive ingredients	Developed by pharmaceutical companies after extensive research, development and clinical trials
Pricing	More affordable due to lower development costs	Often more expensive due to R&D, clinical trials, and marketing
Regulatory Approval	Required to demonstrate bioequivalence to branded drug	Undergo rigorous clinical trials and regulatory approval process before being marketed
Patent Protection	Not protected by patents	Protected by patents, granting exclusivity for a certain period
Appearance	May look different in terms of packaging and colour, but have the same therapeutic effect	Often recognizable due to specific packaging, colour, and branding
Brand Recognition	Lack of unique branding and packaging	Distinct brand name, logo, and appearance
Manufacturer's Choice	Manufacturers can produce generic versions after patent expiration	The original manufacturer retains exclusive production rights
Interchangeability	Can often be used interchangeably with branded drugs under supervision	May need a healthcare professional's approval before switching

1.2.2. Characteristics of Branded Medicines

In the field of pharmaceuticals, "research and development" is integral due to the large investments required to discover and develop new medications. This intricate and multifaceted process begins with discovering suitable drug candidates, followed by extensive preclinical testing before significant clinical trial efforts begin to evaluate the drug's safety and efficacy, as well as therapeutic dosing regimens via randomized trials.

Clinical trials are the initial stage in the approval process of branded medications, which involves extensive human testing, often under tightly controlled conditions, utilizing well-defined protocols to characterize the actual behaviour of the drug, including effectiveness, potential harmful side effects, and general acceptability of the medication.

The pharmaceutical industry is significantly dependent upon patent rights, which grants the company exclusive rights to the manufacture and sale of the medication for a limited time period after clinical trials and the drug have been approved. This exclusivity is critical for recovering substantial research and development costs as disbursements often occur well before the income is generated by sale of the viable product.

Increased costs for the branded drug are typically warranted to recoup considerable expenditures related to research and development, clinical trials, and extensive marketing programs. Therefore, patients will almost always have a higher cost for branded medication relative to generics.

Branded medications are easy to identify because of their unique name, packaging, and in some cases colour. Brand recognition is especially crucial to the pharmaceutical industry because it allows patients a certain level of comfort, trust, and understanding about using their prescribed medication within the larger healthcare system.

1.2.3. Characteristics of Generic Medicines

The bioequivalence of generic drugs represents an integral element of the generic drug process that ensures they behave the same way in the body as the branded counterpart. Regulatory bodies require extensive testing to show that the generic drugs are absorbed into the body at the same rate, and to the same extent as the reference (branded) drug.

In the regulatory approval phase for generic drugs, bioequivalence and safety is assessed through extensive testing and studies. This regulatory approval process is generally not as rigorous compared to that of branded drugs, since the efficacy of the active ingredient has already been established.

Cost effectiveness is a major advantage of generic drugs, as they are less expensive to manufacture largely due to a lesser expense in research and development. Therefore, patients gain access to medications at lower cost and without any decline in efficacy or quality.

Interchangeability can usually occur between generics and branded drugs under the direction of trained health professionals. However, patients might require their doctor's approval to switch medications to assure therapeutic effectiveness.

While generic drugs offer the same active ingredient as their branded counterpart, they may look different in terms of packaging and appearance. In appearance, the surprise stories regarding an important factor, the actual therapeutic effect of a generic drug is not altered, providing a safe and less expensive alternative to a branded drug.

1.2.4. Branded generics

The assessment of bioequivalence of generic drugs is a fundamental aspect of the generic drug process, which ensures that the drugs act the same way in the body as the branded drug. Regulatory authorities require significant data that demonstrates that both drugs are absorbed into the body at the same rate, and extent, as the reference (branded) drug (*Hemant & Joshi, 2003*).

Bioequivalence of a generic drug, and overall safety of its use, is verified through comprehensive testing and studies by regulatory authorities during the drug's approval process. Generally, the approval process for a generic drug is not as robust as that of a branded drug, since the branded drug's active ingredient has already been established.

Cost effectiveness is a big advantage, as generic drugs are often much cheaper to manufacture due to lower research and development costs. Thus, patients achieve access to the medication without sacrificing efficacy or quality at a lower cost.

Under the careful guidance of trained healthcare professionals, generic drugs can be interchangeably used with a branded drug (*Generic Drug Facts, 2018*). However, patients may

need to obtain permission from their physician for change of medication to ensure therapeutic benefit.

While generic drugs will contain the same active ingredient as the branded drug, their packaging and medicine appearances may vary. In appearance, the surprise stories focus on an important point, which is that the actual therapeutic effect of a generic agent has not change, thus they are safe and less expensive alternative to a branded drug.

1.2.5. Assessing the Advantages and Drawbacks of Authorized Generics:

There are several advantages for customers and pharmaceutical companies regarding authorized generics. Since they are manufactured by the same company but sold under a different label, they are typically less costly than brand-name drugs. Customers benefit because the price is lower and there is more competition in the marketplace, especially during the 180-day exclusivity period. Brand-name companies also profit from the royalties and/or sales earned by their contracting partners on authorized generics. This additional revenue can be put to use for drug research and development. Authorized generics also help to resolve patent infringement lawsuits quickly, which benefits brand-name and generic companies by avoiding costly litigation and assuring a steady income stream. Authorized generics give customers expedited access to affordable alternatives to brand-name drugs, especially those who have allergies or limited options in medication. Moreover, generic manufacturers may enter into agreements with brand-name companies to delay the launch of their generic drugs in exchange for not launching authorized generics but still protect their revenue during the exclusivity period. While this may benefit the companies involved, it can limit consumer choice and result in customers paying more for fewer affordable options for drugs.

1.2.6 Assessing the Advantages and Drawbacks of Branded Generics:

In the realm of pharmaceuticals, there are several advantages associated with branded generics. To begin with, they identify significant savings for life-saving medications for a larger audience while providing an alternative to branded medications. In particular, with combo prescriptions, the generic names may not be easy to recall, which can lead patients to branded generics. Patients are liable to adhere to prescribed treatments when they are world familiar with them. Additionally, patients are more inclined to favour generic medicines, as they bear the association to reputable manufacturers of branded medicines like Sandoz by Novartis or Torrent Pharmaceutical.

On the flip side, there are some weaknesses concerning branded generics. When considering medication, sometimes branded generics are only available through alternate sellers, which risk potential breaks in the supply chain or transitioned to a branded medication from a primary seller. Also, logistic issues can arise for patients' access to branded generics, as not all pharmacies have a full inventory of branded generic medications. This can place a limitation on patient access to prescribed therapy if they have to switch from a branded to an available generic due to familiarity or prior traction with prescribed brands.

The most relevant inquiries need to focus on the differences in formulation, cost, development methods, and pricing from branded generic vs unbranded generic medications. Branded medications are usually more costly due to the considerable risk and investment of research and development but provided generic options that typically have the same effectiveness as branded options. Before switching stations, it is imperative for the patient to talk with their health care provider to ensure it can be used safely and effectively in their course of therapy. Pharmaceutical companies have created strategies to manage the life cycle of a drug in preparation or response to threats of increasing competition in the market, particularly when a patented drug is available and generic works are made available after taking into consideration on reworking pricing as trends shift. The objective of creating marketing strategies like branded generics and authorized generics is to provide an increased element of competition while keeping generic companies in the business. There are also options catered towards innovation branded generics, which the innovator company profit from, but risk unsuccessful funding due to generics also being priced lower than brand priced therapies, although priced higher than unbranded generics.

1.3 Indian Pharmaceutical and Generics Industry

India is famous for its inexpensive immunizations and generic drugs and is the world's primary source of generic pharmaceuticals. The Indian pharmaceutical industry (*Swain et al., 2014*) has grown at a compound annual growth rate of 9.43% over the last nine years, enabling India to rank third in the world in the pharmaceutical industry in terms of volume. The Indian pharmaceutical industry comprises a number of important sub-sectors, such as OTC (over-the-counter) drugs, vaccines, generics, bulk drugs, contract research and manufacturing, biologics, and biosimilars.

There are around 500 companies producing active pharmaceutical ingredients (API) in India, which controls roughly 8% of the world API market.

India's pharmaceutical industry produces nearly 50% of the world's vaccines, and 40% of the generics used in the United States, and meets about 25% of the total pharmaceutical needs of the United Kingdom. There are approximately 10,500 manufacturing units and over 3,000 pharmaceutical companies in the domestic pharmaceutical market industry. India is also a strong participant in the global pharmaceutical market. The country has a large supply of skilled scientists and engineers, which contributes to increased development of this industry. India has long been called the "pharmacy of the world" due to the low cost and high quality of its pharmaceuticals to manage AIDS (acquired immunodeficiency syndrome) (*Marzo et al., 2012*).

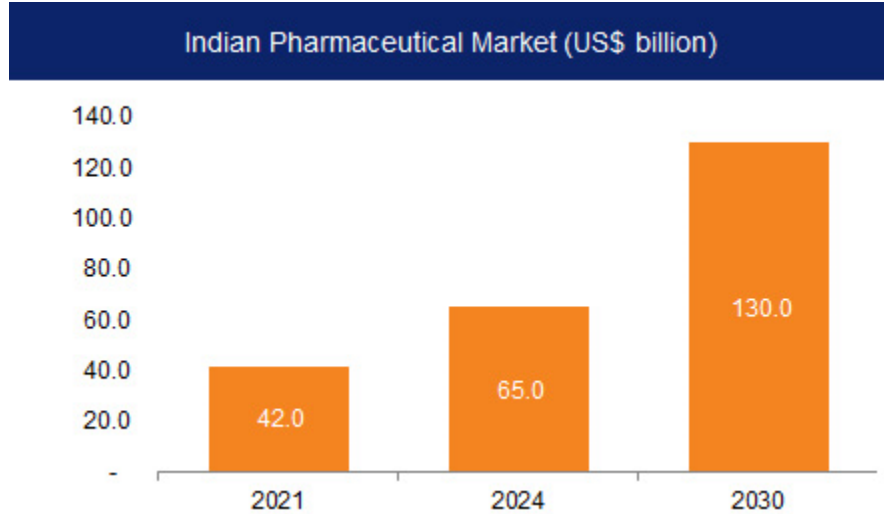
The Indian pharmaceutical sector is internationally recognized for its generic drugs and affordable vaccines. Following several years of progressive expansion, it has become the world's third largest producer of pharmaceuticals. The increasing consensus to provide innovative therapies to patients will result in a value of \$130 billion by 2030 for the Indian pharmaceutical sector according to a new EY FICCI report. At the same time, analysts expect the global pharmaceutical industry to reach \$1 trillion by 2023.

1.3.1. Market size

The Indian medicines sector is projected to surpass \$65 billion by 2024, with projections to exceed \$130 billion by 2030. According to the official data, exports value more than 25% of the total valuation of the Indian medicines industry, which is nearly US\$50 billion. Approximately 20% of the global exports of generic medicines are from India (*Nidhi Tewathia, 2014*).

India ranks third in the area of the bio-pharmaceutical sector in the Asia-Pacific region and is amongst the top 12 countries across the globe in terms of biotechnology. The value of India's biotechnology industry has grown to over US\$80.12 billion in 2022, reflecting a 14% increase on the previous year. The pharmaceutical market in India grew between FY18 and FY23, with growth rates of 6-8%. These gains were mainly driven by a 6% local market growth and an 8% growth in exports.

Figure – 1.5
Indian Pharmaceutical Market



Source: Indian Pharmaceutical Sector Report, 2025

The pharmaceutical industry in India has experienced huge growth over the last several years due to constant advancements in quality, affordability, and innovation, and the country is anticipated to contribute more than 13% of the global pharmaceutical market in the upcoming years. The biosimilars market in India is expected to comprise nearly 20% of the pharmaceutical industry by 2025, worth about USD 12 billion, with an annual compound growth rate (CAGR) of 22%.

India supplies 8% of the global active pharmaceutical ingredients (API) market, making it the third largest producer of APIs in the world. India manufactures approximately 500 APIs and contributes roughly 57% of WHO-prequalified APIs. Indian pharmaceutical companies dominate the US and EU prescription drug markets, and India has more FDA-licensed facilities than any other country outside the US.

According to the Health Economic Survey 2021, the Indian pharmaceutical industry may be tripling in size over the next decade. The moratorium would take the market value up to USD 65 billion in 2024 from USD 42 billion in 2021, and USD 120 - 130 billion by 2030 with no further growth. The health care industry is estimated to be worth approximately USD 150 billion by 2025. The medical devices market, valued at \$10.36 billion USD in FY20, is projected to grow to \$50 billion USD from 2020 to 2025 with a compound yearly growth rate (CAGR) of 37%. As of August

2021, CARE Ratings had projected that the Indian pharmaceutical sector would expand at a rate of more than 11% annually over the next 2 years, reaching a value of more than USD 60 billion.

The pharmaceutical sector in India is one of the most remarkable and rapidly growing economic sectors in the world. India generates over 20% of global supply of vaccines by volume, but the country has already fulfilled 60% of global requirements for vaccines. The value of Indian pharmaceuticals is currently USD 42 billion. The pharmaceutical market in India expanded at an annualized rate from 13.7% in July 2020 to 17.7% in August 2021. India Ratings & Research believes the Indian pharma industry's revenue expansion would exceed 12% in FY220 (*India Brand Equity Foundation Report, 2015*).

1.3.2. Exports

The pharmaceutical sector in India is seen by foreign investors as one of the ten best places to invest globally. India's medicines are shipped to over 200 countries including the highly regulated markets of the United States, Western Europe, Japan, and Australia. India supplied hydroxy chloroquine with 45 metric tons and 400 million pills to over 114 countries around the world. According to Pharmexcil, India exported pharmaceuticals and drugs worth Rs. 2,08,231 crore (US\$ 25.3 billion) in FY 23. The export of the pharmaceuticals and drugs saw an increase of 8.14% from April to October 2023. It is estimated that US\$ 2.42 billion was exported in drugs and pharmaceuticals in October 2023 which accounted for 7.21% of all exports for that month.

1.3.3. Investments and Recent Developments

The Indian pharmaceutical industry plays a substantial role in the overall pharmaceutical industry on a global scale. India stands as the third-largest producer globally (in volume) and the fourteenth-largest producer globally (in value). There have been several recent investments and advancements in the Indian pharmaceutical industry.

- a. The automatic route has allowed to 100% FDI for greenfield pharmaceutical projects and up to 74% under the automatic route in brownfield pharmaceuticals projects, subject to further approval by the government.

- b. From April 2000 to September 2023, the total FDI equity inflow in the drugs and pharmaceuticals sector was US\$21.58 billion. This is around 3.3% of the total FDI received in all sectors.
- c. The Union Minister of Labor & Employment, Environment, Forests & Climate Change, Mr. Bhupender Yadav, announced the start of chemotherapy services at 30 ESIC hospitals nationwide in August 2023.
- d. On June 4, 2023, the Ministry of Health in Suriname and the Indian Pharmacopoeia Commission (IPC) of the Indian government signed an MOU to accept the Indian Pharmacopoeia (IP) in Suriname.
- e. The Department of Pharmaceuticals will soon launch the PRIP MedTech Sector Scheme for Promotion of Research and Innovation in Pharma. The Union Cabinet has cleared the scheme for a five-year period, starting in 2023-24.- Emcure Pharmaceuticals Limited (EPL) has launched Orofer FCM 750, an extension of the parenteral iron brand Orofer, which is the first of its kind product, which includes ferric carboxymaltose (FCM). Most Indian patients who suffer from iron deficiency anemia or deficiency can receive this dosage.
- f. The Indian pharmaceutical and healthcare equipment industry is inviting Japanese companies to invest. The “Pharmaceutical Traders Association” and the “Japan Federation of Medical Devices Associations” can collaborate to help reinforce the global supply chain, in particular for medical devices and active pharmaceutical ingredients (APIs).
- g. There is a new line of ocular aesthetics that Entod Pharmaceuticals has launched with the aim of making eyes more comfortable and attractive.
- h. BDR Pharmaceutical launched the first generic version of apalutamide under the name Apatide, which will play a fulfilling role to treat prostate cancer that has spread to other parts of the body but is also non-metastatic castration resistant, in addition to the prevents metastatic cancer, throughout India.
- i. Anglo French Drugs & Industries Limited (AFDIL), which has been in business for 99 years, has launched the LYBER collection, marking its entry into the reproductive space.
- j. Eli Lilly will launch Ramiven in India in November 2022 for specific patients with early-stage, high-risk breast cancer.
- k. From 2000 to 2022, the Indian medicines and pharmaceuticals industry garnered 19.90 billion US dollars in foreign direct investment (FDI).

- l. The Indian pharmaceuticals and medicines industry received US\$ 19.41 billion in FDIs from April 2000 to March 2022.
- m. During the fiscal years 2021 and 2022, the Indian pharmaceuticals and medicines industry received \$1,414 million in FDI inflows.
- n. Sun Pharma and SPARC announced a licensing agreement for the sale of injectable phenobarbital in the US in late November 2022. In October 2022, Glenmark became the first Indian company to launch a combination of Teneligliptin + Dapagliflozin Fixed Dose Combination. Lupin acquired two inhalation products from Sunovion Pharmaceuticals Inc. in late October of the same year.
- o. In June of 2022, Cipla and the Drugs for Neglected Diseases initiative (DNDi) announced the launch of a 4-in-1 antiretroviral drug for HIV-positive children in South Africa.
- p. Glenmark is also the first pharmaceutical company in India to launch a fixed-dose combination medicine for asthma, which is a 50/5 combination with Indacaterol and Mometasone.
- q. In May of 2022, Sun Pharmaceutical Industries Limited also announced they will be entering the Indian market with Brillo, a brand name for Bempedoic Acid, which is used to lower LDL cholesterol.
- r. In April of 2022, Dr. Reddy's Laboratories Ltd. and MediCane Health announced they will launch the first medicinal cannabis products in Germany under an agreement between the two companies.
- s. The Union Cabinet approved changes to the FDI policy in the pharmaceutical sector to allow for 100% approval of FDI for the manufacturing of medical devices under the automatic route, subject to certain limitations (*Complex Products and FDA*)
- t. VIRALEX, an antiviral drug developed and manufactured by Themis Medicare Ltd. (Themis), was approved by the Drug Controller General of India (DCGI) in March of 2022.
- u. Additionally, the National Digital Health Blueprint may result in an economic benefit of an additional \$200 billion for the healthcare industry in India over the next ten years.
- v. In August of 2021, the Uniza Group, a pharmaceutical firm from Ahmedabad, India, signed an agreement with Lysulin Inc. of the USA to introduce Lysulin, a nutritional supplement, to the Indian market (*World Health Organization, 2010*).

1.3.4. Government Initiatives

The following are examples of some of the measures done by the Indian government to boost the pharmaceutical industry: As per the Union Budget 2023-24:

- By 2047, we will have initiated an effort to eradicate sickle cell anemia. The plan calls for concerted efforts to educate the public, test seven crore people in the affected tribal areas (ranging in age from zero to forty), and provide counseling.
- A new program will be launched to promote pharmaceutical research and innovation via centers of excellence, with the aim of fostering innovation in the pharmaceutical industry. Businesses are encouraged by the government to invest in research and development (R&D) in certain priority areas. Government medical institutions and 157 nursing colleges would be constructed side by side, according to grassroots announcements.
- On April 26, 2023, the National Medical Devices Policy, 2023 was adopted by the Union Cabinet. The goal of the National Medical Devices Policy, 2023 is to ensure that the medical device industry grows in a controlled manner so that it can achieve the public health goals of accessibility, affordability, quality, and innovation.

Ayushman Bharat Digital Mission

- The Ayushman Bharat Health Account (ABHA) number may be associated with a citizen's digital health data via the ABDM. As a result, healthcare practitioners will be able to make better clinical decisions and patients will have access to longitudinal health information that span several providers.
- Over the course of the trial, we built a digital sandbox and are now integrating more than 774 partner products. There is a total of 450,164,619 Ayushman Bharat Health Accounts, 224,967 licensed physicians, and 218,602 registered health facilities as of September 4, 2023.
- Umbrella Scheme for the Development of the Pharma Industry: A comprehensive plan, the "Scheme for Development of Pharma industry," has been put up by the Department of Pharmaceuticals. Which includes the following subschemas:
 - “Assistance to Bulk Drug Industry for Common Facilitation Centres”
 - “Assistance to Medical Device Industry for Common Facilitation Centres”

- “Assistance to Pharmaceutical Industry (CDP-PS)”
 - “Pharmaceutical Promotion and Development Scheme” (PPDS)
 - “Pharmaceutical Technology Upgradation Assistance Scheme” (PTUAS)
- As per the Union Budget 2022-23:
 - A sum of 83,000 crore (about \$10.86 billion) has been allocated to the Ministry of Health and Family Welfare, with 4,19.2 million (about \$321 million) designated for research.
 - Funding for the "National Health Mission" comes from a total of Rs. 37,000 crore, or \$4.83 billion USD.
 - The Pradhan Mantri Swasthya Suraksha Yojana will receive a sum of Rs. 10,000 crore, or almost \$1.28 billion at today's exchange rates.
 - The Ministry of AYUSH now gets an allocation of 3,050 crore (US\$ 399.4 million), up from 2,970 crore (US\$ 389 million) before.
 - In August 2021, “Union Health Minister Mr. Mansukh Mandaviya” said that more Indian pharmaceutical firms will likely start producing anti-coronavirus vaccines by October or November of the same year. It is anticipated that this action would strengthen the nationwide immunization campaign even further.
 - Ms. Nirmala Sitharaman, the finance minister, announced in June 2021 that an additional Rs. 197,000 crore (US\$ 26,578.3 million) would be used over five years for the pharmaceutical PLI scheme in 13 important sectors.
 - The Department of Pharmaceuticals established a PLI project to promote domestic production by developing greenfield factories that offer minimum domestic value addition in four different regions, with a total investment of Rs. 6,940 crore from FY21 to FY30. "Target Segments" in order to achieve self-reliance and reduce reliance on imports for the nation's crucial bulk drugs.
 - The Government of India launched Mission COVID Suraksha in May 2021 as part of Atmanirbhar Bharat 3.0 to expedite the research and manufacturing of domestic COVID vaccines. The Department of Biotechnology, Government of India, awarded a grant to vaccine manufacturing facilities to increase their capacity to produce Covaxin domestically

as part of the mission. By September 2021, it is anticipated that these facilities will be producing over 10 crore doses per month.

1.3.5. Road Ahead

India's pharmaceutical sector contributes significantly to the country's international commerce and presents investors with attractive investment opportunities. India, which also operates a significant number of plants that comply with “Good Manufacturing Practices” (GMP) standards established by the “United States Food and Drug Administration” (USFDA) and the “World Health Organization” (WHO), provides generic medications that are both affordable and inexpensive to millions of people worldwide. India has historically been the leading country in pharmaceutical production. Over the next five years, India's medical expenditure is expected to increase by 9–12%, placing it among the top 10 nations in terms of medical spending. The capacity of businesses to orient their product portfolio toward chronic treatments for illnesses like cardiovascular, anti-diabetic, anti-depressant, and anti-cancer, which are on the increase, will also be a determining factor in future improvements in domestic sales growth. Numerous actions have been made by the Indian government to lower healthcare expenditures (*Nicholls A. & Pannelay, 2014*).

1.4 Pharmaceutical Value Chain – Supply and Demand Side

The operations of the pharmaceutical industry are based on a complex value chain that incorporates both supply and demand aspects. Quality control and regulatory compliance at each step is critical in delivering a safe, effective product. Distribution and logistics support the movement of pharmaceuticals to pharmacies, hospitals, wholesalers, and ultimately patients. In addition, research and development efforts aimed at finding and developing new therapies, as well as ongoing improvements and enhancements to existing medications, are also related to the supply side (*Stegemann S., 2015*).

The demand side of the pharmaceutical value chain includes patient needs, provider prescriptions, and payer reimbursement mechanisms. Patient demand is influenced by factors such as cost, options for therapy, and prevalence of the disease (*Srai & Harrington, 2015*). Provider engagement in prescribing medications based on clinical recommendations tailored to the patient is important. Payer-related factors, such as government regulation and insurance coverage, also impact pharmaceutical demand because they can influence a patient’s ability to obtain prescribed

medications and what the patient will pay for them. Understanding and ability to manage the interaction between supply-side issues and demand-side considerations is important in optimizing the pharmaceutical value chain and ensuring timely access to safe, effective, and affordable medications.

1.4.1. Supply Side of the Pharmaceutical Value Chain

Manufacturing Processes: Manufacturers employ advanced practices to transform raw ingredients into finished dosage forms such as tablets, capsules, injectables, and topical preparations. Quality assurance and quality control are important at every step in the production process to meet regulatory expectations and maintain product consistency (*Harrington, et al., 2017*).

Quality Assurance and Compliance: Strict quality assurance measures are employed to monitor the quality of a pharmaceutical product through the production process. Compliance with regulations is important to ensure products conform to Good Manufacturing Practices (GMP) and other regulations from health authorities.

Distribution and Logistics: The pharmaceutical supply chain is complex as goods are distributed to pharmacies, distributors, and wholesalers. Effective logistics management ensures on-time delivery and proper storage and inventory management to meet consumer demand and reduce disruptions across the supply chain (*Narayana et al., 2014*).

Research and Development (R&D): R&D efforts drive innovation in the pharmaceutical sector. Typical R&D involves formulation development, preclinical and clinical trials, and drug discovery. Overall, the continual intent of R&D initiatives is to address unmet medical need, improve existing pharmaceuticals, and develop new therapeutics.

1.4.2. Demand Side of the Pharmaceutical Value Chain:

Patient Requirements and Considerations: Considerations regarding the prevalence of illnesses, options for medical care and patient preferences all impact the patient demand for pharmaceutical products. A multitude of considerations, including cost, route of administration, safety profiles, and effectiveness all influence the patient choice and adherence to prescribed medication.

Practices of Prescribing by Healthcare Providers: Healthcare providers, including doctors, nurse practitioners, and pharmacists, play an important role in creating the demand for pharmaceuticals through their decision to prescribe and dispense medications. The prescriber practices are informed by clinical guidelines, patient-specific characteristics, and therapeutic effectiveness.

Payer Considerations: Payors (e.g., insurance plans, government health plans, and pharmacy benefit managers) influence the demand for pharmaceuticals in their management of formularies and reimbursement policies. Decisions on formulary inclusion, copayments, and levels of coverage, all impact patient access to prescribed medications.

Market Access and Commercialization: To maximize the launch and market sales of their products, pharmaceutical companies implement market access strategies. Market access includes considerations of pricing strategies, market segmentations, and the development of value propositions according to the various demands and preferences of stakeholders.

Regulatory and Policy Considerations: The demand of pharmaceuticals is impacted by health care policy and regulatory framework, this can include reimbursement policies, price controls, and market access to pharmaceuticals. Changes to regulations or policy changes may possibly affect the dynamics of the market and overall growth of the pharmaceutical industry.

Understanding the interrelatedness of the supply and demand aspects of the pharmaceutical value chain is essential to increasing patient access to pharmaceuticals, the efficiency of pharmaceutical processes, and enhancing innovation in the healthcare community. Collaboration among all stakeholders in the pharmaceutical value chain (i.e., manufacturers, healthcare providers, payors, regulators, and patients) is required to resolve issues and achieve the maximum value the pharmaceutical value chain can provide (*Privett & Gonsalvez, 2014*).

1.5 Importance of Physicians' Prescription Attitude

The distinction made by physicians between branded and generic medications has profound implications for healthcare systems across the globe. Access to medications is largely facilitated via generic medications, which are usually cheaper and bioequivalent to their brand-name analogs.

However, physicians' anterior ideas and attitudes towards generic medications heavily influence how frequently they are utilized in practice (*Glickman et al., 1994*).

Physicians play a substantial role in patients' access to medications and the overall price healthcare costs during the prescribing phase. If physicians are biased in their views of generic medications, it could influence their clinical use of generic medications. There are different influences on physicians' prescribing behaviour that include physician perceptions of their level of expertise, beliefs about safety and efficacy, concerns about quality, and assessments of patient preferences.

To enhance healthcare delivery by optimizing and maintaining cost-effective treatment regimens, it is vital to understand the prescribing practices of physicians regarding generic medications. The goal of the exploration of those perspectives and their implications to patient care, health systems and the availability of pharmaceuticals was the impetus of the research.

The research investigated the factors that shape the prescribing attitudes of physicians toward generic medications, along with their broader implications potentially for health service delivery in the context of the importance of these attitudes. By elucidating the processes of decision-making by physicians when prescribing medications, there are opportunities to increase the prescribing of affordable generic pharmaceuticals and support more sustainable practices in medicine (*Barefield & Ramamurthy, 1995*).

1.6 Perceived Drug Importance in Patient Decision-Making

Assessing perceived importance of drugs in the context of patient decision making is important for improving healthcare outcomes and patient satisfaction. Patients frequently assess the importance of medications based on a number of factors including their perceived effectiveness managing symptoms or treating underlying conditions. Perceived effectiveness of the drug to help patients live better lives, relieve pain, or improve health are major factors that affect patient decision making. Patients will consider using medications they perceive to have some 'benefit,' and will use medications if the medications demonstrate that benefit the patient expects from treatment. The 'benefit' may include medications that patients can capture on a visible, tangible scale, and medications that align better with their expectations and treatment goals. The perceived importance of drugs can also be influenced by their own treatment experiences; the severity of their illness

compared to others, the information patients obtain from health professionals throughout their healthcare experience, and the recommendations or information shared from family members, and peers. Patient experiences, stories, and testimonials enhance the perceived importance of drugs to patients to build agency to use the drugs, and encourages adherence to prescribed therapy (*Entwistle & Watt, 2006*).

Perceptions of drug importance may be based upon patients' understanding of risks or possible side-effects of medications. Health consumers typically weigh the benefits of drugs against adverse effects, and potential safety specifically with antipsychotic medications. Expected effects or side effects of medications can impact how patients weigh the expected outcomes, and ultimately the importance of drugs. The education provided by health professionals around drug effectiveness, drug safety and possible risks of drugs is the means patients develop some understanding of drug importance. Perceived importance of drug by patients also relates to aspects of cost, access, and convenience of use, all of which impact desired drug importance and adherence. If we understand the factors that influence patient's perceived importance of drugs, we can ultimately adopt a patient centered approach which allows us to make informed decisions in partnership with patients to optimize treatment, address patient concerns, and reinforce engagement - active involvement in their 'care journey' (*Harter & Moumjid, 2017*).

The study depicted the step-by-step explanation of the perceived drug importance in patient decision-making:

Symptom Management and Treatment Goals: Patients rank the importance of drugs according to perceptions of their usefulness in managing symptoms or achieving treatment goals. Drugs that provide symptom relief or disease management are ranked as more important, and assist in improving quality of life and overall well-being.

The impact on quality of life and health outcomes: The perceived ability of drugs to improve quality of life, reduce pain, or improve health outcomes is a factor that influences patient decision-making behavior. Patients emphasize medications that have the potential to impact their daily life and functioning (*Mehralian et al., 2015*).

Personal Experiences and Other Recommendations: Patients often consider personal experiences in which they have received medications, including past experiences and outcomes, and recommendations from others (healthcare providers, family, peer) that influence their health decisions. The power of personal experiences and the stories of others affect the perceived importance of a drug and ultimately influence patient adherence (*Carter et al., 2015*).

Understanding Risks and Benefits of the Drug: Patients are often influenced by weighing benefits of a drug over risks and side effects. Healthcare providers enhance this dynamic through patient engagement by bringing the patients up to speed on the drug's efficacy, safety and efficacy profiles, and side effects. This can protect the patient's interest in the drug day to day.

Affordability and Access: The affordability of the medication along with patient access play a role in the importance of a drug in patient decision-making. Patients may place more importance on drugs that are affordable, covered by insurance, or easy to access, knowing that it will facilitate and sustain adherence.

Convenience/Administration: The convenience and administration of the medication assesses importance in drug. Factors that influence patient preferences and adherence to their prescribed medications in relation to the drug's pose, frequency of dosing, device administration, and other medications with potential interactions.

Understanding these stepwise factors that contribute to the perceived drug importance in patient decision-making enables healthcare providers to tailor treatment plans to their patients, understand their concerns, and foster medication adherence. Recognizing patient observations and considerations into treatment conversations gives healthcare teams the opportunity to invoke shared understanding to foster patient engagement and health outcomes (*French M.T., 1995*).

1.6.1. Influence of Pharmacists:

Medication Education and Counseling: As medication specialists, pharmacists are in a unique position regarding patient-specific information about the medications they dispense. Pharmacists ensure the verification of validated data regarding drug indications, doses, contraindications, and potential side effects, and most importantly, the appropriate use of medication (which gets very

little attention during physician encounters). As such, providing medication-based information will enhance patient knowledge and allow them to find meaning and comfort in the decisions about their treatment plans.

Medication Adherence Support: Pharmacists may improve medication adherence by addressing patient obstructions to therapy or situation-specific conditions/misinterpretations, offering invites/reminders, clarifying the importance of medication adherence, and even helping to develop alternate plans for overcoming barriers to therapy compliance. Patients with an appreciation for the significance of medication adherence tend to care more about the adherence to the treatment plan and adopt a superiority of health outcomes.

Monitoring and Management of Adverse Effects: Pharmacists will monitor patients for any emerging adverse effects subsequent to the use of a drug and will intervene quickly to attempt to counter the risks of the adverse effect. Pharmacists assess their expertise regarding drug interactions, allergic reactions, notifications, surveillance for adverse side effects, and offer management information about the side effect; thus, enhancing both the patient's safety and medication efficacy (*Chih et al., 2014*).

Collaborative Care: Pharmacists will also collaborate with other allied health disciplines to assess the appropriateness of the medication prescribed to the patient and the opportunity to optimize therapy inclusion. The role of the pharmacist is evolving through interdisciplinary collaborative care meetings brings shared awareness of medication as another discipline in treating the same patients, optimizing health outcomes.

1.6.2. Statistics on Adverse Effects (OOPS - Outcomes of Pharmaceutical Services):

Monitoring and Reporting Adverse Events: Pharmacists utilize OOPS data to monitor and report Adverse Drug Events (ADEs) and share these data in a manner that helps enhance medication safety as well as quality improvement initiatives. Pharmacists use the ADE data to recognize statistical patterns of ADEs in conjunction with their efforts to improve medication management processes and minimize patient risks.

Medication Safety and Risk Assessment: OOPS statistics are used to inform pharmacists about medication safety concerns, such as medications that have significant risk or populations that are only

at risk for medication usage. When OOPS statistics are made available to clinical pharmacists, pharmacists can customize an intervention related to patient safety, such as counseling or dosing adjustments.

Quality assurance and continuous improvement: OOPS metrics can identify quality assurance initiatives in pharmaceutical services with an emphasis on ongoing improvement in the way we care for patients or the way medications are used or managed. Pharmacists are able to use OOPS statistics to introduce evidence-based practices, or provide clarity in quality assurance processes while establishing artfully deliberate opportunities for constant improvement; not just procedures but demos and recognizable service quality.

The way that pharmacists contribute toward patient's decision-making goes beyond dispensing medication to encompass education about compliance assistance, management of contrived adverse effects, or working collaboratively with designated healthcare teams. Data around adverse effects are just as important as the statistics themselves for monitoring, reporting, feedback, and assessing the collective value of medication safety, quality assurance, and, towards continuous improvement with pharmaceutical services toward improved patient outcomes as well as better quality healthcare.

1.6.3. Correlation of Cost of Medicines and Recovery/Treatment Outcomes

Understanding the relationship between medication costs and treatment or recovery outcomes is important to healthcare decision-making and resource allocation. The relationship between medication costs and patient outcomes may have important consequences for both individual patients and health care systems (*Orom H & Biddle, 2016*).

Impact of Medication Cost on Treatment Adherence and Outcomes: Cost of medications is an important consideration affecting adherence to treatment regimens. Patients face what is called Direct cost of medications. When medications are expensive and/or not covered by their insurance, patients may face financial barriers to getting and using prescribed medications as part of their treatment regimens. Not following medication regimens because of expense-related issues lead to poor treatment outcomes, and can accelerate disease progression or complications. Conversely, medication that is affordably priced and accessible improves adherence, improves disease management, and ultimately improves patient recovery and outcomes. This demonstrates that

affordability of medications can be an important consideration in patient adherence and treatment efficacy, which ultimately is an important consideration to be included in health care planning.

Economic Considerations and Healthcare System Efficiency: The relationship between medication costs and treatment outcomes has ramifications on healthcare system efficiency and sustainability. For example, high medication costs may place added pressure on healthcare budgets and access to important treatments, especially in low-resource settings or with vulnerable patient populations. Therefore, policymakers and healthcare stakeholders need to find a delicate balance between interventions that prioritize cost-effectiveness while allowing for equitable access to medications that may potentially be life-saving. For example, research studies that investigate the cost-effectiveness of different treatment options illustrate how research can be used to understand how to make various treatments more affordable while maximizing patient benefit. By moving toward strategies that are more cost-effective while producing satisfactory treatment outcomes, healthcare systems may be able to more efficiently allocate resources to improve health and/or, population health (*Advanced Medical Technology Association & IQVIA, 2018*).

Addressing Cost-Outcome Disparities through Value-Based Care: In order to address discrepancies in cost-outcome relationships, there is an increasing focus on value-based care models that prioritize patient-centered outcomes and cost-effective interventions. Value-based care aims to optimize healthcare delivery by prioritizing interventions that provide the the most clinical benefits compared to cost. This also fosters the integration of evidence-based practices, drives shared decision-making between the provider and patient and rewards outcome-based healthcare delivery models. Value-based care models aim to align the financial incentives with treatment outcomes so that medications and treatments are paid for in line with recovery and treatment outcomes, while improving the efficiency and effectiveness of healthcare services (*Das K. 2003*).

The relationship between treatment outcomes and medication costs is important for optimizing care, efficiency in the healthcare system, and moving towards a value-based healthcare delivery system. Because addressing cost-related access barriers to medications and informing evidence-based decisions for cost-appropriate therapies could improve treatment outcomes, cost-efficient care may also improve quality of care for individuals and populations.

1.6.4. India's socio-economic profile significantly influences pharmaceutical costs

The socio-economic profile of India is critical to the relationship between pharmaceutical costs and access to healthcare. The socio-economic landscape of India is incredibly diverse, with a broad spectrum in terms of income, level of education, and access to healthcare services, each of which affects the affordability and the use of pharmaceuticals (*Mehta A., Farooqui H et.al., 2016*).

Income Disparities and Affordability: In India, income disparities are pronounced, with a significant share of the population in lower income brackets. For many individuals and families, high costs for pharmaceuticals can be a substantial financial burden, especially if healthcare costs are not entirely covered by insurance or government programs. Thus, the affordability of medications is a major factor influencing treatment decisions and healthcare utilization patterns. Especially among lower income families, health care expenses will often take a backseat to basic needs, making it difficult to access essential medications or health care, and potentially adversely affect treatment outcome (*Lakdawalla D. N., 2018*).

Healthcare Infrastructure and Access: India's healthcare infrastructure struggles to meet the increasing availability and quality of care associated with rapid economic growth in the country, especially in rural areas and other communities that have yet to benefit from India's economic growth. Limited healthcare facilities and trained providers may disrupt the distribution and provision of pharmaceuticals to specific areas, which can impact the pricing and availability of the pharmaceuticals for disparate segments of the population. Moreover, differences in socio-economic status will impact access to pharmaceuticals, but the barriers are elevated for marginalized communities to access affordable and essential medicines.

Government Healthcare Initiatives and Policy Interventions: The Government of India plays an important role in addressing socioeconomic differences and increasing access to medicines through various health programs and policy changes. The Jan Aushadhi Scheme is one such initiative that seeks to improve access to essential medications for the general public by promoting the use of generic medications that have lower price points, to make them more affordable. Additionally, health insurance programs such as Ayushman Bharat operate to reduce out-of-pocket

costs for health services, including prescription medications by providing the ability to protect against excessive health costs (*Joseph R. K., 2016*).

Role of Generic Medicines and Cost-Effectiveness: Generic medications play a critical role in India's pharmaceutical industry because they are cheaper than name-brand drugs. Generic medications can lower total healthcare costs and improve access to medications for at-risk populations due to their price and availability. Government regulation supporting generic medications has also enabled the expansion of medication coverage and improved pricing for essential medications across multiple socioeconomic groups.

In the Indian healthcare system, the socioeconomic status of the population has an extensive impact on the pricing, availability, and utilization of medications. To not only provide equitable healthcare service delivery, but to improve health status outcomes for all sections of the population, it is paramount to address the underlying socioeconomic disparities through targeted strategies, policy initiatives, and programs aimed at improving medication cost and availability.

CHAPTER – II
REVIEW OF LITERATURE

The use of generic medications is a growing topic of interest due of its immense potential to lessen the cost associated with health care and provide access to life-saving medications. Understanding prescribers' attitudes towards prescribing generic medicines, and also patients' perceptions of the importance of these drugs, is necessary to facilitate the recommended use of generics. The current literature base has provided us with some insight concerning prescribing behaviours and patients' perceptions. There are issues of misperception and trust that have arisen as major barriers to the wise use of generics and the literature points to the need to address their misperception and trust levels. This review synthesized the available studies to better understand these issues with the hopes of identifying ways to widen the use of generic medications.

2.1.1. Literature Review from Pharmacist's Perspective

Azam, A., Hamza, M. A., Sarwat, R., et al. (2025) examined the knowledge, attitudes, perceptions, and barriers related to generic medicines among physicians and pharmacists in Pakistan using a cross-sectional survey approach. The findings indicated that while most respondents demonstrate adequate awareness of the cost-effectiveness and therapeutic equivalence of generic medicines, significant gaps remain in their confidence regarding quality, bioequivalence, and regulatory approval processes. The study also identified key barriers such as concerns about patient acceptance, lack of trust in local manufacturers, and limited policy enforcement. The study concluded that targeted educational programs and stronger regulatory frameworks are necessary to enhance healthcare professionals' acceptance and promotion of generic medicines.

Saad Abdullah et al. (2025) explored the major challenges involved in implementation of generic medicine prescription and dispensing policies in Pakistan to reveal that weak regulatory enforcement, lack of standardized prescribing guidelines, and resistance from prescribers are major obstacles to effective policy implementation. The study also highlighted economic and commercial pressures from pharmaceutical companies that influence prescribing behaviours. Additionally, insufficient awareness among patients and healthcare professionals further restricted the success of generic medicine policies. The study recommended strengthening regulatory oversight, empowering pharmacists, and implementing nationwide awareness campaigns to improve the acceptance and utilization of generic medicines.

Dawande, M., & Rahate, V. (2023). studied the perceptions of doctors regarding the Safety Index of Generic Medicines in the Nagpur Region using questionnaires with a 5-point scale and involved 182 doctors. The statistical analysis was done with Hypothesis Testing by Proportion Method. The study revealed that 70% of doctors preferred generic medicines, with a majority considering safety index similar between generic and branded generic medicines. The focus on the prescribing of generic medicines indicates quality standards are critical. However, among the doctors who do not prescribe generics, the sub-standard quality perceived, especially with regards to safety index was of utmost concern.

Osemene, K. P. et al. (2021) examined the knowledge, attitudes, opinions, and behaviours of 380 community pharmacists in Southwestern Nigeria regarding generic medications. Results revealed pharmacists' knowledge was below ideal, with a mean score of 5.6 out of a maximum of 10. This study found that most had positive attitudes and behaviours towards generic medications, with 85 % , mainly stocking generic medicines and 93 % substituting generics almost exclusively without contacting prescribing physicians. That said, 89 % of pharmacists agreed that patients needed more information about generic medicines. In order to better serve patients and make reasonably priced medication available, it was recommended that pharmacists in Nigeria receive continuous professional education and training to improve their awareness and understanding of generic medicine substitution.

Mohammed, et al. (2020) assessed community pharmacists' knowledge, attitudes, and practices regarding generic medications in Harar, Eastern Ethiopia, while adopting a cross-sectional approach. Although more than half of 74 respondents acknowledged that generics are cost-effective and bioequivalent, more than half also expressed concern about their effectiveness. Female pharmacists, and also those with more than 5 years of experience held a more positive attitude toward generics. Overall, this study indicated that there is a gap in pharmacists' knowledge and perception of generic drugs. It recommended targeted strategies for improvement of pharmacists understanding to support the rational use of generics in practice.

Mekonnen, T. et al. (2020) undertook a facility-based cross-sectional study in Bahir Dar city, Ethiopia to assess community pharmacists' knowledge, attitudes, and practices toward generic medications. The 102 pharmacist's average knowledge score was 22.9/40, and more than half scored above average. However, only 43.5% and 44.6% of respondents, respectively, scored above

mean for attitudes and behaviours regarding generic medications; which, for the most part, were lower. Differences were also seen with respect to years of experience, Institution of graduation, education level, age, and membership for professional organization purposes. These results provided an imperative opportunity for pharmacists in Bahir Dar city, Ethiopia to have more opportunities for intervention to improve pharmacists attitude and behaviour towards generic medicines.

Alsaffar, N. et al. (2018) conducted a descriptive cross-sectional study that explored the knowledge, attitudes, and experiences of pharmacists in Kuwait regarding generic medication replacement. Less than 40% of the 180 pharmacists surveyed, thought that generic medications were equal to brand name medications and opinions differed about the effectiveness of generic medications for treating chronic conditions. Even with knowledge about the strengths of brand name drugs and brand pricing differences, pharmacists expressed confidence in recommending generic substitutes, if brand medications are unavailable. However, a sizable percentage reported that they would try to persuade patients to stay on brand medications if the patients were dissatisfied with generic medications. The study recommended a national policy for brand substitution for pharmacists to help accomplish these changes in behaviour and reduce healthcare costs when appropriate.

Fadlallah et.al. (2017) examined local pharmacists' attitudes towards generics medicine substitution and their practices related to this policy. The study included 153 pharmacies, of which 64% of the pharmacists supported generic substitution, while only 40% of pharmacists reported performing generic substitution at their pharmacy. The study identified several challenges with the substitution policy including the reimbursement price system, technical difficulties with prescription forms, and overuse of "non-substitutable" by physicians in prescriptions. The study showed that although consumers accepted generic substitution, implementation challenges hampered their national policy objectives. Strategies for improvement included bolstering healthcare provider allegiance, educational initiatives, and aligning stakeholder incentives. The results of the study stressed the need for continuous policy adaptation to overcome the obstacles of implementation and strengthening the use of generics drugs in Lebanon.

Shraim, N. Y., & Al Taha (2017) sought to develop an understanding of Palestinian community pharmacists' attitudes towards, and practices of, generic medicines. Based on findings from 302

pharmacists, in the West Bank, who completed a self-report survey, the research identified that generic replacement was well-accepted and that most pharmacists supported the use of it. There were still gaps in pharmacist's knowledge about the technical and regulatory aspects of generic medicines, especially around bioequivalence and pharmacokinetic parameters - even if they had a basic understanding of the medicines. To optimize pharmacists' involvement in medication management and health care delivery in Palestine, the findings demonstrated the need for education and training activities aimed at improving pharmacists' knowledge of the safety and quality elements of generic medicines.

Drozdowska, A., & Hermanowski, T. (2016) examined the attitudes of community pharmacists towards generic substitution in Poland in relation to efficacy perception, knowledge of generics, and willingness to recommend substitution. The study was conducted using telephone interviews with 802 pharmacists. The results indicated that only 40% usually inform patients regarding the option to use generics. Pharmacists with less experience were less likely to offer generic options. Although 60% were aware about definitions of generics, there were gaps in their knowledge of the differences in dosage. Most pharmacists recognize generics as equally effective to brand-name products and were generally comfortable in substituting generics for brand-name products. This research noted that communicating to a pharmacist to ease their concerns of generics can be achieved through awareness and by establishing pharmaceutical care systems that monitor safety and quality in order to advocate for informed decision-making with regard to generic substitution.

Yousefi, N., & Mehralian (2015) attempted to determine the perceptions of the pharmacists in Tehran with respect to generic substitution, and the roles of the patient, physician, government in this regard. 1208 pharmacists completed a self-administered questionnaire which was distributed to a total of 106 pharmacies with a response rate of 60%. There were two basic findings of this study. First, while a significant percentage of participants considered generics therapeutically equivalent and practiced substitution, more than half remained sceptical regarding their efficacy. Second, an overwhelming majority of pharmacists felt that patients, physicians, and governmental support encouraged and promoted generic substitution. Pharmacists in fact emphasized the primary importance of governmental policies.

Al-Arifi et.al. (2015) deep dived into the understanding, knowledge, and awareness of generic medications by community pharmacists in Saudi Arabia. The study was conducted in central Saudi

Arabia and surveyed 365 pharmacies which resulted in a response rate of 81.1%. The survey showed that pharmacists have differing beliefs - about 80% believe generic equivalents are therapeutically equivalent to innovator medicines, while only half believe there are potential side effects. Also, a large proportion trust brand name medicines more than generics in terms of safety standards. The study highlighted the necessity for educational programs designed for pharmacists and national policy recommendations from the government in support of generic medicine policies and guidelines in Saudi Arabia, in an effort to raise awareness and build trust in generic medicines.

Awiusu, A., Kheir, N., & Ibrahim (2014) executed a cross-sectional study to evaluate the pharmacists' perspectives on generic medicines. Out of 160 distributed surveys 118 surveys were returned and yielded a mean knowledge score of 6.8 out of 10. The pharmacists demonstrated a positive disposition towards generic substitution and believed pharmacists should have the option of substituting generics. Concerns about bioequivalence and the lack of policy guidance as barriers were identified. The authors recommended educational programs and policies to foster appropriate use of generic medicines in Qatar for improved pharmacist knowledge, and patient care as a whole.

Dunn, S.S., Shannon, B., et.al. (2014) examined the perceptions of Irish community pharmacists towards generic medicines prior to the implementation of generic substitution legislation in June 2013. The researchers completed one-to-one semi-structured interviews with 44 pharmacists that documented overwhelmingly positive attitudes towards generics. 98% of pharmacists examined, perceived generics as of equal value to the originator drugs, and 96% perceived generics as equally effective. While concerns still remained, among a minority of pharmacists, regarding manufacturing quality and for patient complaints (mostly ascribed to the nocebo effect). Most pharmacists indicated that they would be in favour of legislation that supported the use of generics and believed that generics would feature as the dominant medicine in their practice; although practical implementation of any such provisions appeared to create a level of unease for almost half of the pharmacists. The research pointed to the need for interventions to address the issues of patient perception, clinical effectiveness, and manufacturing quality in order to support the successful implementation of a generic substitution policy in Ireland.

El-Dahiyat, F. A., & Kayyali, R. (2013) described the inputs of Jordanian pharmacists regarding generic medicines and issues related to generic substitution, while undertaking a cross-sectional descriptive approach. The study was undertaken in Amman, Jordan involving a sample of 294

community pharmacists, with data collection via a self-completed anonymous survey. Findings suggested that pharmacists had positively recommended the introduction of a generics formulary, stating that the majority view generics as being bio-equivalent to the originators and were in favour of a mandatory generic prescription policy. Pharmacists were overwhelmingly in favour of the concept of generic substitution, stating that there needs to be a policy structure and a formulary of interchangeable medicines which pharmacist can use to guide practice. They had also expressed concerns over what would happen to the local pharmaceutical industry. The study concluded that there is a need for a generic substitution policy to be put in place in Jordan, while establishing a means of considering many economic factors on a macro level.

Maly et al. (2013) focused on how Czech pharmacists feel, think and work with generic substitution (GS) policies. The survey of pharmacists (n=615) was distributed to 7665 members of the Czech Chamber of Pharmacists. The survey results showed that there are a broad range of perceptions on GS. The most common perception was that the majority considered generics to be bioequivalent and therapeutically equivalent to brand-name medications. However, there was also a significant cohort that expressed levels of concern related to quality, or adverse drug reactions (ADRs) associated with generics. Most pharmacists had a favourable view of generics and GS options, yet only 36% were fully cognizant of the current legislation regarding GS. The study acknowledged that age was somehow linked to legislation knowledge and attitudes towards GS operations. The study emphasized the role of pharmacist awareness and attitude in reducing potential adverse events and optimizing GS use, possibly improving professional esteem.

Olsson, E., & Kalvemark Sporrang, S. (2012) concentrated on twelve Swedish community pharmacists' experiences and attitudes to generic drug substitution. The study was based on a theoretical model concerning the practices as they relate to patients, and pharmacists. The authors used semi-structured interviews with 16 pharmacists and analysed the data inductively to derive three dominant themes: the pharmacist's role, patient concerns, and generic drug premise. The pharmacists acknowledged that a significant reason to endorse generic substitution was cost-saving, but emphasized their concerns about patient confusion and anxiety, which shifted the pharmacist-patient relationship toward economic considerations. The authors highlighted that pharmacist education and support were necessary to adequately address concerns related to patient management for generic substitution.

Basak, S. C., & Sathyanarayana, D. (2012) conducted a poll in 39 private pharmacies in India. Based on a questionnaire, the survey revealed that a large proportion of respondents, particularly drug retailers, had little awareness of generic medicines. About 30% of respondents had the view that generic medicines were inferior to branded medicines and only 63.6% believed in therapeutic equivalence. Higher degrees of education correlated positively with accurate answers on knowledge of generic medicines. Alarming, 80% of respondents were against generic substitution, which pointed to a clear misunderstanding about the basics of generic medicine. The results highlighted the need for education and training interventions for pharmacists and medicine retailers to enhance informed choice and acceptance of generic medicines in India.

Bahari et al. (2011) focused on a cross-sectional, national study involving community pharmacists in Malaysia that sought to gauge their perceptions of generic medicines related to aspects such as bioequivalence, quality, safety and efficacy. The results reflected that out of 219 pharmacies almost 50% believed generics were therapeutically equivalent. However almost all agreed that there should be no substitution on medicines with narrow therapeutic index. While generic medicines were accepted if they had the same active pharmaceutical ingredient (API) and dosage form, many expressed concerns regarding the quality of generic medicines suggesting some coordination is needed from pharmacy educators/public sector to resolve this misunderstanding within pharmacy practice.

Chong, C. P., & March, G. (2011) aimed to explore Australian community pharmacists' practices in relation to generic medicine substitution, where they could generate cost-savings for their patients and have optimal utilisation of the medicines. A national sample that consisted of 500 pharmacies surveyed the principal pharmacists or a pharmacist colleague working at the pharmacy pertaining to the prescription items eligible to be substituted for generic medicines. 82 pharmacies provided usable data (a response rate of 16.4%). A total of 96.4% disclosed they recommended generics to their patients, thus enabling them to reduce their patients' total medicine expenditure on average by approximately 21%. However, in the study it was evident that there was some disparity in generic acceptance levels between rural and urban community pharmacists, and in relation to patient types, suggesting there needs to be effort towards improving acceptance of generic medicines, and ultimately optimise the role of community pharmacy for the benefit of Australian citizens when choosing generic medicines.

Babar, Z. U., & Grover, P. (2011) undertook a cross-sectional survey investigating New Zealand pharmacists who aimed to improve quality use of generics. A previous study by Grover et al. (2011), including 625 pharmacists surveyed in New Zealand, found 360 eligible responses. Safer, quality and effective (compared to the originator brands) generic medicines were viewed differently. While the survey identified there were many pharmacist concerns around brand substitution, suggestions for intervention (advertising and public awareness campaigns and/or distinct packaging) were numerous. They also explored what influences pharmacists' perceptions to generic medicines by outlining pharmaceutical policies and consumer interactions. It predicated that greater engagement with community pharmacists, that would signal knowledge intervention to establish where the short-falls are, and seek more appropriately informed decision making in pharmacy practice.

Jamshed et al. (2010) examined community pharmacist's general awareness, perceptions, and attitudes towards generic medicines in Karachi, Pakistan. Thematic content analysis on eight pharmacists' responses from snowball sampling, and semi-structured interviews, indicated that generic medicines are understood and perceived positively. On the specific topic of distribution of generics in the community, views varied with price being the most salient consideration. This study indicated the importance of pharmacists being present in community pharmacies and that having compulsory qualified pharmacists available may lead to increased public confidence in pharmacists and possibly promote generic substitution to help control costs in the health care landscape.

Al-Gedadi, N. A., & Hassali, M. A. (2008) systematically reviewed pharmacists' perspectives and practices that impact the use of generic medicines in practice based on 13 studies identified between 1980 to 2007. It adopted a quantitative methodology, the results of which concluded that pharmacists' attitudes towards generic medications can be influenced by economic considerations, quality and bioequivalence perceptions, therapeutic class, and the interactions pharmacists have with physicians, patients, and public health officials. A general acceptance and support for generic medication existed although this support is likely to vary with factors related to policy. It concluded that this would likely be an area of prominent discussion within the profession in the near future.

Heikkila, R., & Mantyselka, P. (2007) explored customer and physician perceptions about generic substitution when it was introduced in Finland in 2003 to address the problem of rising

medicine spending. Using customer surveys and clinician interviews, information was collected from customers who accepted generic substitution and who rejected it, and an understanding of the views of physicians was also developed. A large proportion of patients and providers found generic substitution to be beneficial primarily because of its cost-saving advantages. However, providers expressed concerns regarding the effectiveness and safety of all interchangeable medications. Overall, the study indicated general support for generic substitution in practice systems reform, but it suggested that the safety and efficacy issues raised by health professionals require further examination.

Kirking, D. M., & Gaither, C. A. (2001) reported on pharmacists' and professional organizations' perspectives on the use of generic medications, which were found from published articles indexed with the appropriate terms and supplemented with a telephone survey of significant national pharmacists' organizations. Overall, pharmacists had support for generic medications, with worries concerning substitution in some therapeutic classes and the demands from managed care. They found that after the decision to dispense a generic drug, suppliers' confidence, rather than price, influenced which one to choose. Although 'quality' is important, documentation of how to go about quality monitoring does not appear to exist. They found that while they support pharmacists getting involved in drug selection, outlining things such as therapeutic interchange, organizations and associations had written documents that supported the pharmacist's mission, organizations, and generic medicines. Nevertheless, they found that issues related to generic medications remain an accepted concern, indicating an opportunity for impact for pharmacists and their associations.

Suh, D. C. (1999) assessed formulary listings, acceptance rates by patients and doctors, and the rate of generic medicine substitution by pharmacists. A study of 9,328 prescription orders received from 94 pharmacies revealed that generic substitution rates have increased significantly over the past 20 years. The increase could be traced to internal and external variables, for example growing acceptance rates of generic substitutions by other health care providers. Physicians and consumers both recognized that many prescriptions would be filled as a generic version of a brand name product because there will be formulary recommendations. Collaboration among health professionals, third-party payers, and patients is an important first step in the promotion of generics, and the ability to diminish health care spend.

Ping, C. C. et al. (2008) considered Malaysian community pharmacists practice surrounding generic substitution (GS), their communication with prescribers, consumer acceptance of GS, and the estimated savings on cost. Of 40 surveyed pharmacies, 34 agreed to participate in the study. In 47% of GS cases pharmacists contacted the prescriber. 84.4% of prescribers accepted GS. 88% of consumers accepted GS. The estimated cost savings of GS for consumers was RM6137 (US\$1615), an estimated 61.1% of drug costs as a result of GS. This study highlighted the role of community pharmacists in offering cost-effective healthcare, and continued to demonstrate the potential of GS as a method for reducing medication costs to patients.

2.1.2. Literature Review from Physician's Perspective

Abdelhakim, H., et al. (2025) investigated physicians' perceptions and attitudes toward generic medicines and examined their impact on prescribing behaviour within hospital and clinical settings. The findings revealed moderate levels of awareness about generic medicines but persistent scepticism regarding their quality and interchangeability with branded products. Many physicians expressed concerns related to patient adherence, manufacturer credibility, and regulatory enforcement. The study also identified demographic and professional factors such as experience, specialization, and exposure to continuous education as significant determinants of physicians' acceptance of generics. The study concluded that targeted educational interventions and stronger regulatory transparency were necessary to improve physician trust and promote the rational use of generic medicines.

Rafiq, R. et al. (2024) provided a narrative review that examined physicians' opinions on the utilization of generic medications across Gulf Cooperation Council (GCC) countries, focusing on awareness, attitudes, and prescribing behaviour. The review synthesized findings from published studies to assess physicians' perceptions of the quality, safety, and therapeutic equivalence of generic drugs compared to branded medicines. The results indicated that although physicians generally recognize the cost-saving benefits of generic medicines, concerns persist regarding their efficacy, bioequivalence, and manufacturing standards. The study also highlighted variations in attitudes across different GCC countries due to regulatory frameworks, healthcare policies, and market structures. The study concluded that strengthening awareness programs and harmonizing

generic medicine policies can enhance acceptance and rational prescription of generic medicines in the Gulf region.

Joshi, S. (2023) sought to study how private medical practitioners' perceptions of generic medicines were affected by pharmaceutical companies' advertising efforts. The data was collected from 167 private medical practitioners who filled out the surveys. The author stated that advertising efforts had an influence on an unfavourable perception about generic medicines. The factors with the least effect on the prescription practices of private medical practitioners are the personal sales of medical representatives of these companies and patient demand for specific drug brands that they had learned about directly from a pharmaceutical company via email, social media, and postal correspondence.

Dawe, M. et al. (2023) scrutinized the doctors' perceptions regarding the Safety Index of Generic Medicines in the Nagpur Region. The study reported that 70% of participating doctors utilize generic medicines. More than 50% of the doctor's responding to the survey believed that the Safety Index of generic medicines is about the same as branded generics. Interestingly doctors emphasized that there should be quality standards for generic medicines and that they could be persuaded to write prescriptions for generics of a good quality. However, a large number of doctors do not write prescriptions for generics as they feel the quality is poor, especially with regard to their Safety Index. These results attested to the fact that regardless of professional considerations, Safety Index would impact physicians' beliefs. It established that the need to use generics could never come at the expense of quality.

Hatem, G. et al. (2022) conducted a cross-sectional survey, which included a sample of 598 Lebanese physicians over a three-month period. The survey data revealed that 73% of respondents believed that the physicians prescribing generics preserves their choice and exclusivity over the medications prescribed. Multiple recommendations were provided, ranging from coordinating the necessary elements of policy implementation, the results of the new overall pricing system, ongoing monitoring of the results, followed by advocating for ongoing coordination. Despite a lot of perceived drawbacks, the unified medical prescription was intended to address the pharmaceutical search costs and the ease of medication access for the socio-economically weaker patients.

Sanjaya, et al. (2022) surveyed a cross-sectional sample of Vietnamese doctors who were concerned about the impact of high medicine costs on patient drug compliance, the anticipated physicians' outcomes on concern with generics, the use of and availability of generics and attitude toward quality for a given patient in Vietnam.

He, J. H. et al. (2022) investigated the perceptions of Chinese physicians regarding generic drugs through a cross-sectional study from June to July 2020. This survey adopted convenience sampling method, whereby 648 physicians participated through an online survey using Sojump app. Overall, the study demonstrated positive attitudes toward generics but with significant gaps in knowledge and considerable persistent negative perceptions regarding efficacy and side effects with brand-name drugs compared to generics. The study indicated significant variations based on demographics and professional levels. It attested to the fact that respondents needed education about generic drugs evaluation on consistency and in ways to look at the overall health cost-of-care issues, including incentive plan-based interventions.

Charan, J. et al. (2021) examined the physicians' knowledge and perception regarding generic drugs and the impact depending on the healthcare sector (public vs. private). The study found that only 11.6% of primary care physicians correctly understood all statements regarding generics, while 57% agreed that the physicians should prescribe generics. On examination, 24.4% expressed concern with substandard quality and 35.6% had concerns with reduced effectiveness of generics as major obstacles to prescribing generics. This is despite 76.1% rating the likelihood that patients agreed with substitution if the brand was not available. Awareness was not a problem for the present sample, as 79.3% knew the existence of Jan Aushadhi scheme, but 45.6% preferred to take generics themselves. Overall, the study highlighted the importance of improving knowledge and acceptability of generic drugs from the physicians' side to improve the utilization of the product and benefitting from the consequent advantages of generics.

Mahdi, L. A. et al. (2020) undertook a cross-sectional study that aimed to assess the knowledge and attitudes of doctors in Iraq about locally produced and generic medicines. A self-administered questionnaire was used to survey 124 doctors from different five government hospitals in Baghdad selected randomly. The study found that only a small proportion of doctors could correctly respond to questions about generic medicines' therapeutic equivalence, safety, and regulatory/requirements. Generally, there was a negative impression of generic medicines among

doctors, particularly concerns about quality and undesirable adverse effects if they were to prescribe them. While the majority of doctors said they would prescribe on-quality and affordable medicines, only about half said they would leave generic options open to their patients. This implied that doctors were not significantly enthusiastic about generics. Therefore, the findings indicated substantial misconceptions and knowledge gaps that existed among Iraqi doctors regarding generic medicines, thus requiring concentrated efforts that seek to change their opinion.

Malhotra, A. et al. (2018) conducted a cross-sectional study using a pretested questionnaire to determine clinicians' knowledge, attitudes and practices (KAP) on generic medicines at a tertiary care teaching institution in Jammu (J & K, India). The study found that a substantial proportion of doctors considered the generic medicines to be interchangeable with branded products and recognized the importance of bioequivalence studies for generic drug manufacturers. Most agreed that there was a need to educate about generic medicines very early in internship, and believed that switching patients from brand-name products to a generic equivalent would not result in inferior therapeutic outcomes. The study suggested that doctors have a generally optimistic awareness about generic medicines, although it also indicated that targeted interventions to quash misconceptions and further promote acceptance and understanding of generics would benefit the medical community.

Vo, T. Q. (2018) conducted a cross-sectional study at hospitals and private clinics in Vietnam between January and April of 2017. It sought to evaluate physicians' attitudes, knowledge, perceptions, and factors underlying physicians' prescriptions of generic medicines. The study results indicated that only 37.2% of physicians had an adequate knowledge base of generic medicines, and that physicians' consensus level on the level of knowledge is found to be in accordance to their years of professional practice. All physicians were found to generally display similar perceptions regarding interchangeability of generic medicines and brand-name medicines, independently of the various levels of knowledge about generic medicines. The results substantiated the need for specific policies and regulations to optimize the quality and use of generic medication effectively.

Ryu, M., & Kim, J. (2017) explored the changing attitudes and prescription practices of Korean holders of medical licenses related to generic medicines, subsequent to a reform of pricing policy in 2012 for pharmaceutical products. Surveys administered to registered physicians in 2011 and in

2013, identified an unwavering preference for the original drug rather than generics, based on the perception of differences in effectiveness and issues with bioequivalence testing. While the reform did result in an increase in the number of generic prescriptions by physicians, about 70% of respondents still preferred the original product. The study results provided some indication for the future improvement of physicians' trust and acceptance of generic medicines as a result of government attempts to improve regulatory conditions.

Bhattacharjee P., et al. (2017). investigated the knowledge, attitude and perception (KAP) of doctors regarding generic medicines at a tertiary-care teaching hospital in Tripura, using cross-sectional design. Overall, doctors demonstrated a good knowledge base regarding interchangeability, bioequivalence studies, and safety of generic drugs. The majority of respondents also acknowledged the importance of education with regard to generic medicines early in their professional training. Most doctors also confirmed that they would be able to prescribe generic drugs without doubt, while acknowledging that they considered effectiveness, safety, and quality. Overall, the findings demonstrated importance of generic medicines, and holding continued education and promotion regarding generic medicines in order to promote their educational use in practice.

Khadke, V. V., & Khanda, S. Y. (2017) attempted to explore the reasons for not prescribing generic drugs by 234 randomized RMPs (registered medical practitioners) in Nanded, Maharashtra. While 45.7% of RMPs indicated that they could prescribe generics, the survey showed that 35.5% thought the quality was poor. Over half of the respondents did not know of any generic medical supply stores in the area. The study urged for targeted education on production, sale, and quality variables to promote the use of generic medications, as the data indicated that RMPs are unaware of or feel comfortable with the generic quality or availability.

Tsaprantzi, A. V. et al. (2016) studied how the provision of information impacted doctors' attitudes towards generic medicines, in a public hospital in Greece. The study employed a cross-sectional survey, with an 82.71% response rate, and information from 134 doctors was analysed using descriptive statistics, inferential analysis, reliability assessment, validity assessment, and structural equation modelling. The results indicated significant associations between the provision of information and doctors' attitudes towards generics, influenced by demographic factors. The provision of quality information was determined to improve doctors' views and prescribing

practices about generic medicines, highlighting the fact that this process is dynamic. The authors emphasized the need for effective information provision policies that will improve doctors' attitudes towards generics.

Fadare, J. O., et al (2016) assessed the knowledge and perception of physicians of generic medicines in Nigeria, at tertiary health care facilities across four geolocations. A questionnaire was administered to 191 physicians, with the majority being male (85.9%). They reported an average knowledge score of 5.3 out of 9, with significant associations found between knowledge level and duration of practice. Concerns over treatment failure (82.7%) and reluctance to generic substitution by pharmacists (63.9%) were common, highlighting knowledge gaps and need for specific strategies to improve perceptions and prescription of generics by doctors in Nigeria.

Salhia, H. O. et al. (2015) examined the factors associated with the dilemma of low prescribing rates of generic drugs within Saudi Arabia by investigating the knowledge, belief, and attitudes of the doctors in Saudi Arabia. Data was collected on the perceived knowledge and attitudes of 231 doctors from hospitals in Riyadh about local generics using a random sampling approach. Results showed that doctors had a significant knowledge gap, with only few physicians understanding general terms like "generic" and "bioequivalence". The ratio of brand preference versus regionally available generics was shown to be most associated with clinical efficacy. Overall, the work identified senior level doctors at public hospitals as a group that has a relatively higher probability of prescribing generic drugs. It called for focused efforts on bridging knowledge gaps and driving the usage of generic drugs.

Yousefi, N. et al. (2015) conducted a cross-sectional study that focused on the perceptions of Iranian doctors with respect to effectiveness, safety, cost containment, marketing, patient acceptance, and government involvement of generic drugs. Findings from an administered survey of 410 doctors, indicated that, when doctors chose between brand name and generic forms of a drug - over 70% of doctors would have prescribed the generic form. Nonetheless, concern exists surrounding the quality and trustworthiness of generics manufactured in the United States. The studies discussed emphasized the need for governmental efforts to support the prescribing of generic drug prescriptions by providing evidence, training, and public awareness. The study also highlighted the need for educated and informed choices about drug therapy.

Kumar, R. et al. (2015), through a cross-sectional study, explored the attitudes, opinions, and practices of doctors at a private medical centre in Penang, Malaysia concerning generic drugs. A total of 263 doctors (35.8% response rate) completed the survey on generic medications. The findings suggested poor attitudes of doctors concerning quality, safety, and efficacy of generic medications, and that very few were adequately aware of regulatory bio-equivalence specifications. Because of some of these misconceptions, it was likely that private facilities were not using generic medications as much as they could. Increasing the use of generic medications and healthcare overall could be accomplished through the implementation of national pricing regulations and educating doctors about regulatory approval processes.

Gupta, S. K. et al. (2015) took up a cross-sectional study at a tertiary-care teaching hospital in Tamil Nadu, India, that suggested that most clinicians have an adequate understanding of generic drugs and prescribed generics most of the time. Even though most clinicians were found to have positive attitudes about generic drug safety, efficacy, and quality, some continued to hold a negative attitude around generics which delayed the use of generics and increased healthcare costs. This study highlighted the removal of barriers in order to enhance the usage of cost-saving generic medications.

Labiris G. et al. (2015) undertook a study among Greek physicians, eliciting their responses, through a validated survey, towards understanding their overall perceptions on generic medicines. The study included 908 physicians, and almost all of them reported very little acceptance of the national initiative on generics. Men respondents had higher scores on the instrument than women respondents. Physician comments included scepticism about the economic impact of generics, and doubts about the capability of Greek authorities to carry out pharmaceutical vigilance activities. The study provided strong evidence towards generic medicine acceptance issues among the physicians in Greece, especially those in Athens.

Hassali, M. A., Alrasheedy, A. A., Chan, C. W., Saleem, F., & Tangiisuran, B. (2014) conducted research in Perak, Malaysia to examine physicians' perceptions of generic medicines in a private medical setting. Of 105 respondents, there was little knowledge about bioequivalence standards, and doubts about generic efficacy (35.3% agreed) and safety (58.1% agreed). fifty percent believed that pharmaceutical marketing was a determining factor in prescription of medicines, and most agreed to a standardized brand substitution protocol. Paediatricians and

general medical specialists were more receptive to following such a protocol. Overall, the study highlighted the need for education on issues surrounding generic medicines making it easier for private sector physicians to break down the barriers and misconceptions.

Hassali M. A., et al (2014) focused on the impact of an intervention on physicians' prescribing practices, awareness, and attitudes of generics at a tertiary care hospital in Perak, Malaysia. This study utilized one cohort pre-test and one cohort post-test. The intervention comprised an interactive lecture, educational booklet and medication list. The intervention affected physicians' awareness of bioequivalence, similarities between generics, safety issues surrounding registration of a generic product. However, the intervention did not affect physicians' attitude and practice of prescribing generics by International Non-proprietary Name. Even when awareness of generic medications was increased through the intervention, physician misconceptions of generics remained.

Hassali, M. A. et al. (2014) focused on the differences between the attitudes of physicians in high income and low-income countries with respect to generics. Doctors practicing medicine in rich countries held a much more favourable opinion towards generic medicines, whereas practices in low- and middle-income countries showed varied opinions. Physicians in both high- and low-income countries had many similar concerns around knowledge of bioequivalence testing, cost incentives or disincentives to prescribing generics, concerns for product safety and quality in generics, as well as the influence of sales representatives. These variances may correspond to the variations between healthcare systems, pharmaceutical policies, educational interventions or access to drug information sources in low-, middle-, and high-income countries.

Bidgood, P. et al (2014) described the prescription practices of physicians in Jordan, while exploring the potential use of 'Electronic Prescription' (EP). Using a self-administered questionnaire, the study found that cost is an important factor in making prescribing decisions and noticed that the majority (77.4%) of physicians routinely prescribe generics. It found that 92% of respondents had positive attitudes towards equivalence product implementation, and that it seemed that these physicians would be willing to implement methods such as prescribing using the International Non-proprietary Name (INN) and generic substitution as a means to reduce pharmaceutical costs. Overall, this study highlighted that the physicians in Jordan are open to

generic medication, and have positive attitudes towards initiatives aimed at improving both clinical efficacy and financial efficacy in the Jordanian healthcare system.

Haque, M. (2017) examined the importance and impact of generic drugs on accessibility to healthcare, characterizing them as equivalent to brand-name drugs. It identified the legal context of generic and bio-similar drugs, and reports the pros and cons of generic medication with suggestions for future research. It concluded that generics can play an essential role in the provision of low-cost healthcare. However, in low-income countries and government health care systems, there are issues with regulation and standards of inspection. It also highlighted with a strong statement of support from both WHO and national health policies that physicians should prescribe essential drugs by their generic names, with an emphasis on the need for more vigilance and effort on the monitoring of prices and availability of drugs for robust policy decisions.

Singh, K. R. et al. (2016) investigated how healthcare workers viewed both original and generic medications and their emotions regarding these agents. Findings showed that half of the 200 people that participated in the descriptive cross-sectional study supported initiating the use of generic versions of brand-name medications when possible, and a third supported their use, when possible, in total. Contrary to popular opinion, 58.5% of people believed generic pharmaceuticals were much more expensive than original drugs. Furthermore, 56% of people believed that generic drugs were equally effective but also indicated that they had noticed differences in quality as well. As such, it was suggested for healthcare practitioners to receive enhanced training programs that address their knowledge as well as prescribing habits regarding generic medications.

Masood, I. et al. (2016) explored the preference for brand medicines over generic medicines by physicians in Pakistan. The study was conducted at two public hospitals in Bahawalpur, Punjab, using a survey of 150 physicians with a 17-item questionnaire employing a 4-point Likert scale. According to the survey results, many physicians preferred brand medicines for their perceived higher efficacy, especially male physicians and specialist doctors. Physicians' preference for brand medicines was influenced by a lack of knowledge regarding generics, as well as exposure to advertising by pharmaceutical companies. This study serves as an important reminder of the biases that operate in prescribing practices among healthcare practitioners.

Kumar, R. et al. (2015) evaluated the pre- and post-intervention effect of a multimedia educational program on the physicians in Kuala Lumpur, Malaysia, regarding generic medicine

knowledge and attitudes. The intervention, which was an interactive lecture, was found to significantly increase the local physician's knowledge of bioequivalence regulatory standards and many aspects of generic medicines including their safety, efficacy and bioequivalence. There was also a positive effect on doctors' attitude towards generic medicines. Based on these findings it was recommended that educational programs, such as the one under study, are likely to improve doctors' knowledge and attitudes towards generic medicines which could in turn lead to more rational prescribing practices.

Doracaj, D., & Grabocka, E. (2014) reported a study that examined how doctors and pharmacists in Albania perceive generic drugs and their concerns regarding their use. The results showed that there are knowledge gaps and uncertainty in regard to knowledge about generic drugs by doctors and pharmacists. Results indicated a general unawareness of bio-equivalence and quality assurance, as well as the influence of an array of pharmaceutical companies, which can influence a prescriber's habits. The overall conclusion was that doctors and pharmacists in Tirana need to be informed and educated in regard to generic drugs to ensure that they are utilised which is particular significance to help manage healthcare costs in Albania.

Shrank, W. H. et al. (2011) focused on physician perceptions of generic medications, and used Likert scales to evaluate respondent attitudes towards cost-related medication non-adherence, generic efficacy, potential generic quality, and preferences. The results revealed some significant negative perceptions: over 23% were unsure about generic efficacy, nearly 50% were unsure about generic quality, and over a quarter of respondents said they would prefer alternatives for themselves or their family. Logistic regression analyses revealed age was a significant predictor of perceptions, as older physicians were more likely to express doubt. These results illustrated the need for targeted education of older practitioners, so as to remove barriers to switching to generic medications and more cost-effective prescribing decisions.

Ganatra, N. A. (2010) scrutinized medical doctors' perceptions and prescribing behaviour of generic drugs at the Aga Khan University Hospital in Nairobi, Kenya. Data was collected from 33 medical doctors using a descriptive research design and semi-structured questionnaire. The findings suggested that medical doctors generally perceive generic drugs as inexpensive alternatives, of acceptable quality, and also an equivalent to branded medicines. Factors influencing the prescription of medicines include: the hospital formulary, knowledge of medicines,

the origin of the medicines, and insurance and patient preferences. While these study findings were comparable with most literature about the generics market, the researchers suggested that extending the research to a larger population in multiple hospitals would yield a more generalizable and encompassing understanding.

2.1.3. Literature Review from Patient's Perspective

Alwhaibi, M. et al. (2025), through a cross-sectional study, examined consumers' knowledge and perceptions regarding generic medicines in Saudi Arabia and their influence on medicine-use behavior. The findings indicated that while a large proportion of respondents were aware that generic medicines are more affordable than branded medicines, fewer participants perceived them as equally effective and safe. The study also found that physician and pharmacist recommendations significantly influenced patient willingness to use generic medicines. The study highlighted the importance of patient education and healthcare provider communication in improving public confidence in generic medicines. The authors concluded that targeted awareness programs can enhance rational medicine use and promote cost-effective healthcare.

Kassandros, K., et al. (2024) applies machine learning techniques to analyze survey-based data on patients' perceptions of generic medicines in Greece. A structured questionnaire was used to capture patient beliefs regarding the effectiveness, safety, and interchangeability of generic drugs. The findings revealed that perceptions of therapeutic equivalence, trust in regulatory authorities, and prior experience with generics play a central role in acceptance. The study demonstrated that advanced analytical techniques can enhance understanding of complex behavioral patterns related to medicine use. The authors concluded that evidence-based patient education strategies informed by predictive modeling can improve acceptance of generic medicines and support sustainable healthcare systems.

Celedón, N., González, C., & Cuadrado Nahum, C. A. (2021) presented the views and acceptability of patients and consumers on the use of generic drugs to sustain the global public health challenge of access to medicines. Many interventions have begun to bring attention to the promotion of generic drugs, to reduce pharmaceutical expenditure and increase coverage, but the

idea of using generics has not been prominently promoted. After searching the Epistemonikos database from several sources including MEDLINE and Cochrane, a total of 47 studies in four systematic reviews, one of which was a randomized controlled trial, was included. Across the studies reviewed, a general trend was noted, wherein a minority of consumers had negative views of generic medicines, for reasons that included lack of effectiveness, quality, safety, and possibility of adverse reactions.

Nagarajappa, M.H. et al. (2020) conducted exploratory research to understand the attitude of patients in Bangalore, India towards the acceptance of generic medicines, available at Jan Aushadi stores (JAS). It also sought to develop a model to simulate buying behaviour and thus suggest mechanisms to improve acceptance of generics. Seven factors were zeroed-in for adoption of generic medicines from Jan Aushadi Stores - value for money, trust, quality indicators, education by doctors, convenience of availability, home delivery and overall availability. Results found that doctor's prescription, lower price, availability of Jan Aushadi stores, promotion by the pharmacy owner, promotion by state and central government are significant in acceptance of Jan Aushadi. An important finding of the study was that patients who used generic drugs also recommended generic drugs to others.

Sammut Bartolo, N. et al. (2020) measured knowledge, attitudes and use patterns to study the general public's perceptions on generic medicines in Malta. A total of 228 individuals completed the self-administered questionnaire survey. Of the individuals surveyed, a total of 54% were female, 42% were 60 years and over. Results indicate that 61% knew about generic medicines, yet only 55% had used them before. 20% had never used a generic medicine based on concerns of lower quality. If the original product became unavailable, 54% of the respondent would use a generic, while 38% would use one for up to 20% less the cost of the original. The study's findings indicated that people were more open to generic medicines, had greater awareness of generic medicines, and had overall positive attitudes toward generic medicines, all of which was advantageous when compared to past local surveys.

Jangra, S. et al. (2018) examined the opinions of the general population of Jaipur, Rajasthan, regarding generic medicines as an option for reducing costs of healthcare. The study found the majority of subjects (92%) were familiar with the concept of a generic medicine, and the majority (76%) were able to differentiate generic medications from brand-name medications. 34.7% of

people felt generic medications were of less quality, whereas, 47.8% said that the brand name medicines worked better. Although 65% of persons would prefer a doctor to write a prescription for a generic medicine when available instead of a brand name medication, only 30.4% of respondents knew that the government was attempting to promote generic medications. Notably, the majority of the respondents used social media as their primary source of information. In order for generic medicines to be promoted as an effective strategy for lowering healthcare costs in India, the report recommended a Joint strategy not only social media, but also greater engagement of healthcare professionals in particular doctors to market the benefits of generic medicines.

Kesselheim, A. S. et al. (2016) discussed attitudes and use of generics in various therapies. The survey revealed large amounts of respondents stating they never asked their physician to prescribe them a brand-name medication instead of a generic one in the last year, while most respondents felt a physician should if possible, so the same. Most respondents found generic medications equal to brand-name medications in effectiveness, safety, and active components. Respondents who were non-Caucasian were more sceptical of efficacy of generic medications and also asked for brand-name medications more. The study highlighted an improved perception of generic medications, but emphasized the need to continue addressing lingering concerns to maintain the improvements for savings and better health outcomes.

Dunne, S. S. (2016) indicated that considerations such as trust in the brand name and perceptions that the generic medicine is of lower quality, create barriers to adoption of the same. College education is associated with increased acceptance, whereas lower socioeconomic status is associated with scepticism. The paper concluded that recognizing and correcting misconceptions, and positively changing physician perceptions wouldn't only improve patient trust and acceptance with regard to generic drugs, but would also further encourage continued use of these therapeutic options by improving patient attitudes and beliefs.

Sanchez, C. K., & Zurke, A. (2016) identified the central role that pharmacists have addressing patient misperceptions of generic medications amidst increasing health care costs and ever-increasing use of generic medications. Findings from the literature review and the survey data analysis identified the necessity of pharmacist-driven interventions to educate patients on the both the safety and efficacy of generic medications. The findings also indicated that pharmacists' communication with patients was a dominant component in improving patients' acceptance and

adherence to their prescribed generic medications, and thus were facilitating both cost containments and better healthcare outcomes.

Yousefi, N. et al. (2015) analysed how patients in Tehran, Iran evaluated generic medications and the factors influencing their acceptance. A comparison of 1309 completed surveys indicated that patients valued doctors' encouragement to use generic medications most importantly. Pharmacists' encouragement, the cost, and uncertainty in efficacy and safety closely followed. Capitalizing on patients' trust in health care professional to encourage the generic alternative for medications in Iran may be an effective way to reduce pharmaceutical spending while reducing patients' out-of-pocket (OOP) costs.

Nardi et al. (2015) investigated clinical information about generic drugs, socio-economic and demographic characteristics, consumption of generic drugs, and consumers' attitudes in comparison to branded drugs. Among the survey, 44.6% of respondents indicated generic drug use in the last 3 months, this also indicated that there were higher levels of use among women and elderly people. Overall respondents seem to prefer branded drugs over generic drugs at the same price point, and 30.4% indicated that they believe generic drugs do not work as effectively. It was indicated that ethnic and racial minorities, the elderly, and those with lower incomes tended to have less favourable impressions of generic drugs. These findings were found to be essential to develop robust health care policies that can enhance accessibility to quality medications at lower prices.

Fraeyman, J. et al. (2015) examined consumer perceptions of generic medicines in Belgium. Their data collection particularly examines the consumer awareness of generics around price advantage, given Belgium's relatively small generic marketplace. In general, results from an online survey with 1,636 respondents showed favourable attitudes towards generics, however their awareness was found to be lacking, particularly among older and less educated individuals. Price advantage was a major factor affecting the choice of brands, indicating a gap that requires clearer labelling and consumer education, so consumers can trust and promote using generics in pursuit of more cost-effective healthcare.

Smith, L. et al. (2015) tried to understand patient preferences between brand name and generic medications in the United States. The study included 347 survey responses from English-speaking adults. The research found that while cost was the main influence for preferring to have a generic

drug in place of a brand drug, patients with diagnosed chronic obstructive pulmonary disease (COPD), epilepsy, high cholesterol or other chronic or complex conditions felt their condition played a greater role in their preference. The findings represented a need for better patient-education of the drug class difference, within a branded name versus a generic to instil positive knowledge in patient decision making regarding medication treatment choices.

Cullen, W. et al. (2014) looked into the perceptions of generic medicines in an Irish patient population prior to the introduction of generic substitution and reference pricing in 2013. Using interviews administered to 42 patients from two general practices and arriving in community pharmacy settings, it was determined that there was limited knowledge about generic medicines (often confused "generic" with genetic - 39%). Of special point of worry was concerns about the quality of generics (24%), efficacy (18%) of generics and standard of manufacture of generics (30%) as noted in the discussions. Notwithstanding the reported worrisome knowledge gaps about the equivalency of generics, 86% of respondents supported reference pricing and the use and promotion of generic substitution. These findings supported the need for targeted patient education and enhanced availability of information about generic medicines to help alleviate concerns and uncertainty and enable decision making.

Alrasheedy, et al. (2014) provided an overview of patients' and consumers' perceptions, acceptance and knowledge about generic medicines. It found that predisposing factors among patients contributing to the decision making of taking generics included the degree of severity of the disease, provider recommendations to use generics, costs considerations to individual patients with their insurance prescription coverage, past experiences with generics versus branded medications, as well as their actual knowledge of generic medicines. The results suggested that there is a need for educational programs to further promote and assist with patient knowledge and understanding of generic medicines, moreover the overall findings point to the important role of health care professionals in facilitating the use of generics to aid with the acceptance and utilization by patients' needs.

Lira, et al. (2014) carried out a cross-sectional study that delved into the usage characteristics of generic drugs with 278 laypersons using a survey with a questionnaire. Most of the participants were aware of generics, however only about half of the sample were able to accurately define generics. Television was the main source of information about generics. Most participants were

confident that generics worked, and they were less expensive. However, many reported that they have never received a generic prescription from their doctors. The authors suggested that there should be educational programs to persuade healthcare practitioners to utilize generics more often and support patients to take them.

Raikwar, et al. (2013) assessed patients' perceptions of brand-name versus generic product options, while administering an online cross-sectional survey. The majority of respondents (68% and a mean age of approximately 29) saw generics as good value for the money and effective for some conditions, but only half of those individuals actually preferred them. The willingness to choose generic drugs rather than branded drugs differed among socioeconomic groups depending on preference for chronic versus general illnesses from four different preference clusters. The reliance on information sources was also investigated. The findings revealed intricate factors that influence patients' decisions between branded and generic medicines, which was a very novel dimension of their decisions about pharmaceutical consumption.

Francisquinho, A. M. N. (2013) studied the consumer perceptions of generic and brand medicines during an economic crisis in Portugal. Several variables measured included an individual's attitudes towards brand and generic drugs, influenced by information sources, technology and innovation, perceived quality and safety and their intention to purchase other medicines in the future. Considering the advances being made in the generic medicines sector, and the continued relatively low prescription rate and preference for brand medicines, it was incumbent upon those working with generic medicines to pursue new models of education and awareness that would, with appropriate interventions improve consumers' understanding of generic drugs so that informed decisions can be made, and consumption of generic medicines can be increased, within their constrained economic circumstances.

Faris El-Dahiyat & Reem Kayyali (2013) surveyed 400 patients in Jordan, which reported that participants shared similar concerns about medication expenses and preferences in decision making. It found associations between income, cost of medication, and medicines prescribed to patients. These results highlighted the need to address medication costs in Jordan, and also provided information as to patients' positive perceptions of generics that might be useful in making policy decisions regarding the most econometric use of medications. The results also suggested that even though a fair number of respondents knew generic medicines existed and could

differentiate those medicines in terms of price, there were also misconceptions, such as believing doctors preferred generics and didn't realize government promoted generics and had regulations. In summary, although most demonstrated a preference for generic medicines, they did not want to request a prescription for generics.

Lebanova, H. et al. (2012) tried to identify patients' expectations and attitudes regarding generic medicines in Bulgaria, identifying the most important factors impacting their views. Researchers used pseudo-randomized sampling to recruit 225 participants, men and women from the general public, and/or patients of the pharmacy, using a standardized questionnaire. Results revealed that 74% of participants had no information on generic drugs. Only 26% had good information provided by their healthcare providers. The major reason why most preferred original medicines over generics was due to lack of information. Patient perceptions were impacted based on recommendations of medical professionals, and previous experiences. They recognized lower prices and increased accessibility as benefits, but, again, there needs to be better awareness and knowledge on generic medicines and rational drug use in the Bulgarian population.

Kobayashi, E. et al. (2011) focused on Japanese patients' understanding and attitudes about generic drug substitutions and potential factors that influenced patients' acceptance and attitudes. Conducted among both male and female respondents purchasing prescription drugs, a survey of 1215 respondents reported an overall lack of awareness of the existence and accessibility of generic drugs, notwithstanding the majority had a correct understanding that generics were cost-effective and had the same active ingredients as brand drugs. Experience using generic drugs has a positive impact on willingness for substitution. Recommendations from doctors and pharmacists influenced consumers' willingness to use generics. Overall, the study concluded that there is need for expanded public education campaigns to inform consumers about the true nature of generic substitution, the important role of health-care professionals in informing patients correctly, and called for better education and communication strategies about generics in Japan.

Babar, et al. (2010) also studied consumers' perceptions, knowledge and attitudes towards generic medicines. The study was undertaken in 30 pharmacies, across four regions and involved an analysis of 441 questionnaires. Over half of respondents had pre-existing knowledge about generics mainly from pharmacists. However, some incorrect understandings continued to exist at the time. Higher education was associated with correct knowledge, and general experiences and

recommendations from pharmacists were positively linked to attitudes towards consumers using generics, especially for milder illnesses. Overall, understanding generics was the key to consumers making informed choices and improving quality use of and access to generics; therefore, education and health care professionals were considered to play a pivotal role.

Shrank, et al. (2009) addressed the perceptions of commercially insured adults related to generic drugs and has examined perceptions relative to costs, effectiveness, safety, and preferences between use of generic drugs vs. brand name drugs. Conducted as a national survey, findings were presented that indicated that although patients view generics as an inexpensive, and, safe alternative, only 37.60% took preference for them. 56% of participants supported that Americans should use more generics. This study examined the interaction of the practitioner with patients about generics and the relationships with policymakers regarding the use of generics. Findings supported the continued difficulty in having commercially insured adults use generic medications cost effectively, indicating that providers, insurers, and policymakers would need to further foster adoption of the generics if there are barriers to the use of generic drugs.

Hassali, et al. (2009) investigated the consumer attitudes towards generic medicines from 1970 to 2008, based on reports in 20 studies, mostly from US and Europe. Particular to this review were the responses that varied according to many factors such as, socioeconomic status, policies on education and health care. Overall confidence levels in generic medicines had increased over the decades more so in developed countries. The results indicated to the further need to rely on mass education, monetary incentives, and communication between the patient and health care professional, for the promotion of generic medicines.

Stewart, K. et al. (2005) attempted to find out what people believe about generic medications and what they believe are barriers to the use of them. Sixteen respondents between the ages of 22-80 were interviewed in Melbourne, Australia, using a semi-structured questionnaire. Knowledge of generics, acceptance, rejecters, and educational needs were the four major areas formed from the thematic analysis. Price, was an important factor in the acceptability of 'generic medicines', even when the term was unfamiliar to some respondents. Acceptable information from health care professionals influenced acceptance, whereas practitioner influence, concerns about side effects, and confusion with branding were identified as barriers to acceptance. There was a general consensus that generics were safe and effective, and acceptance of the findings were endorsed by

them recommending that health care providers and governments should educate patients about generics. It suggested that acceptance may be significantly increased through the continued education by healthcare practitioners to directly educate patients.

Sansgiry, S. S., & Bhosle, M. J. (2004) tried to predict how social and health factors would impact the use of generics drugs, and to assess people's views about the substitution practices of pharmacist in America. The questionnaires were sent to ten community pharmacies in the Houston metropolitan area, where the response rate was 61% (505). 62% of participants thought that the generic drug substitution practices were helpful, 68% believed the substitution practices were safe, and only 50% thought they were the same as the generic. The most important aspect that affected the adoption of generic medicine by patients, was their attitude toward generic drugs. This reflected the need to promote positive information toward generics, which could enhance consumer attitudes, increase awareness of potential savings, and assist in relieving rising healthcare costs for the populace.

CHAPTER – III
RESEARCH METHODOLOGY

3.1 STATEMENT OF PROBLEM:

The rising focus on generic medicines as viable and cheaper substitutes to brand medicines has paved the way for understanding the factors affecting the adoption of generics. Physicians have a central role in forming patients' attitudes towards generics and their prescription behaviours impact patient pharmacological behaviours. However, physician perceptions about the effectiveness and quality of generic drugs differ, which in many cases impedes their quality of prescribing generic drugs. Additionally, the patient perceptions of the importance and effectiveness of the drug, also influences patients' willingness to accept generics. This study investigates physician attitudes towards prescribing generic medicines and how their attitudes, with the patients' perception of drug importance, informs patients' acceptance and adherence to generic drugs. Addressing these issues is important and essential to facilitate better adoption of generic medicines, improve accessibility to health care, and lower overall treatment costs.

Despite being one of the largest exporters of generic medicines in the world, India suffers from a big problem of uptake of generic medicines within India's own health care system. India has one of the highest per capita out-of-pocket health expenditure rates in the world, with medicines making up almost 70% of its, but the potential savings through greater uptake finally by using more generic medicines is significant. However, in India, it has been reported that only less than 50% of medicines are prescribed by their generic name. Additionally, the common trend in western countries is that over 80% of medicines are prescribed generically. This stark contrast represents a significant gap in the health care system that can be ameliorated through greater adoption of generic medicines.

This problem is not only related to physicians' prescribing patterns but is also related to the patients' perceptions of drug importance and will ultimately inform generic medicine acceptance. Therefore, this study seeks to examine physician attitudes towards prescribing generic medicines and also the perceived importance of these medicines among patients in India. Ultimately, the findings from this study will provide information regarding potential barriers, and opportunities for increasing adoption of generic medicines in India.

3.2 PROPOSED TITLE:

Adoption of Generic Medicine: Physicians' Prescription Attitude and Perceived Drug Importance among Patients

3.3 RESEARCH GAP:

- Most cited studies on prescriber and pharmacist attitudes are from outside India (Nigeria, Ethiopia, Jordan, Pakistan, Finland, China, Malaysia), limiting the contextual relevance of insights for local prescribing, dispensing, and patient adoption norms. (*Lakshmi V. R., et al., 2023*).
- International studies document the influence of pharmacists on generic drug substitution and patient counselling, but similar systematic analyses of Indian pharmacists remain limited, especially with respect to incentives, practices, and counselling barriers. (*Kaur S., 2020*).
- Most research has gone into comparisons between branded medicines and generic medicines, without differentiating between branded generics and unbranded generics. Price variation between pure generics and branded generics across 54 molecules has been found in range from 8% to 190%. (*Manak S. & Inder D., 2025*)
- The previous research undertaken have not been able to bring a holistic and integrated approach for studying the complete prescription generation, dispensing and adoption of generic medicines. This would be giving a holistic understanding of the issue. (*Gawali U. P., et al., 2018*)
- Most studies into generic medicine have considered only chronic patients. People who do not consume medicine on regular-basis need to be considered and distinguished from regular users. This is relevant as the experience of generics is found to be low among non-regular users. (*Vaishnav D.K., et al., 2024*)
- Majority of the research into generic medicine adoption has considered patients with higher education levels and from urban areas as samples. Individuals with basic education and from rural settings also need to be considered, as the need for cheaper medicines is more acute in this segment. (*Guleria K. S., et al., 2025*)
- Very few studies account for heterogeneity across therapeutic categories. They mostly treat generics largely as a 'monolith' class of medicines. Attitudes may vary across therapeutic

specializations. Therapeutic-class desegregation is mostly found missing. (*Tapan Kumar Mahato & Durgeshwari Raulji 2021*).

- Convenience sampling and small sample sizes has been resorted to by most researchers for their studies in this domain. This raises generalization and validity concerns of the research findings. (*Sunil Madan & Som Aditya, 2024*).

3.4 RESEARCH QUESTIONS

Based on the research gap the following research questions were framed to fill research gap

1. What factors influence physicians' attitudes toward prescribing generic medicines?
2. How do pharmacists impact patients' decisions to purchase generic medicines?
3. How do environmental factors affect patients' perceived importance of generic medicines?
4. What is the mediating role of patients' socio-economic factors in the relationship between physicians' prescription attitudes and the adoption of generic medicines?

3.5 RESEARCH OBJECTIVES

1. To study the factors affecting the physician's prescription attitude towards generic medicines.
2. To analyze the pharmacist influence on the patient's purchase of generic medicines.
3. To study the role of various environment factors on the patient's perceived importance of generic medicines.
4. To understand the mediating role of patient's socio-economic factors on the physician prescription attitude for generic drug adoption.

3.6 HYPOTHESES OF THE STUDY

H₀: There is no significant effect of physician's factors on their prescription attitude towards generic medicines.

H₀: There is no significant influence of pharmacist on the patient's purchase of generic medicines.

H₀: There is no significant influence of environment factors on the patient's perceived importance of generic medicines.

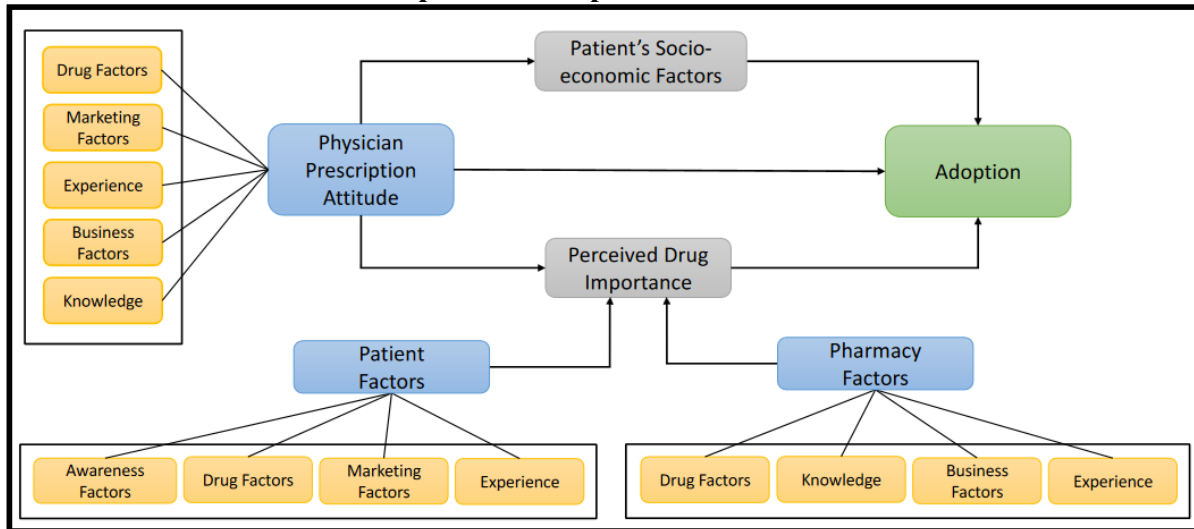
H0: There is no significant Mediation effect of patient's socio-economic factors on the physician prescription attitude for generic drug adoption

3.7 RESEARCH METHODOLOGY

The research design is the overall plan that details how the researcher will integrate the individual parts and parts of the study project in a consistent and logical manner. The research design is helpful for the researcher to ensure that the research problem is addressed systematically and to make sure that the research project meets the overall goals of the study. The research design is basically a "blueprint". It indicates how the data is to be collected, how the data will be measured, and how the data will be analysed. The research design determines how to collect data, what the instrument of measure will be, and which statistical procedures should be used to analyse the data obtained to get accurate results and conclusions. Thus, the researcher makes sure that the research project is designed in a strategic plan of action and that he or she is producing a reliable and valid findings of quoting objectives.

3.7.1 Chosen Research Design: The current study is using a descriptive cross-sectional research design. A descriptive design was used because it will provide a useful and in-depth it is to potentially describe the results relayed from the responses of key informants who are included in the survey, such as, physicians, pharmacists, or patients involved in the process of adopting generic medicines. The aim is to provide a thorough reflection of their knowledge, thoughts and experiences as they relate to generic medicine to improve understanding of generic medicine adoption. A descriptive design will allow for the systematic collection and analysis of data and show the significance of some or all of the factors that help in admitting medicine in the adoption process in the healthcare system. As depicted in Figure 3.1, a model can be proposed that will help conceptualize the relevant variables and their connections to each other. It serves as a framework to help understand the generic medicine adoption process in the healthcare system.

Figure 3.1
Proposed Conceptual Frame work



Source: Compiled by the researcher

This current research model addresses the process of generic medicine adoption by deliberately separating out one dependent variables (DVs) - generic medicine adoption. These DVs are linked to a complex set of independent variables (IDVs) such as physician prescription attitude, patient elements, and pharmacist elements. This study has intentionally categorised the independent variables into dimensions that define their role.

First, the range of drug elements includes, the quality of the generic medicines, the formulation, the trade-offs for risk factors and financial policies. These elements are key variables for both physician and patient acceptance of generics. Second, the range of marketing elements include advertising efforts, promotion initiatives, trade fairs and symposiums. Marketing elements shaped consumers opinions, perception, and ultimately adoption of the generic medicines.

Third, business practice elements, such as the persistence of medical sales representatives (MSRs), the good corporate reputation of the pharmaceutical companies, and the economic incentives offered to physicians or pharmacists. Fourthly, dimensions of experience elements is important and can account for the professional experience of physicians with specialized therapeutic experience, whether the patients had "use experience" with generic medicines, and whether the pharmacist made any recommendations to the patient.

Furthermore, the model has considered the level of knowledge with respect to generic medicines, as it may influence both the physician prescription behaviour and the patient's acceptance. It was

evident that the socio-economic conditions of patients can be viewed as a mediating variable that outlined how these factors interacted to influence generic medicines adoption. Overall, this model offers a theoretical and conceptual framework to demonstrate the adoption process for generic medicines in view of the multi-faceted task of integrating these elements together.

Table 3.1
Sampling Inclusion / Exclusion Criteria

S. No.	Respondents	Category wise
1	Physicians	M.B.B.S or M.D or equivalent as per Medical Council of India Act 1956.
2	Patients	Adult Patients (above 18 years of age) Patients with elementary education (passed 8th Class) Regular users (at-least one chronic medical condition) and Nonregular users (visit health centre on ad hoc basis)
3	Pharmacists	Stand-alone pharmacies holding a valid retail drug license under Indian Pharmacy Act 1948

Source: Compiled by the researcher

The study uses a Two-stage systematic random sampling method for physicians and pharmacists, and a two-stage quota sampling method for patients. The study concentrates on the ten erstwhile districts in Telangana state and the samples are drawn proportionally to the district population in relation to all populations in the state (see Table-1). The population figures in respect of the sampling were based on the 2011 Indian Census data. This method of sampling ensures that the samples are representative and adequately reflect the demographics of the target population in the state.

3.7.2. Sampling Area Justification: Telangana State

Telangana, as a region in India, presents a distinctive and important landscape for researching generic medicine adoption because Telangana is home to a diverse population with varied socio-economic conditions and has a presence in the pharmaceutical sector. Within the state, there are urban centres with Hyderabad as "Pharma City" because it comprises a high throughput of

pharmaceutical companies, and is home to some major producers of generic medicines, making it a great place to explore the demand and supply side of generic medicine.

Telangana, and especially Hyderabad, plays an important part in India's pharmaceutical counterpart and has even been dubbed as the "Bulk Drug Capital of India". Hyderabad accounts for an approximately third of India's pharmaceutical production, and also nearly a fifth of India's exports of pharmaceuticals also go through Hyderabad. This concentration of activity is an advantage when considering the pharmaceutical distribution situation of Telangana, and to investigate trends in drug adoption, including research on generic medicines. In addition to this, Hyderabad is home to 'Genome Valley', which is the largest R & D cluster in the country, with over 800 pharmaceutical companies contributing to the cluster. Hyderabad is a strategic research location in India, as it is the nexus of pharmaceutical manufacturing and distribution. Furthermore, Telangana represents the national averages in terms of demographic, disease burden, and other health index, making it broadly representative of other Indian states. This makes Telangana attractive for research involving generic medicines, which may contain findings applicable to the entire country. In addition, I have over nine years of experience working as a wholesale distributor of pharmaceutical products in Telangana, which will make data collection from involved sectors and stakeholders more feasible, we will be able to make good contacts to gather whatever information would be necessary for this study.

In addition to its broad range of pharmaceutical plants, Telangana has a good mix of health services and population across a spectrum of health facilities ranging from high-end hospitals in urban settings to primary health care providers in rural areas. This variation is important to consider when investigating the adoption of generic medicines, since it plays a direct impact on physicians prescribing behaviours situated distance from their facilities and also consumers purchasing behaviours.

The sample was comprised of the 10 erstwhile districts of Telangana to capture a representative demographic, economic, and healthcare diversity within the geography. This type of approach was chosen to develop a deeper understanding of the various factors impacting the adoption of generic medicines for different groups, making the findings more applicable outside of Telangana.

The sampling method involved a two-stage systematic random sampling process for an appropriate sample size for the physicians. All eligible physicians followed the definition from the Medical

Council of India qualifications of M.B.B.S., M.D. etc., and for the physician population across the 10 studied districts, there were 47,945 physicians. The sample method was intended to provide a random cross-section of healthcare professionals from the target population. Also, the pharmacists in the 10 districts numbered 23,101. The total population for these districts was 34,880,313 according to 2011 census.

3.7.3 Determination of Sample Size for Physicians, Patients and Pharmacists:

The formula for calculating sample size in finite populations when estimating proportions was systematically introduced and disseminated by William G. Cochran in his widely cited textbook Sampling Techniques, and with the original published in 1953, and two further editions in 1963 and 1977, Cochran provided theoretical background and guidance on sampling methods, as well as the precise calculation of sample sizes necessary to obtain a desired confidence and precision level in a known population.

$$\text{Sample size}(n) = \frac{Z^2 N p q}{N d^2 + Z^2 p q}$$

Table 3.2
Sampling Size Determination for Physicians, Patients and Pharmacists

Physicians	Patients	Pharmacists
Z= 1.96 (5% level of sig.)	Z= 1.96 (5% level of sig.)	Z= 1.96 (5% level of sig.)
P= 0.5	P= 0.5	P= 0.5
Q= 0.5	Q= 0.5	Q= 0.5
D=0.05 (Confident level)	D=0.05 (Confident level)	D=0.05 (Confident level)
N= 47,945	N= 3,48,80,313	N= 23,101
=3.8416*(47,945*0.5*0.5)/((47945* 0.0025) + (3.8416*0.5*0.5))=	=3.8416*(3,48,80,313*0.5*0.5)/((34880313* 0.0025) + (3.8416*0.5*0.5))=	=3.8416*(23,101*0.5*0.5)/((23,101* 0.0025) + (3.8416*0.5*0.5)) =
381.106	384.155	377.876
Sample size chosen: 400	Sample Size chosen: 600	Sample Size chosen: 400

Source: Compiled by the researcher

The sampling procedure described above identified the sample size for each of the three segments, i.e., Physicians, Patients, and Pharmacists. The research obtains the sample size from distributing the questionnaires in draft format. This research was conducted using a primary data collection process. In regard to primary data collection methods, this research used the survey method. The survey was conducted using questionnaires that were well constructed and distributed to respondents in the state of Telangana. The respondents were divided into three segments: physicians, pharmacists, and patients. Separate questionnaires were developed and distributed for each type of respondent in order to achieve the study objectives. The data derived from these questionnaires were utilized to test the proposed model for the adoption of generic medicines.

Sampling Design: Sampling method employed, for all respondent categories, was in two stages.

- a) **First Stage:** Elements of the sampling frame were grouped district-wise.
- b) **Second Stage:** Respective sampling technique is then applied within each district.

Representativeness has been attempted in the sample by the following means.

- a. Target populations for each type of respondent have been defined with their sampling frames.
- b. Proportionality was attempted by dividing the populations by strata district-wise, and ensuring that the proportion of respondents from each stratum meant the proportion matched the actual population, based on secondary information.
- c. Random sampling was used for the physicians and pharmacists within each district.
- d. Quota sampling was used for patient categories within the pharmacy outlets, with careful attention to adherence to inclusion/exclusion criteria of the sampling frame along with a 50% increase in the calculated sample.

3.7.4. Sampling Respondents for the Physicians

This study examined the Physician who were practitioners of general medicine and held a Bachelor of Medicine and Bachelor of Surgery MBBS qualification, MBBS with postgraduate degree/diploma, or the equivalent qualification of any other medical branch under the Indian Medical Councils Act 1956. The Physicians were involved in the non-surgical management of patients. The database lists were obtained through the professional association bodies like the

Indian Medical Association and the Telangana State Medical Council, and the respondent were individually select from physicians randomly.

Table 3.3
Sampling Schedule of Physicians

S. No.	District	Total No. of physicians	Physicians %	Physicians Sample size	Kth Term
1	Adilabad	1675	3.49%	14	120
2	Hyderabad	14111	29.43%	118	120
3	Karimnagar	4787	9.98%	40	120
4	Khammam	2591	5.40%	22	118
5	Mahabubnagar	2166	4.52%	18	120
6	Medak	1857	3.87%	15	124
7	Nalgonda	2461	5.13%	21	117
8	Nizamabad	1755	3.66%	15	117
9	Rangareddy	10754	22.45%	90	119
10	Warangal	5788	12.07%	48	121
	TOTAL	47945		400	

Source: Indian Medical Association and the Telangana State

The sampling of physicians throughout various districts in Telangana is summarized in the table above, and it is based on the Telangana State Medical Council (TSMC) data. The sampling procedure involved two steps for the sampling of physicians. The first stage involved grouping physicians by district from the state-level respondent list. The second stage used a systematic random sampling by selecting respondents from each of the TSMC districts. The sampling procedures allowed for some degree of equity in physician representation. Although the study involved a simple random sampling technique to determine a sample size of 384 physicians using the known population of 47,945 physicians in the state, the study was able to exceed this by obtaining responses from 400 physicians. To achieve a sample of 400 physicians, systematic random sampling was used, whereby every 120th physician on the TSMC list was contacted (Kth term = $47,945/400 = 120$). Moreover, the distribution of the sampled physicians was similarly reflective of the overall physician population of Telangana, with Hyderabad comprising the largest sample of physicians with a 29.43% (n = 118), followed by Rangareddy at 22.45% (n = 90).

Warangal and Karimnagar had considerable contributions to the sample with 12.07% (n = 48) and 9.98% (n = 40), respectively. The remaining districts representing Khammam, Mahabubnagar, and others represented between 3.49% and 5.40% of the total sample size.

3.7.5. Sampling Respondents for Pharmacists- With regards to the pharmacists, in accordance with the Indian Pharmacy Act of 1948, licensed stand-alone pharmacies were sampled. The sample of registered pharmacies was obtained from professional association bodies such as the All-India Chemists and Druggist Association and the Telangana State Pharmacy Council. The sample also included Jan Aushadi Kendra's in the state (not the Union Territory's), as provided by the Pharmaceuticals & Medical Devices Bureau of India.

Table 3.4
Sampling Schedule of Pharmacists

S. No.	District	Total No. of pharmacists	Pharmacists	Pharmacists Sample size	Kth Term
1	Adilabad	1365	5.91%	24	57
2	Hyderabad	4592	19.88%	80	57
3	Karimnagar	2841	12.30%	49	58
4	Khammam	1417	6.13%	25	57
5	Mahabubnagar	1362	5.90%	24	57
6	Medak	1451	6.28%	25	58
7	Nalgonda	2294	9.93%	40	57
8	Nizamabad	1585	6.86%	27	59
9	Rangareddy	2773	12.00%	48	58
10	Warangal	3421	14.81%	59	58
		23101		400	

Source: All-India Chemists and Druggist Association and the Telangana State Pharmacy Council

The table provides the sampling distribution for pharmacists in different districts in Telangana, using a total population of 23,101 pharmacists. The study followed a two-stage sampling process, with Stage 1 organizing pharmacists district-wise according to the state respondent list, and Stage 2 applying systematic random sampling of pharmacists in each district. The goal of the procedure was to get fair representation of pharmacists in different districts. From the sampling process,

377.876 was derived as a sample size, however the study collected responses from a sample size of 400 pharmacists, both to ensure representation of each district in proportion to the population size, and to improve the reliability of the findings. The study used a two-stage random sampling method to collect the primary data from the sampling distributors across each district in Telangana. The registered pharmacists in Telangana state is seen as 23,101 pharmacists. In accordance with simple random sampling methodology, the expected responses required for a known population of this size is usually 384. The study was able to collect primary data from a sample size of 400 respondents, which is larger than the minimum required responses. The data was collected by randomly contacting every 58th pharmacist in the entire population (23,101 divided by 400 = 58). A second stage Systematic Random sampling in each of the 10 districts was then applied. Hyderabad (County) produced the most sampled pharmacists, as it has the largest population size contributing 19.88% (80 pharmacists). Warangal and Karimnagar were not too far behind, contributing 14.81% (59 pharmacists) and 12.303 (49 pharmacists), respectively. Rangareddy was almost equivalent at 12.00% (48 pharmacists). Nalgonda, Nizamabad, and Medak contributed between 6.28% to 9.93%. Adilabad, Khammam, Mahabubnagar obtained a contribution of around 5.90% to 6.13% of the total sample size. This sampling approach facilitated sufficient representation of pharmacists in each district for sample representation, and the total representation also ensured variety of representation across the state.

3.7.6. Sampling Respondents for the Patients:

This research included adults' patient-aged >18 years with at least elementary education (Class 8, as per Right to Education Act 2009). The study included both regular medicine users and non-regular users of medicines. Regular patients were defined by Babar et al., (2010) where patients suffered from at least one chronic medical condition. Non-regular medicine users were patients who visit health services as an on-the-spot visit. The method used for data collection from patients was the method suggested by Kobayashi et al., (2011) where patient questionnaires were completed at Jan Aushadi Kendras and pharmacies with 'soft' convenience sampling. It was determined that the convenience sampling done at the same time the druggists were interviewed would minimize bias of personal bias when damn creating questionnaires.

Table 3.5
Sampling Schedule of Patients

S. No.	District	Population	Population %	Patient Sample Size
1	Adilabad	27,40,832	7.86%	47
2	Hyderabad	38,20,369	10.95%	66
3	Karimnagar	33,38,497	9.57%	57
4	Khammam	24,70,900	7.08%	43
5	Mahabubnagar	35,36,291	10.14%	61
6	Medak	33,07,121	9.48%	57
7	Nalgonda	34,88,809	10.00%	60
8	Nizamabad	25,43,647	7.29%	44
9	Rangareddy	58,13,478	16.67%	100
10	Warangal	38,20,369	10.95%	66
	TOTAL	3,48,80,313		600

Source: Secondary data (Census India, 2011)

The analysis discovered the lack of accessibility to patients' data who are buying generic drugs. The study adopted the convenient sampling method for gathering the primary data. The table below was developed to show the sampling distribution for patients across different districts in Telangana as it relates to population of 34,880,313 population, as of census, 2011. The author adopted the Quota sampling method to indicate that 384.155 responses were adequate, however, for data reliability purposes, the study adopted the 600 that were collected from ten districts.

The study involved two steps; step 1 was to group patients by districts as related to the total number of respondents from the state based on census, 2011 and step 2 the Quota sampling method adopted to get the quotient of respondents by districts at the randomly selected pharmacy outlet. The purpose was to try to get a representative sample across ten districts. The district of Rangareddy had the most respondents, with 16.67% (100 patients) which is an equitable representation of its population size. Hyderabad and Warangal had equal contributions of 10.95 (66 patients) respondents. Mahabubnagar sampling reflected contribution of 10.14%; Nalgonda, 10.00%, Karimnagar, 9.57% and Medak, 7.08% reflected similar contributions. The other districts reflected response contributions between 8.36% and 9.34%. This approach allowed for reasonable and

equitable distribution of patients from each district while respecting the sampling distribution based upon the population of each district.

3.8. DATA COLLECTION PROCESS

Data Collection begins with the stage of Questionnaire Preparation. The relevant questions are devised based on the aim of the study. Second, the data collector needs to make sure Content Validity exists, by looking at the research and seeing what the research shows to validate clear and relevant questions. Then the research can be conducted in a Pilot Study to test out the data collection tool and paving the way for improved responses, if necessary. Third is the Reliability Testing, to see if the data will be consistent. Fourth is conduct the Full-scale Data Collection, which is gathering all the necessary information from the selected research respondents.

Structured questionnaires, on 5-point Likert scale, were prepared for each respondent category, separately

Table 3.6
Physician Questionnaire Indicator Schedule

Physician Questionnaire having 6 indicators and 29 items		
Indicators	Description	Total Items
DG	DG Drug Factors	5
KW	KW Knowledge	5
EP	EP Experience	5
BU	BU Business Factors	5
MK	MK Marketing Factors	5
AP	AP Adoption	4
	Total	29

Source: Compiled by the researcher

The Physician Questionnaire contains 29 items divided into 6 key indicators: Drug Factors (DG), Knowledge (KW), Experience (EP), Business Factors (BU), and Marketing Factors (MK), each of which has 5 items. The final indicator, Adoption (AP), has 4 items. These indicators help to assess the multiple aspects that impact physicians’ practice and decisions.

Table 3.7
Patient Questionnaire Indicator Schedule

Patient Questionnaire having 6 indicators and 26 items		
Indicators	Description	Total Items
DG	DG Drug Factors	4
AW	AW Awareness	5
EP	EP Experience	5
MK	MK Marketing Factors	4
AP	AP Adoption	3
PI	PI Perceived Drug Importance	5
	Total	26

Source: Compiled by the researcher

The patient questionnaire consists of 26 items distributed across 6 indicators: Drug Factors (DG) (4 items), Awareness (AW) (5 items), Experience (EP) (5 items), Marketing Factors (MK) (4 items), Adoption (AP) (3 items), and Perceived Importance of Drugs (PI) (5 items). The questionnaire was designed to investigate patients' perceptions, experiences, and knowledge of drugs. In combination, all of the indicators relate to important considerations regarding elements that could influence patient behaviour and decision-making.

Table 3.8
Pharmacist Questionnaire Indicator Schedule

Pharmacist Questionnaire having 4 indicators and 21 items		
Indicators	Description	Total Items
DW	DG Drug Factors	5
KW	KW Knowledge Factors	4
BU	BU Business Factors	6
EP	EP Experience	6
	Total	21

Source: Compiled by the researcher

The Pharmacist Questionnaire includes 21 items across 4 major indicators. These indicators include Drug Factors (DW), which consists of 5 items, Knowledge Factors (KW), which consists of 4 items, Business Factors (BU), which consists of 6 items, and Experience (EP), with 6 items.

The questionnaire is applied to pharmacists' knowledge, business practice, and experience with respect to drugs. These indicators collectively provide information about the factors affecting pharmacists' facilitation of care and decision making in healthcare.

3.9. CONTENT VALIDITY

- Pre-testing form of each respondent questionnaire was given to 10 experts to look for relevance and clarity of items for each questionnaire.
- The panel experts rated them and then the Content Validity Index (CVI) was calculated.
- The process of content validity for the 3 questionnaires of Physicians, Pharmacists and Patients was the methodology of Polit et al., (2007). The I-CVI values are adjusted for chance agreement with the modified kappa statistic.

$$p_c = \left[\frac{N!}{A!(N - A)!} \right] .5^N$$

N= Number of Experts

A = Number of Agreeing or Relevance

P_c = Probability of Chance Agreement

$$k^* = \frac{I-CVI - p_c}{1 - p_c}$$

I-CVI = Item Level Content Validity Index

K* = Modified Kappa statistic

Table 3.9
Expert Panel Criteria for Content Validity

Physician		
Number	Expert Category	Criteria
5	Physician	MBBS, with min 5 years' Practice
5	Academician	Doctorate, with min 5 years' Experience

Patients		
5	Patients	Suffering with at least 1 chronic condition from 1 year or more
5	Academician	Doctorate, with min 5 years' Experience
Pharmacists		
5	Pharmacists	With at-least 5 years of practice.
5	Academician	Doctorate, with min 5 years' Experience

Source: Compiled by the researcher

The Item-level Content Validity Index (I-CVI) and Scale-level Content Validity Index (S-CVI) were analyzed in Microsoft Excel.

- Each item was rated on a 4 point-interval scale (1 – not relevant; 2 – needs some revision; 3 – needs minor revision; 4 - very relevant)
- I-CVI is calculated by the number of experts providing a score of either 3 or 4, divided by the total number of experts (Threshold value is > 0.8).

S-CVI is calculated in two ways:

- Average Agreement (S-CVI/Ave) – Threshold value is > 0.92
- Universal Agreement (S-CVI/UA) - Threshold value is > 0.7

Table – 3.10
Content Validity Indices Table

Category	Measure	S-CVI/Ave	S-CVI/UA	S-CVI/Ave*
Physician (Pretest Form)	Relevance	0.9783	0.7941	0.978
	Clarity	0.987	0.8824	0.9868
Patient (Pretest Form)	Relevance	0.9933	0.8077	0.9933
	Clarity	0.9467	0.6923	0.9437
Pharmacist (Pretest Form)	Relevance	0.98	0.7143	0.9791
	Clarity	0.99	0.7619	0.9899

Source: Compiled by the researcher

The table displays the Content Validity Index (CVI) scores for the Pretest Form by physician, patient, and pharmacist respondents for relevance and clarity. The overall S-CVI/Ave values are

very high across all respondents, with mean scores ranging from 0.9467 to 0.9933 indicating that questionnaire items are highly relevant and clear. The S-CVI/UA values, where universal agreement among experts is indicated, generated moderate to strong agreement overall, with physician importance mean scores being 0.7941 and patient mean scores being 0.8077 for relevance. The overall clarity mean scores were slightly lower; however still above 0.69 indicating that almost all experts felt the items were clear. The S-CVI/Ave* scores closely corresponded with the average scores of the S-CVI scores indicating that questionnaire items maintained both relevance and clarity argued towards the overall content validity of the instrument prior to full scale use of the intervention.

3.9.1. Pilot study

Prior to the full study, a pilot study was undertaken to test the reliability and validity of the structured questionnaire developed to measure the factors impacting the prescription and/or use of generic medicines for physicians, patients, and pharmacists. Using the earlier calculations of I-CVI, S-CVI/Ave and S-CVI /UA, we can conclude that scale of the questionnaire has achieved a satisfactory level of content validity.

- The “5 respondents per indicator” rule has been used for pilot testing of the questionnaires.
- Hence, sample sizes were calculated for each respondent category.

3.9.2. Reliability Statistics

Reliability statistics is used to determine the extent to which the measurement instrument is either consistent or stable in measuring/sampling something as specified (same tool to obtain the same result when the same procedure is applied in the same conditions). Cronbach’s alpha (α) is one of the most widely used estimators of internal consistency reliability. Cronbach’s alpha represents how closely related a set of items are as a group, i.e., if the items are strongly related to one another, then they can reliably be considered to be measuring the same thing. Cronbach's alpha can take any value between 0 and 1, with a high value indicating greater reliability. As a desirable level of reliability, alpha is generally a satisfactory value of 0.70 or greater, with 0.80 to 0.90 indicating good to excellent reliability, respectively.

The term, Cronbach's Alpha, was introduced by Lee J. Cronbach in 1951 in a very influential paper, "Coefficient alpha and the internal structure of tests", in *Psychometrika*. This provided a

foundation for reliability testing in today’s social sciences, psychology and education (Cronbach, 1951). Furthermore, Tavakol and Dennick (2011) provided an easy way to understand Cronbach’s Alpha, and how to interpret it as applied research methodology. They emphasized the use of Cronbach’s Alpha to measure the quality of scales in various disciplines.

Table 3.11
Sample Size Calculations for Pilot Testing

Questionnaire	No of Indicators	Min Responses
Physician	29	145
Patient	26	130
Pharmacist	21	105

Source: Compiled by the researcher

Cronbach’s Alpha coefficients were calculated in SPSS to evaluate the internal consistency and reliability of the questionnaire items in the pilot study. All indicators and items had Cronbach’s Alpha coefficients of greater than 0.7, which indicates acceptable reliability, therefore telling the researchers to move forward with full data collection. Data collection began in April 2023 and was completed in February 2024. The questionnaires were disseminated in the field through online platforms and in-person questionnaires to provide for sufficient participation and accurate data collection.

The following are the **Strategies** used to reduce the non-response bias in the survey.

- Assurance of confidentiality and anonymity was given to the respondents, while also clearly stating the academic purpose of administering the survey.
- Instrument layout and design – in terms of length and no. of questions – was kept optimal to ensure lower refusal rates.
- Multiple follow-up calls were made to non-respondents to encourage participation.
- Questions in the survey were marked as mandatory, to avoid missing data

Table 3.12
Refusal Rate of Respondents

Respondent Category	No of Indicators	Refusal Rate
Physician	29	27.10%
Patient	26	29.16%
Pharmacist	21	11.50%

Source: Compiled by the researcher

The table 3.12 summarizes the response rates among respondents completing the 29 indicators included in the questionnaire across categories from small sample sizes. Physicians presenting a refusal rate of 27.10% to complete 29 indicators in the questionnaire. Patients with 26 indicators present a higher refusal rate of 29.16%, and suggest difficulty with engaging this group for data collection. Pharmacists refused with a refusal rate of 11.50% to participate in completing 21 indicators indicating more accessibility of participation or willingness or willingness to participate compared to physicians or patients. The variances in refusal rates demonstrate variability in engagement from respondents and further underscore considerations for reaching appropriate groupings when collecting data.

Table 3.13
Reliability Statistics – Physician Pilot Test

	Pilot Study		Complete Study	
	Cronbach's Alpha	N of Items	Cronbach's Alpha	N of Items
Physician Attributes factors	0.898	29	0.875	29
Experience Factors	0.705	5	0.769	5
Marketing Factors	0.797	5	0.789	5
Drug Factor	0.749	5	0.740	5
Business Factor	0.750	5	0.775	5
Knowledge Factors	0.792	5	0.772	5
Adoption Variable	0.766	4	0.791	4

Source: Compiled by the researcher

The reliability analysis, found in the table above, presented the Cronbach's Alpha values for the pilot study (145 respondents) and the full study (400 respondents) based on the physician factors. In general, the Cronbach's Alpha values for all constructs demonstrate acceptable reliability values higher than 0.7 and appropriate internal consistency. The highest reliability was for the "Physician Attributes Factors", which had alpha values of 0.898 (pilot) and 0.875 (full study) indicating excellent reliability with 34 items. The other dimensions of "Marketing Factors", "Knowledge Factors", "Business Factors", and "Adoption Variable" demonstrated reasonable reliability with alpha values of approximately 0.75 to 0.79 across both phases. In general, they are in the acceptable range, especially for exploratory research.

Table 3.14
Reliability Statistics – Patients Pilot Test

	Pilot Study		Complete Study	
	Cronbach's Alpha	N of Items	Cronbach's Alpha	N of Items
Patients Attributes factors	0.855	26	0.859	26
Awareness Factors	0.731	5	0.714	5
Drug Factors	0.703	4	0.675	4
Marketing Factors	0.777	4	0.746	4
Experience Factors	0.776	5	0.762	5
Perceived Importance	0.712	5	0.772	5
Adoption Variable	0.850	3	0.865	3

Source: Compiled by the researcher

The reliability metrics for the patient-related constructs, from the pilot study (the entire sample; n = 130 respondents) and the full study (full sample; n = 600 respondents) show acceptable to high consistency across all the factors measured regardless of which measure is used. The Cronbach's Alpha (a commonly utilized measure for reliability) of the constructs primarily exhibited alphas higher than the suggested alpha of 0.7 or greater showing all of the scales are reliable. There was strong consistency within the "Patient Attributes Factors," with pilot alpha value of 0.855, and complete study alpha value of 0.859 -26 items. "Adoption Variable" in the pilot and complete study also demonstrated excellent reliability with alpha values of 0.850 and 0.865 in the pilot and complete study respectively. The factors of "Awareness," "Marketing," "Experience," and "Perceived Importance" exhibited good reliability ranging from 0.714 to 0.777 alpha values. The "Drug Factors" dimension had a slightly lower alpha though (0.703 in the pilot and 0.675 in the complete study) and still fall within an appropriate range (0.60) for exploratory research.

Table 3.15
Reliability Statistics – Pharmacist Pilot Test

	Pilot Study		Complete Study	
	Cronbach's Alpha	N of Items	Cronbach's Alpha	N of Items
Drug Factors	0.854	5	0.766	5
Knowledge Factors	0.749	4	0.789	4
Business Factors	0.755	6	0.771	6
Experience Factors	0.701	6	0.706	6
Pharmacist Attributes factors	0.783	21	0.793	21

Source: Compiled by the researcher

The reliability statistics for the pharmacist-related constructs, based on the pilot study (in which there was a total sample of 105) and the full study (full sample of 400), indicate acceptable to high internal consistency for all measured factors. The Cronbach's Alpha values for all constructs are above the accepted standard of .70. Therefore, the measurement instrument demonstrates reliability. The "Pharmacist Attributes Factors" indicates very high reliability with alpha values of .783 in pilot study and .793 in the full study across 21 items. Similar findings were observed for the "Drug Factors" construct which reflects high reliability in the pilot study (0.854) but did lessen slightly in the full study (0.766); still within a good reliability zone. The other constructs ("Knowledge Factors," "Business Factors," and "Experience Factors") showed similar and consistent reliability values from .701 to .789.

3.8. STATISTICAL METHOD:

Partial Least Squares Structural Equation Modeling (PLS-SEM) is a unique method of statistical analysis that is advantageous for examining the complicated relationship between multiple variables. This study focuses on the adoption of generic medicines in Telangana, while adopting PLS-SEM data analysis. This study involves several stakeholders (physicians/pharmacists/patients), their different perspectives across different socioeconomic conditions and geographical area, which adds to the complexity of this research. Due to the dynamic nature of PLS-SEM, it is suitable for the current study, because the research model contained several independent variables, mediating variables and dependent variables.

PLS-SEM can accommodate a very complicated model that uses multiple constructs. When building a model, each of the different constructs could include both reflective and formative measurement models. As such, it is especially helpful in this research model, where not only did we want to examine the direct relationships, such as the potential impact of physician prescription attitudes toward prescribing generic medicines, but also the indirect effects of a patient's socioeconomic conditions, the researcher would like to determine how patients' socioeconomic conditions can mediate prospective relationships between physician attitudes and generic medicine adoption.

PLS-SEM would also allow the researcher to analyse the entire situation all at once; in this case, regarding the physician prescription attitudes, patient factors, pharmacist factors, use of generic medicines, as a totality. This is one of the PLS-SEM means of understanding the defined relationships in the research model and includes all of the details since the proposed model covered a multitude of dimensions including drug quality, marketing and sales efforts, business practices, knowledge and experience of all the stakeholders.

PLS-SEM also applies to exploratory research whereby the objective is to predict important target constructs; in the case of this research, the use of prescriptive attitudes from physicians was explored. This serves as an example of being able to understand the total dynamics and causal associations of variables available. In particular, PLS-SEM would help to understand the relationships across various dimensions of each stakeholder, which gives a unambiguous idea of how each of the various factors impacts the adoption of generics. In addition, when the research is based on a smaller sample size (in this case, potentially people's perceptions of physicians and pharmacists), PLS-SEM is the preferred analysis approach. Moreover, PLS-SEM works on non-normal distributions as well and all of this contributes to why it was selected for this data analysis.

Overall, employing Partial Least Squares Structural Equation Modelling (PLS-SEM) is the perfect statistical calculation method for this research as it would allow the researcher to fully explore the and test the complex relations among variables and ultimately the goal of the study is to fulfil the purpose of the objectives of study and determine in some capacity if the research hypotheses are comfortably met. The ultimate goal of using PLS-SEM in this research, is to identify and elucidate actionable insights about the customized factors that ultimately drive the adoption of generics in service delivery of becoming a drug regimen for compliance of systemic and emergence of health

services needed to seek healthcare for the and the opportunities within the adoption of generics along the entire route of provincial accountability, relative to the prescriptions pathway to either more meticulous management of their patient population or compliance supportive and health-enhancing use. This full understanding of the causal associations provides confidence for important stakeholders in fulfilling the potential - policy makers; health care personnel; and the pharmaceutical industry that is sometimes misaligned.

CHAPTER – IV
DATA ANALYSIS

4.1. Descriptive Analysis

This study employs a descriptive research design to understand the factors in the adoption of generic medicines from the perspectives of physicians, pharmacists, and patients. Three surveys were administered to physicians, pharmacists, and patients to highlight the different forces at play. The proposed model breaks independent variables into three categories; Physicians' Prescription Attitude, Patient Factors, and Pharmacist Factors.

Physicians' Prescription Attitude includes; drug-related factors, marketing effects, professional experience, business sense, and state of mind. Patient Factors include; awareness factors, drug-related factors, marketing-related factors, and experience. Pharmacist Factors include; drug knowledge, business sense, and experience. Patients' Socio-economic Factors function along as a mediating variable between Physicians' Prescription Attitude and the adoption of generic medicines. In addition, Perceived Drug Importance mediates the relationship between Physicians' Prescription Attitude and adoption. The dependent variable (Adoption) is influenced by the collective effects of; Physicians' Prescription Attitude, Perceived Drug Importance, and Patients' Socio-economic Factors, indicating the multifaceted nature of adoption of generic medicines.

It is important to assess the study topic, research questions, data characteristics, and specific elements of the provided conditions (Malhotra, 2007) before committing to a statistical analysis approach. The study used both descriptive and inferential statistics to meet its aims. Data entry, coding and tabulation was accomplished using SPSS 21.0; a Partial Least Squares (PLS) model was used to evaluate the impacts of physician, patient and pharmacist factors on the adoption of generic medicines. The study also explored the mediating role of patients' socio-economic factors in the relationship between physician factors and the adoption of generic medicines.

Chin, Marcolin and Newsted (2003) recommend the PLS method as an optimal way to analyse constructs in a model, while minimizing errors. PLS modelling entails two parts: evaluation of the measurement model (or outer model) and evaluation of the structural model (the inner model). The PLS technique is optimal when the major research objective entails the pursuit of the highest explained variance on the dependent constructs. In measurement model part, reliability, construct validity and discriminant validity are examined. In the structural model part,

the structural model is assessed and we examine the path coefficients to assess predictive power and relationships between endogenous and exogenous variables. In this research there are a number of latent variables and it is also exploratory in nature, therefore PLS-SEM is considered the appropriate method to utilize for the analytical framework.

In terms of sample size calculations, the respondents were selected to be proportional to the target population. As discussed in the research design, sample sizes of 400 for the physician sample, 600 for the patient sample, and 400 for the pharmacist sample were utilized as the study has multiple objectives such as examining the factors that affect physicians' prescription attitudes towards generic medicines, assessing how environmental factors effect patients' perceptions, examining the role of pharmacists in influencing patients' perceptions, and investigating the role of the patients' socio-economic factors in the relationship between the physicians' prescription attitudes and the adoption of generic drugs.

By investigating these objectives and variables in depth, the study sheds light and understanding into the complexities involved in adopting generic medicines. Statistical techniques were applied in the data that were tabulated to help achieve the research objectives and provide useful and meaningful interpretation.

The study discussed the Demographic Profiles of Physicians, Patients, and Pharmacists. The study collected the primary data from the ten districts of erstwhile Telangana state. They are as follows,

Table 4.1
Demographic Profile of Physician

		Frequency	Percent (%)
Gender	Male	228	57
	Female	172	43
	Total	400	100
Your age in years	< 30 years	103	25.8
	31-45 years	182	45.5
	46-60 years	88	22
	> 60 years	27	6.8

	Total	400	100
Highest Education Qualification	MBBS	110	27.6
	MD	223	55.8
	DM	36	9.0
	Others	31	7.8
	Total	400	100
Therapeutic Specialization	Infectious Disease Specialist	84	21.0
	Urologist	39	9.8
	Endocrinologist	26	6.5
	Neurologist	57	14.3
	Orthopaedic Physician	17	4.3
	Cardiologist	68	17.0
	Gynaecologist	46	11.5
	Dermatologist	31	7.8
	Pulmonologist	32	8.0
	Total	400	100.0
Total years of practice	< 5 years	112	28
	6-15 years	167	41.8
	16-25 years	93	23.3
	>25 years	28	7
	Total	400	100
Consulting at	Govt Hospital	37	9.3
	Govt-Medical College	25	6.3
	Private	159	39.8
	Charitable	43	10.8
	Self-owned	136	34
	Total	400	100
	Rural	143	35.8
	Urban	257	64.3

Geographical location of practice	Total	400	100
No of Patients being provided consultation per week	< 30	58	14.5
	31-60	84	21
	61-90	150	37.5
	91-120	56	14
	>121	52	13
	Total	400	100
Consultation Fees Charged in Rs.	<100	82	20.5
	101-300	93	23.3
	301-500	158	39.5
	>501	67	16.8
	Total	400	100

Source: Primary data

Table 4.1 illustrates the demographic characteristics of 400 physician participants from the state of Telangana in terms of attributes of gender, age, education, specialization, years in practice, place of practice, location of practice, number of patients seen per week, and the range of fees charged to patients. In terms of gender, 57% were males (228 physicians) and 43% were females (172 physicians). The distributions of age of the study participants were 45.5% were aged 31 years to 45 years of age; 25.8% were under 30 years of age; 22% were aged 46-60 years; and 6.8% were aged over 60 years. In terms of education of participants, 55.8% were MDs, 27.6% were MBBS, 9% were DM, and 7.8% had other degrees.

In terms of therapeutic specialization, 21% were Infectious Disease Specialists (84), followed by Cardiologists (17%, 68), and Neurologists (57, 14.3%). Gynecologists made up 11.5% (46) participants versus Urologists (39, 9.8%); Dermatologists (31, 7.8%); Pulmonologists (32, 8.0%); and Endocrinologists (26, 6.5%). The smallest group of participants were Orthopedic Physicians (17, 4.3%). The data on total practicing years of the physicians indicated that 41.8% practiced within the range of 6 years to 15 years of practice. This was then followed by 28% for less than 5 years of practice; 23.3% within the range of 16 - 25 years of practice; and 7.0% with over 25 years

of practice. The settings of practice showed that 39.8% did their practice in private practice, 34% in a self-owned practice; while the remaining percent were in a government hospital (9.3%), charitable practice (10.8%), and a government medical college (6.3%).

In regard to geography, most of the physicians practiced in an urban area (64.3%) compared to a rural area (35.8%). In terms of volume of patients seen, 37.5% of the physicians saw 61 patients to 90 patients per week; and the remaining groups were seeing either less than 30 patients or more than 121 patients per week. The fees charged by physicians indicate that 39.5% charged Rs. 301-500 for the consultations. The other price brackets included; Rs. 101-300 (23.3%); <Rs.100 (20.5%); and >Rs. 501 (16.8%).

Table 4.2
Descriptive statistics of Physician Factors

	Code	N	Minimum	Maximum	Mean	Std. Deviation
I am aware of the generics that are available at various pharmacies and Jan Aushadi stores	BS1	400	1	5	4.105	1.04004
I prescribe drugs from reputed pharmaceutical companies	BS2	400	1	5	2.9375	1.04706
I prescribe drugs where the MRs possess sufficient knowledge of the medicine.	BS3	400	1	5	2.4925	1.11042
Repeated visits of MRs influences my drug prescription	BS4	400	1	5	2.985	1.17824

I tend to prescribe a drug when I get free drug samples to be distributed among patients	BS5	400	1	5	1.9775	1.09315
I consider generics to be as safe as branded ethical drugs	DG1	400	1	5	3.13	0.77109
I consider generics to be therapeutically as effective as branded ethical drugs	DG2	400	1	5	2.9925	0.79311
Generics are cost efficient than branded ethical drugs	DG3	400	1	5	3.87	0.89168
I consider the income levels of the patient before prescribing a drug	DG4	400	1	5	3.61	0.88025
I analyse the cost-efficacy benefits of a drug before prescribing it to my patients	DG5	400	1	5	3.575	0.92819
I prescribe drugs to my patients that are easily honored by the pharmacist	EP1	400	1	5	3.93	1.15039
I prescribe drugs which are also prescribed by my colleagues.	EP2	400	1	5	3.6075	1.01292
The long-standing presence of the drug in the market helps me to prescribe the same	EP3	400	1	5	3.3275	1.02854

I consider patient requests in prescribing particular medication	EP4	400	1	5	3.01	0.97841
I prescribe generic drugs regularly to cure my patient's ailments	EP5	400	1	5	3.125	0.89799
I keep myself regularly updated with the latest advancements in my therapeutic area	KW1	400	1	5	4.3475	0.85062
I have read articles on safety and efficacy of generic drugs in comparison to branded ethical drugs (innovator)	KW2	400	1	5	3.9925	0.97715
I prescribe drugs with generic name to my patients	KW3	400	1	5	3.2925	0.86244
I consider that generics can be prescribed in place of branded ethical drugs	KW4	400	1	5	2.99	0.76247
I regularly attend symposia/conferences to update my therapeutic drug prescription knowledge	KW5	400	1	5	4.24	0.89689
I tend to attend the symposia/conferences sponsored by pharma companies	MK1	400	1	5	3.925	1.03055

I regularly meet the medical sales representatives (MRs) of various pharma companies to understand their drug portfolio	MK2	400	1	5	3.515	1.05952
I prescribe those drugs whose information is published in medical and scientific journals of repute	MK3	400	1	5	3.1675	1.06408
Small promotional gift items like pens, pads etc., influences my drug prescription	MK4	400	1	5	3.2125	1.39363
Sponsored medical camps / awareness events by pharma companies influences my drug prescription	MK5	400	1	5	2.065	0.99158
My generic drug prescription is widely acknowledged by the pharmacists	PI1	400	1	5	3.6025	0.98076
The price of the generic drugs is patient-friendly	PI2	400	1	5	4.3	0.85547
I prescribe generic drugs in emergency cases	PI3	400	1	5	2.83	0.87922
I recommend usage of generic medicines to my friends/relatives	PI4	400	1	5	3.71	0.98658

I consider generics to be bioequivalent to their innovator (branded ethical) drug	PI5	400	1	5	2.9875	0.73736
I tend to prescribe innovator (branded ethical) drug when generic drug is available	AP1	400	1	5	2.9175	0.87899
I tend to switch a patient prescribed on innovator (branded ethical) drug to the available generic drugs	AP2	400	1	5	2.8075	0.8528
Availability of generic drugs in various government and private pharmacies will help me to prescribe it	AP3	400	1	5	4.21	0.9236
More bioequivalence studies showing comparison between generic and branded ethical drugs will help to build my prescription confidence	AP4	400	1	5	4.2625	0.85171

Source: Primary data

Table 4.2 presents the descriptive statistics of physician factors in Telangana State including the sample size of 400 physicians, which provide insights into the physicians' attitudes and practices regarding prescription drug factors. The descriptive statistic for awareness of the generics available at pharmacies and Jan Aushadi stores (BS1) has a mean of 4.105 and standard deviation of 1.04004, suggesting a high-level awareness. The second descriptive statistic falls under the category of prescribing medications from reputable pharmaceutical companies (BS2). The mean

for this descriptive statistic is lower than previously discussed at 2.9375 with a standard deviation of 1.04706. The third descriptive statistic falls under the category of knowledge received from medical representatives (MRs) about the medications they represent (BS3), the mean for this descriptive statistic is 2.4925 and standard deviation of 1.11042. The mean for the second description statistic of influence from repeated visits from medical representatives (BS4) has a mean of 2.985 and standard deviation of 1.17824. The last descriptive statistic for free samples (BS5), is the lowest mean among the five variables at 1.9775 and standard deviation of 1.09315.

The second domain, was categorized as physicians' attitude towards generics including the first question about safety compared with branded drugs (DG1) has a mean of 3.13 and standard deviation of 0.77109. The second descriptive statistic (DG2) is about therapeutically effective, (DG2) has a mean of 2.9925 and standard deviation of 0.79311. Lastly, cost efficiency (DG3) had a mean of 3.87 and standard deviation of 0.89168. The incoming levels of the patients (DDG4) are accounted for during prescribing with a mean of 3.61 (SD 0.88025) and cost-efficacy benefits (DDG5) are analyzed as well with a mean of 3.575 (SD 0.92819). The prescribing of medications that can be easily fulfilled at the pharmacy (EP1) ranked with a mean of 3.93 (SD 1.15039), and then more often prescribed medications deemed recommended by their peers (EP2) with a mean of 3.6075 (SD 1.01292). The long-standing presence of the medication on the market (EP3) averaged out to be in the influence mean of 3.3275 (SD 1.02854), whereas patient-requested prescriptions (EP4) mean of 3.01 (SD 0.97841) averaged lower. The regular prescribing of generic drugs (EP5) accounted for a mean of 3.125 (SD 0.89799).

Physicians account for keeping themselves updated with advancements in their treatment area (KW1) was rated very high at a mean 4.3475 (SD 0.85062) while reading articles that compare the safety and efficacy of generics (KW2) proved to lead into a mean of 3.9925 (SD 0.97715), while writing of medications by their generic name (KW3) provided an average of 3.2925 (SD 0.86244) as a conclusion, and then on the greatest on average, generics were rated to be similar substitutes for brand medications (KW4) at a 2.99 (SD 0.76247). The frequency of attendance at symposia/conferences (KW5) is high, with a mean of 4.24 and a standard deviation of .89689, and symposia sponsored by pharma companies (MK1) has a mean of 3.925 and a standard deviation of 1.03055. Meeting with MRs (MK2) has a mean of 3.515 and a standard deviation of 1.05952. The mean prescription of drugs based on reputable journal publications (MK3) is 3.1675 with a

standard deviation of 1.06408. Small promotional gifts (MK4) have a mean influence on prescriptions of 3.2125 with a larger standard deviation of 1.39363 while sponsored medical camps (MK5) has a mean influence of 2.065 and a standard deviation of .99158.

Physicians' prescriptions of generics are acknowledged by pharmacists (PI1) with a mean of 3.6025 and a standard deviation of .98076. Pharmacists find generics to be friendly for patients' pocketbooks (PI2) with a high mean of 4.3 and a standard deviation of .85547, and prescribe generics in emergencies (PI3) with a mean of 2.83 and a standard deviation of .87922. The mean of recommending generics to friends/relatives (PI4) is 3.71 with a standard deviation of .98658 and considering generics to be bioequivalent to branded drugs (PI5) is a mean of 2.9875 and a standard deviation of .73736.

On average, physicians prefer to prescribe branded drugs over generics (AP1) if both are available with a mean of 2.9175 and a standard deviation of .87899, and also switch patients from branded to generic drugs (AP2) with a mean of 2.8075 and a standard deviation of .8528. The availability of generics in pharmacies (AP3) would help in prescribing generics, with a mean of 4.21 and a standard deviation of .9236. Overall, there would be increased confidence in prescribing generics with more bioequivalence studies (AP4) with a higher mean of 4.2625 and a standard deviation of .85171.

Table 4.3
Demographic Profile of Patients

		Frequency	Percent
Occupation	Farming	25	4.2
	Business	69	11.5
	Private Employee	309	51.5
	Govt Employee	42	7
	Unemployed	42	7
	Retired	40	6.7
	Student	73	12.2
	Total	600	100
	Gender	Male	400

	Female	200	33.3
	Total	600	100
Age	<20 years	40	6.7
	21-40 years	363	60.5
	41-60 years	140	23.3
	>61 years	57	9.5
	Total	600	100
Marital status	Unmarried	206	34.3
	Married	369	61.5
	Divorced	13	2.2
	Widowed	12	2
	Total	600	100
Household size	1	12	2
	2	80	13.3
	3	166	27.7
	4	227	37.8
	5	79	13.2
	6	26	4.3
	>6	10	1.7
	Total	600	100
Education level	8th pass	28	4.7
	10th pass	32	5.3
	Intermediate	332	55.3
	Graduate	156	26
	Post graduate	52	8.7
	Total	600	100
Monthly income	>15000	94	15.7
	15001-30000	297	49.5
	30001-45000	84	14
	45001-60000	51	8.5

	>60000	74	12.3
	Total	600	100
Place of Residence	Rural	91	15.2
	Urban	509	84.8
	Total	600	100
Are you buying medicines for an acute disease or chronic disease? (Past /	Acute	382	63.7
	Chronic	218	36.3
	Total	600	100
Type of the healthcare center you are most likely to visit	Government	467	77.8
	Private	133	22.2
	Total	600	100

Source: Primary data

The patient demographic profile shown in Table 4.3 reveals a diversified distribution with respect to occupation, gender, age, marital status, household size, education, income, and health-care choices, all of which have significant implications for the patients' likelihood of adopting generic medicines. The majority of respondents were private employees (51.5%), followed by students (12.2%) and business professionals (11.5%). The high number of private employees shows a population largely fed on salary and being price conscious, which will more likely lead them to use generic medicines for the purpose of reducing their health-care expenditures. Unemployed (7%) and retired (6.7%) contribute a sizeable share as well, which reinforces the importance of affordability in their purchasing decisions regarding medicine.

In respect to gender, the sample was mainly male (66.7%), with one-third of respondents being female. This could affect household-level decisions about medicine purchases, particularly in urban centres, where men are more often the primary earners and decision-makers about health-care spending. In terms of age, the majority of patients were 21–40 years (60.5%), followed by 41–60 years (23.3%). This younger and younger and middle-aged group will likely perceive the benefits of cost-saving options, which may lead more individuals among this age group to be willing to undertake generics, more so when addressing long-term issues. The older age group (>61 years, 9.5%) often requires ongoing medications for chronic disease, which further reinforces

a willingness to pursue affordable generics versus brand name alternatives. Married status indicates that a majority of respondents were married (61.5%). The other 34.3% were not married. Married households, especially those with dependents, generally have a higher need for healthcare, and generics are a more viable option due to the lower costs. The household information adds to the perspective here; most people lived in households of 3-4 people (65.5%). Households with more dependents generally will have higher costs to manage and having generics will allow them to manage costs over time more easily.

Education level is another important factor in patient awareness and acceptance of generics. More than half of patients had intermediate educational levels (55.3%), graduates made up 26%, while 8.7% had postgraduate status. All this indicates that the sample was relatively educated and should have the capacity to assess the value proposition of generics. Higher education also tends to build trust in the evidence that is scientifically evaluated for therapeutic equivalence between branded and generic medicines to be adopted more widely. Monthly income also adds to this interpretation; nearly half of respondents (49.5%) reported income levels between 15,001-30,000, while only 15.7% reported income levels below 15,000. Income levels, particularly in the middle class often relate better to weighing cost against quality of medications leading to the use of generics when the patient is cost constrained. Higher levels, > 60,000 (12.3%) likely rely more heavily on branded medicines, but the majority remain in the income level of when cost is prohibitive.

Place of residence also presented different adoption behaviours. For example, the vast majority of patients lived in urban areas (84.8%) while only 15.2% reported living in rural areas. Urban patients have generally greater access to pharmacies and awareness campaigns promoting generics which facilitates adoption of generics. In rural areas, Government Health Facilities often supplied individuals with generics thereby providing for use by default. The nature of disease also clarifies the inclination; 63.7% of individuals were seeking treatment for acute conditions while 36.3% were seeking care because they were managing a chronic condition. Chronic conditions are likely a particular interest for generics which include the burden of costs to health care over the lifetime of medical treatment.

Finally, patient preferences related to health centre preferences also provide strong support for the generics trend. An overwhelming majority of respondents (77.8%) reported visiting Government Hospital while only 22.2% reported private facility preference. Since Government Hospitals and

health schemes distribute primarily generics, patient exposure and familiarity will thus drive rates of adoption to generics. The combination of cost factors, awareness, and access data provide to the picture is a patient population that is cost sensitive, but an increasingly more adoptive of generics as a practical and sustainable solution.

Table 4.4
Descriptive Statistics of Patients Factors

	Code	N	Minimum	Maximum	Mean	Std. Deviation
I am aware that there are many generic versions of medications available.	AW1	600	1	5	4.0183	1.10907
I generally ask the chemist / pharmacist for generic forms for the prescribed branded drugs	AW2	600	1	5	2.865	1.31262
I generally ask my doctor to prescribe generic names of medicines	AW3	600	1	5	2.6433	1.25914
I ask my physician to prescribe cost effective drugs	AW4	600	1	5	2.4733	1.19931
I am aware that drugs available at some stores like Jan Aushadhi Kendras, OneIndia Pharmacy, Dava Dost, etc., are at low prices	AW5	600	1	5	3.48	1.36481
I consider generic medicines to be safe	DG1	600	1	5	3.365	1.07099
I consider generic medicines to be of equal quality with their branded equivalents (Drugs)	DG2	600	1	5	3.225	1.11495
I know generic medicines also cause side effects	DG3	600	1	5	3.3033	1.10606
I consider generic medicines to be therapeutically effective	DG4	600	1	5	3.25	0.93396
I change my medication only on the advice of my doctor	MK1	600	1	5	4.3	0.91728

I am able to buy generic medicines easily from the pharmacies	MK2	600	1	5	3.1833	1.1699
Price of generic medicines is pocket friendly	MK3	600	1	5	4.075	0.94031
Generic medicines are available on online pharmacies	MK4	600	1	5	2.7817	1.11926
I buy medicines that I have been using previously, irrespective of price	EX1	600	1	5	3.8583	1.04726
I go for drug substitution when prescribed medicine is not available at the nearest pharmacy	EX2	600	1	5	3.615	1.16291
I take into consideration the suggestions of my family and friends while choosing generic medicine	EX3	600	1	5	3.03	1.22267
My previous usage of generic medicine plays an important role in me continuing with generic medicine	EX4	600	1	5	3.7017	1.21592
My disease gets cured with the usage of generic medicines	EX5	600	1	5	3.2417	1.01076
I buy those medicines that are prescribed by the doctors	PI1	600	1	5	4.1617	0.87568
I consider price of the medicine to be an indicator of good quality	PI2	600	1	5	2.745	1.11597
I tend to go for generic medicines as they are available in non-standard (less than strip) quantities.	PI3	600	1	5	2.7183	1.12001
Price is a criteria while buying prescribed medicines	PI4	600	1	5	2.7383	1.14981

I tend to buy those medicines which are easily available near my place of residence	PI5	600	1	5	3.6183	1.18392
I am comfortable taking generic versions of medications	AP1	600	1	5	3.4783	1.10373
I don't mind the pharmacist substituting the prescription medicines with generic versions	AP2	600	1	5	3.2367	1.2543
I recommend usage of generic medicines to my friends and family	AP3	600	1	5	3.3817	1.16401

Source: Primary data

Table 4.4 conveys the descriptive statistics associated with patient characteristics, attitudes and behaviours concerning generic medicines reported by 600 patients. Awareness regarding the existence of various generic types of medications available (AW1) was fairly high with an average of 4.0183, and standard deviation of 1.10907. However, the likelihood of patients asking their pharmacist about generic alternatives to branded prescriptions (AW2) and requesting their doctor to write a prescription for generic alternatives (AW3) were lower with averages of 2.865 and 2.6433, respectively. Patients were also less likely to ask their physician for alternatives to branded medications that were cheaper (AW4) which had a mean of 2.4733. Awareness that low-cost medications are available over-the-counter at places (AW5) such as Jan Aushadhi Kendras was fair with a mean of 3.48. In relation to the experiences patients encountered regarding generic medications, patients expressed attitudes toward safety (DG1), quality (DG2), and therapeutic effectiveness (DG4) associated with generics more positively with mean (DG1) of 3.365, (DG2) of 3.225, and (DG4) of 3.25 respectively. Patients were fairly aware of possible side effects of taking generics (DG3) with a mean of 3.3033. Additionally, a large proportion of patients feel that they will only change medication if their doctor advised it (MK1) with an average of 4.3. They expressed a moderate finding in regard to the ease of obtaining generics from the pharmacy (MK2) to be 3.1833, while their assessment of generics being a low monetary investment (MK3) was significantly higher (4.075). However, patients exhibited low awareness that generics are available through online medications (MK4) with an average of 2.7817.

Patients are less inclined to purchase medications they have already used regardless of price (EX1), with an average score of 3.8583. Patients are likely to substitute the prescribed agent for medication that was commercially obtainable instead (EX2) with an average of 3.615. Family and friends have a moderate influence on the choice of generics (EX3) with an average of 3.03, while past experiences with generics have a high leverage on their persistent use (EX4), with an average of 3.7017. Patients feel that they are generally treated well when using generics (EX5) with a mean of 3.2417. With regard to purchase behaviour, patients specifically prefer medications prescribed by their physician (PI1) with an average of 4.1617. They were less likely to think of the price of the medication as a marker of quality (PI2) with an average of 2.745. Patients had low preference for generics available in non-standard doses (PI3) and for the price of medications they purchase following their doctor's recommendation (PI4) when asked responding with 2.7183 and 2.7383 mean respectively. The availability of medications in proximity to their residence (PI5) was another important factor with a mean of 3.6183. In addition, patients expressed that they would generally be comfortable taking generics (AP1) with a mean of 3.4783, while they moderately accepted pharmacists substituting generics for prescribed medications (AP2) with a mean of 3.2367. They were moderately likely to recommend generics to their family or friends (AP3) with a mean of 3.3817. These results suggest that patients generally have a positive attitude toward generic medications; however, their knowledge, attitudes, and behaviours toward them vary with each factor.

Table 4.5
Demographic Profile of Pharmacists

		Frequency	Percent
Gender	Male	133	33.3
	Female	267	66.7
	Total	400	100
Age	<30	232	58
	31-40 years	144	36
	41-50 years	24	6
	Total	400	100
Highest Education in Pharmacy	Bachelor's Degree in Pharmacy	336	84
	Master's Degree in Pharmacy	59	14.7
	PharmD / Ph.D	5	1.3

	Total	400	100
Number of years in practice	<5 years	204	51
	6-10 years	173	43.3
	11-20 years	23	5.7
	Total	400	100
Type of Pharmacy	Hospital Pharmacy	31	7.7
	Clinic Pharmacy	319	79.7
	Independent Pharmacy (1 - 4 branches)	45	11.3
	Community Pharmacy	5	1.3
	Total	400	100
Employment Position	Self or part owner	132	33
	License holder	66	16.7
	Advisor	11	2.7
	Seller	191	47.7
	Total	400	100
Pharmacy Location	Rural	106	26.7
	Urban	294	73.3
	Total	400	100
Daily average number of customers	<20 customers	129	32.3
	21-40 customers	238	59.7
	>40 customers	33	8
	Total	400	100
Majority of generic drugs sold at your pharmacy	Anti-infective	5	1.3
	Neurology	49	12.3
	Cardiology	49	12.3
	Endocrinology	19	4.7
	Gynaecology	47	11.7
	Gastroenterology	56	14
	Pulmonology	68	17
	Dermatology	23	5.7
	Urology	41	10.3
	Orthopaedics	43	10.7
	Total	400	100

Source: Primary data

Table 4.5 summarizes data about the demographics of a sample of 400 pharmacists from the total population of study area, regarding pharmacy characteristics such as gender, age, education, years in practice, type of pharmacy, employment position, location of pharmacy, daily average number of customers, and most sold generic drugs. The gender of the pharmacist sample population consisted of 66.7% females and 33.3% males. Age characteristics revealed that 58% of the pharmacists were less than 30 years old, 36% between the ages of 31 - 40 years, and 6% were aged between 41 - 50 years old. Educational qualifications indicated that 84% of the pharmacists had a Bachelor's Degree in Pharmacy, 14.7% held a Master's Degree, and 1.3% held a PharmD or PhD. Information about years in practice showed that 51% of the pharmacists reported being in practice for less than 5 years, 43.3% for 6-10 years, and 5.7% for 11-20 years. As related to type of pharmacy, 79.7% of the pharmacists reported working in clinic pharmacy, 11.3% reported that they worked in an independent pharmacy with 1-4 branches, 7.7% worked in hospital pharmacy, and 1.3% reported working in community pharmacy. Employment position indicated that 47.7% of the pharmacists were sellers, 33% were self or part owner, 16.7% were license holders, and 2.7% were advisors. The pharmacy location data indicated 73.3% of pharmacists are attributed to Urban Location, and 26.7% are from Rural Location. As related to average daily number of customers, 59.7% of the pharmacy had between 21-40 customers, 32.3% reported had less than 20 customers, and 8% reported had more than 40 customers. As related to the majority of sold generic drugs, the results indicated the following categories; pulmonology (17%), gastroenterology (14%), neurology and cardiology (12.3% each), gynaecology (11.7%), orthopaedics (10.7%), urology (10.3%), dermatology (5.7%), endocrinology (4.7%), and anti-infectives (1.3%).

Table 4.6
Descriptive Statistics of Pharmacist Factors

	Code	N	Minimum	Maximum	Mean	Std. Deviation
Generic medicines are therapeutically effective in treating diseases	DR1	400	2	4	3.2033	0.45755
Generic medicines are as safe as branded ethical drugs /innovator drugs	DR2	400	2	4	3.19	0.44859

Generic medicines are pocket-friendly for the patients	DR3	400	3	5	4.35	0.49157
Packaging of generic medicines is of good standard	DR4	400	2	4	3.1633	0.42101
Generic drugs have similar side effects as their branded equivalents	DR5	400	3	5	4.2233	0.57261
Generic medicines are bioequivalent to branded ethical drugs and can be substituted	KN1	400	2	4	3.1467	0.39029
Generic substitution improves compliance towards drug therapy among patients	KN2	400	3	5	3.1733	0.39642
Substitution by generic medicines having narrow therapeutic index is inappropriate	KN3	400	3	5	4.1733	0.67191
I keep myself regularly updated about advancements in pharmacology through books like CIMS (Current Index of Medical Specialties), MIMS (Monthly Index of Medical Specialties), etc.	KN4	400	4	5	4.6567	0.47561
There are a wide range of generic medicines available in my pharmacy	BU1	400	2	4	3.0933	0.48862
The credibility of generic medicine manufacturers is a concern when stocking medicines in the pharmacy	BU2	400	3	5	4.3067	0.62764

Pharmaceutical companies' product bonuses and incentives will influence the choice of medicines selection	BU3	400	3	5	4.3867	0.59301
Generic substitution for prescription drugs is done after consulting the prescribing physician	BU4	400	1	4	2.5233	0.72425
Visual reminders provided by pharmaceutical companies influence dispensing over-the counter (OTC) medicines	BU5	400	3	5	4.38	0.5446
I dispense those generic medicines which offer good margins	BU6	400	2	5	3.1433	0.56319
I recommend generic alternatives for branded ethical drugs to my customers	E1	400	2	4	2.9767	0.351
I regularly dispense generic drugs for patient's day-to day health related problems	E2	400	1	5	2.93	0.42312
Patients accept generic substitution after they are educated about generic medicine	E3	400	1	5	3.1233	0.61322
Doctor prescriptions are written in generic names of the medicines	E4	400	1	4	1.23	0.48084
Patients tend to buy only those drugs that are prescribed by the doctor	E5	400	3	5	3.6133	0.50795

Patients ask for cost effective drug equivalents	E6	400	3	5	3.6533	0.51709
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Source: Primary data

Table 4.6 illustrates the descriptive statistics of patient factors as derived from responses of a total sample comprised of 400 respondents who provided information about their experiences and behaviours related to generic medications. Physicians believe that generics are as therapeutically effective (DR1) on average (Mean = 3.2033, SD = 0.45755), and as safe (DR2) as brand name medications (Mean = 3.19, SD = .44859). The value physicians give to generics is evident in their opinions related to cost effectiveness of generics (DR3) (Mean = 4.35, SD = 0.49157). Respondents indicated the packaging of generics are of good standard (DR4) (Mean = 3.1633, SD = 0.42101), as well as that generics have the same side effects (DR5) as brand name medications (Mean = 4.2233, SD = 0.57261). Respondents accepted the notion of bioequivalence of generics to brand name medications (KN1) (Mean = 3.1467, SD = 0.39029), and were in agreement that generics improve compliance with drug therapy (KN2) (Mean = 3.1733, SD = 0.39642). However, physicians strongly agreed it was not appropriate to substitute a generic with a narrow therapeutic index (KN3) (Mean 4.1733, SD = 0.67191). Physicians are consistently updated on their pharmacology literature (KN4) (Mean = 4.6567, SD = 0.47561).

In relation to the availability and business side of generics, Physicians recognized that generics are available in various presentation (BU1) within pharmacies (Mean = 3.0933, SD = 0.48862), there are concerns with the credibility of generic manufacturers (BU2) (Mean = 4.3067, SD = 0.62764), as well as recognized that product bonuses and incentives from pharmaceutical companies (BU3) impacted their selection of medications (Mean = 4.3867, SD = 0.59301). Physicians tend to substitute generics often after first consulting the physician who prescribed them (BU4) (Mean = 2.5233, SD = 0.72425), and they reported that visual reminders from pharmaceutical companies impacted their OTC dispensing (BU5) (Mean = 4.38, SD = 0.5446). Physicians also indicated they dispense generics when having good margins (BU6) (Mean = 3.1433, SD = 0.56319). Patient experiences revealed that patients typically recommended generics (EX1) (Mean = 2.9767, SD = 0.351) and typically dispensed generics for health issues (EX2) (Mean = 2.93, SD = 0.42312). Physicians felt that educating the patient on generics increased acceptance (EX3) (Mean = 3.1233, SD = 0.61322) but also reported that doctor prescriptions are rarely written by generic medications

(EX4) (Mean = 1.23, SD = .48084). Patients tend to purchase doctor prescribed drug (EX5) (Mean = 3.6133, SD = 0.50795) and frequently inquired about cost effective equates (EX6) (Mean = 3.6533, SD = .51709). Overall, the provided data represents a generally favorable appraisal of generic medications with patient factors that embrace caution and business practice of pharmaceutical companies.

4.2. Structural Equation Modelling

For the most part, first-generation techniques were used by researchers in the past to analyse data and answer research questions. These questions were either exploratory, in which they looked for patterns in the data, or confirmatory, in which they tested the hypotheses of already-existing theories and concepts. Multiple regression, logistic regression, and analysis of variance are all examples of first-generation methods. Other examples include cluster analysis, multidimensional scaling, exploratory and confirmatory component analysis, and regression-based approaches.

To address the limitations of first-generation methodologies, researchers have turned to structural equation modelling (SEM) and other second-generation techniques in the last twenty years. Measurement error in observed variables and unobservable factors evaluated indirectly via indicator variables are both taken into consideration by these second-generation methods (Chin, 1998). Structural equation modelling is one of the most valuable new tools for sophisticated statistical analysis in the field of social sciences, having arisen in the last few decades. By integrating features of factor analysis and regression, structural equation modelling allows researchers to examine relationships between latent variables (structural theory evaluation) and both measured and latent variables (measurement theory assessment).

Peripheral least squares SEM, also known as PLS route modelling, and covariance-based SEM are the two main varieties of structural equation modelling (SEM). In 1973, Karl Joreskog pioneered CB-SEM. In exploratory research, PLS-SEM is used to construct hypotheses, while CB-SEM is used to validate or reject ideas with software tools like LISREL, EQS, and AMOS. It does this by looking at the model through the lens of explaining the dependent variables' variation. The social science fields have grown to rely on PLS-SEM, a statistic first proposed by econometrician Herman Wold (1966) in the 1960s.

4.2.1. Why PLS- SEM?

Partial Least Squares Structural Equation Modelling (PLS-SEM) has some advantages over Covariance-Based SEM (CB-SEM) when estimating complex models having multiple variables with complex relationships, which is common in social science research or with small sample sizes. Jöreskog and Wold (1980) recommended PLS-SEM in situations where theoretical knowledge is limited and where the research setting is complex. The current study has such complexity in that it employs a hierarchical component model that is reflective-formative and therefore PLS-SEM is more appropriate than CB-SEM (Wold, 1980).

PLS-SEM is now considered well established in academic research, producing reliable results, and is widely used in less-than-ideal research situations (Hair, Ringle & Sarstedt, 2013). It is widely regarded as one of the most useful techniques to assess early prediction models (Hair et al., 2012b; Henseler et al., 2009). In this study that examined pharmacists' views of availability, substitution, and prescribing of generics PLS-SEM was employed to develop a theoretical framework and to test associations that have not been examined (Richter et al., 2016; Sarstedt et al., 2014; Wold, 1980). As Hair et al. (2017) suggest, PLS-SEM is particularly appropriate for complex models that include first- and higher-order constructs, and both direct and indirect relationships (Albort et al., 2016).

Thus, the current study examines the effects of factors related to physicians, pharmacists, and patients, on the perceived importance of generics availability and also their adoption. This was further examined to see if patients' socio-economic factors were a mediating variable between the physicians and the adoption of generics. To simultaneously examine this relationships SEM was employed. SEM is a multivariate statistical technique used in social sciences research that examines cause–effect relationships between latent variables (Hair et al., 2014). SEM is proponents and systematic approach to situations testing hypothesized relationships and is an advancement as a “second-generation” technique linking multiple regression with factor analysis (Gefen et al., 2000; Hair et al., 2010).

SEM can be estimated using either a covariance-based SEM (CB-SEM) or variance-based SEM, more commonly referred to as Partial Least Squares SEM (PLS-SEM) (Fan et al., 2016; Vinzi et al., 2010). SEM analyses consist of two phases: the first phase is the evaluation of the measurement model then followed by the evaluation of the structural model. In difference, PLS-SEM is

explained variance (R^2) of dependent variables rather than covariance based, like CB-SEM, which is particularly useful for studies aimed at making predictions (Hair et al., 2017).

4.2.2. Measurement Model Analysis

The analysis of the measurement model aims to empirically validate the measures of the relationship between indicators and constructs and between constructs,” (J. Hair et al., 2014). Besides illustrating the hypothesized relationship, it serves to provide quality criteria for model assessment. The measurement model analysis involves 125 assessing the internal consistency reliability established through either “Cronbach's alpha or composite reliability (CR), convergent validity through indicator reliability and average variance extracted (AVE), discriminant validity through cross loading and Furnell locker criteria,” (Joseph F. Hair et al., 2019). The measurement model analysis also provides evidence of confirmatory factor analysis referred to as confirmatory composite analysis (CCA) in PLS-SEM (Hubona et al., 2021). The measurement model assessment also provides evidence related to the quality of the model,” (Ringle et al., 2012).

4.2.3. Confirmatory Factor Analysis (CFA)

Confirmatory Factor Analysis (CFA) assesses whether predictions of the theory regarding the links between latent constructs and observable variables are confirmed in the data. This study utilized CFA for assessing variables related to pharmacists' attitudes toward prescriptions, patients' perspectives, and doctors' attitudes toward prescriptions. As a general practice, CFA excludes factors with loadings less than 0.70 to build robustness into the model and because they have a weak links between the observable variables and the latent constructs. By using strong indicators, the study improves the validity of the analysis by assuring that the underlying constructs are reliably represented. The following are CFA of Factors

Figure 4.1

Confirmatory Factor Analysis related to Physician factors

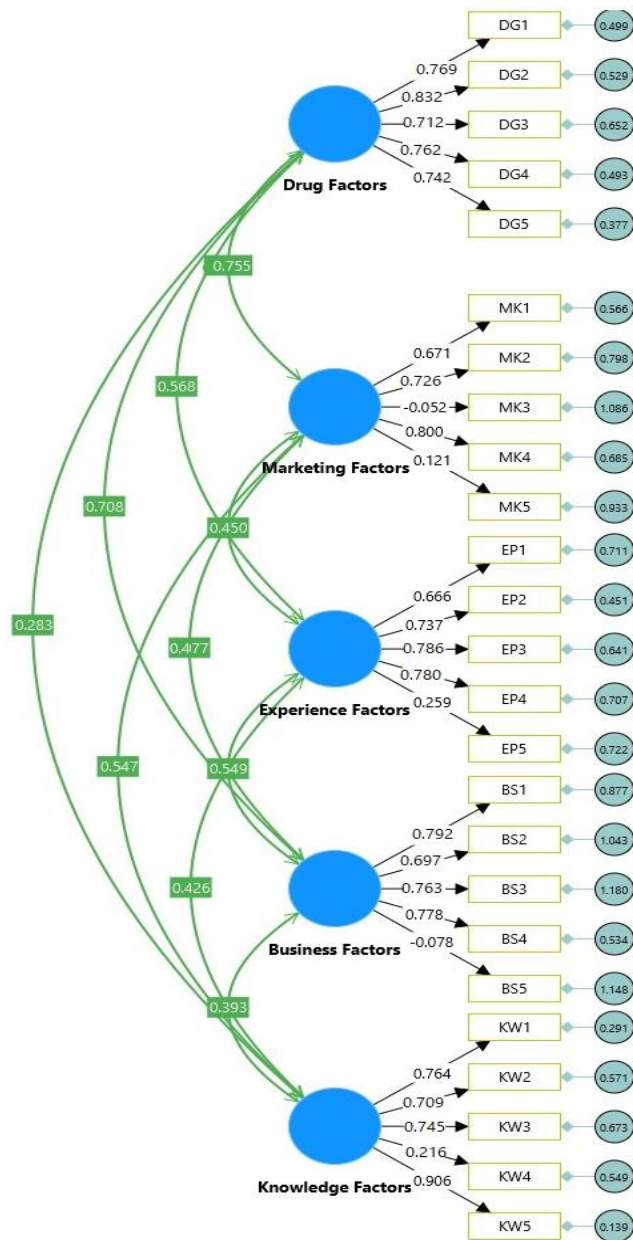


Figure 4.2

Confirmatory Factor Analysis related to Physician's Perceived Importance and Adoption towards Generic Medicines.

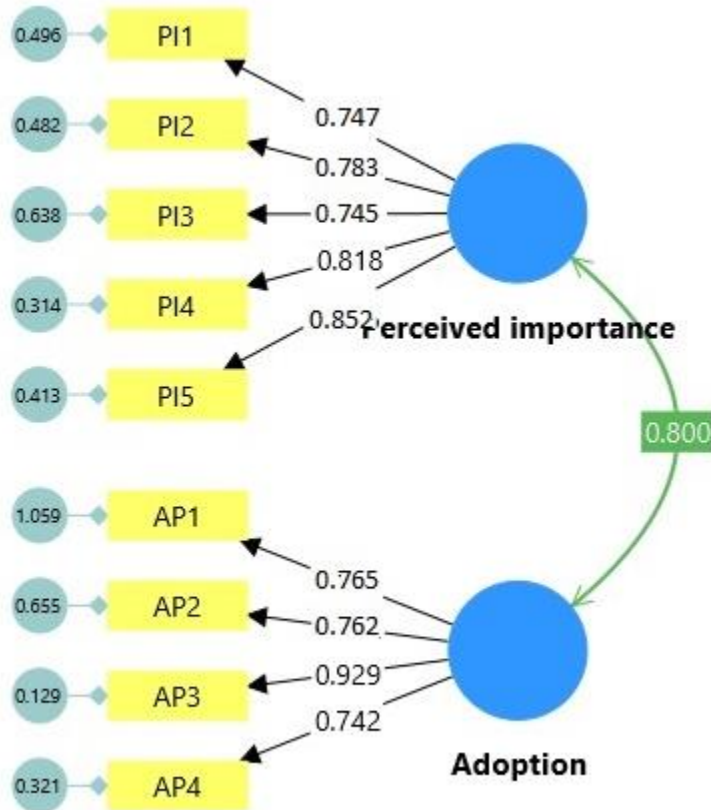


Figure 4.1 displays a Confirmatory Factor Analysis (CFA) model, which assesses the relationships among latent constructs, specifically Drug Factors, Marketing Factors, Experience Factors, Business Factors, and Knowledge Factors, along with the respective observed variables. Regarding the Drug Factors construct, in this model, the majority of observed variables (DG1 to DG4) demonstrate strong loadings (greater than or approximately 0.70). Conversely, DG5 has a loading of 0.377 and hence shows a much closer relationship with the Drug Factors construct, which raises the question of whether it is a relevant measure of the Drug Factors construct. With regard to the Marketing Factors construct, observed variables (MK2 and MK5) have loadings greater than the .70 cutoff mentioned previously, while MK3 is close to .70 (0.671), which generally supports their ability to represent Marketing Factors construct. On the other hand, observed variables (MK1 and MK4) have the lower loadings, indicating their weaker relationship with the Marketing Factors

construct. In terms of the Experience Factors construct, the observed variables (EP1 to EP5) generally have strong loadings, with EP3 and EP5 noted to be above the .70 cutoff, demonstrating the observed variables' strong relationship with the Experience Factors construct. The Business Factors construct demonstrates a similar, but more qualified pattern, as it sees that, for example, BS1 and BS3 have loadings close to .70, although most observed variables report strong loadings. Of note, BS4 actually has a negative loading, which could indicate an issue of weak or negative association with the latent Business Factors construct. Finally, the Knowledge Factors construct has a mix of loadings, but since KW2 and KW3 have loadings greater than or in proximity to .70, they are consistent with the pattern we see throughout the remaining variables. Finally, KW1 and KW5 (particularly) have weaker loadings than other observed variables and with a loading of .139, KL5 indicates that these loadings may not provide an adequate basis for representing the Knowledge Factors construct overall.

Figure 4.3
Confirmatory Factor Analysis related to Patients' factors

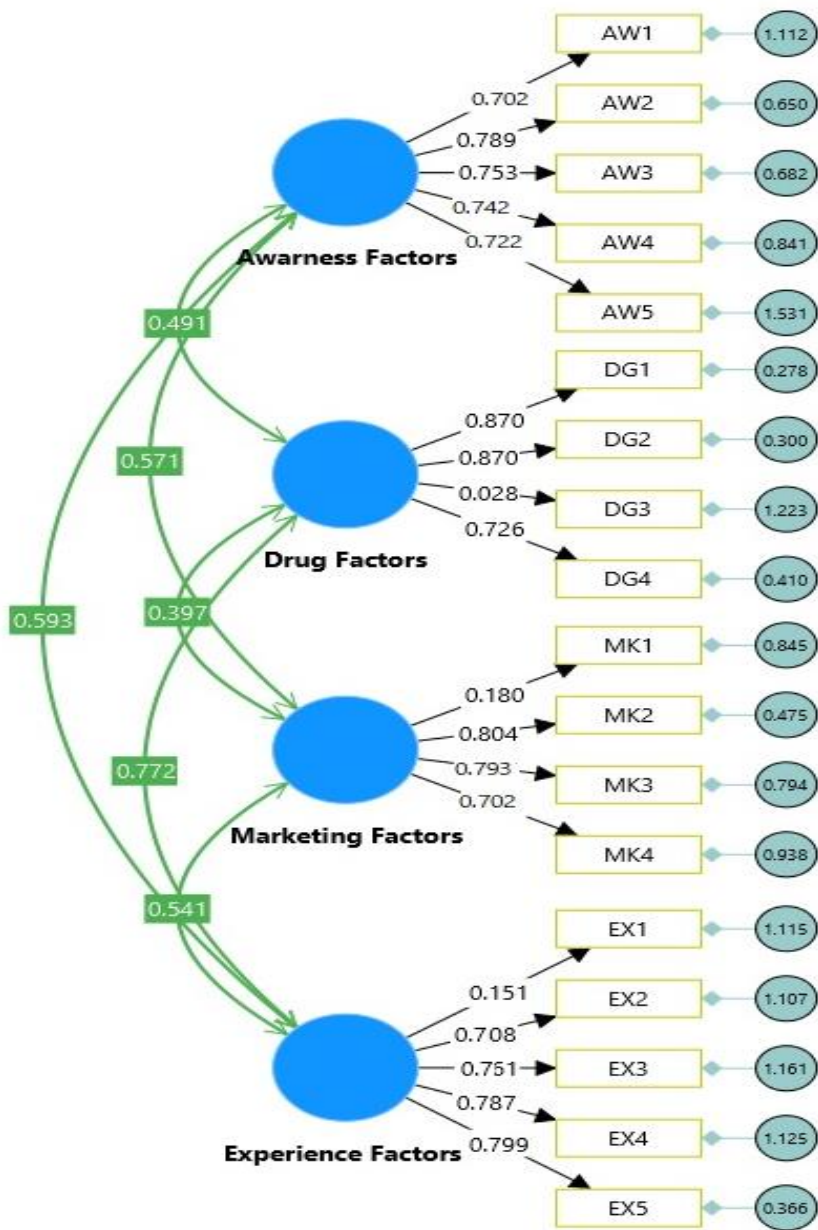
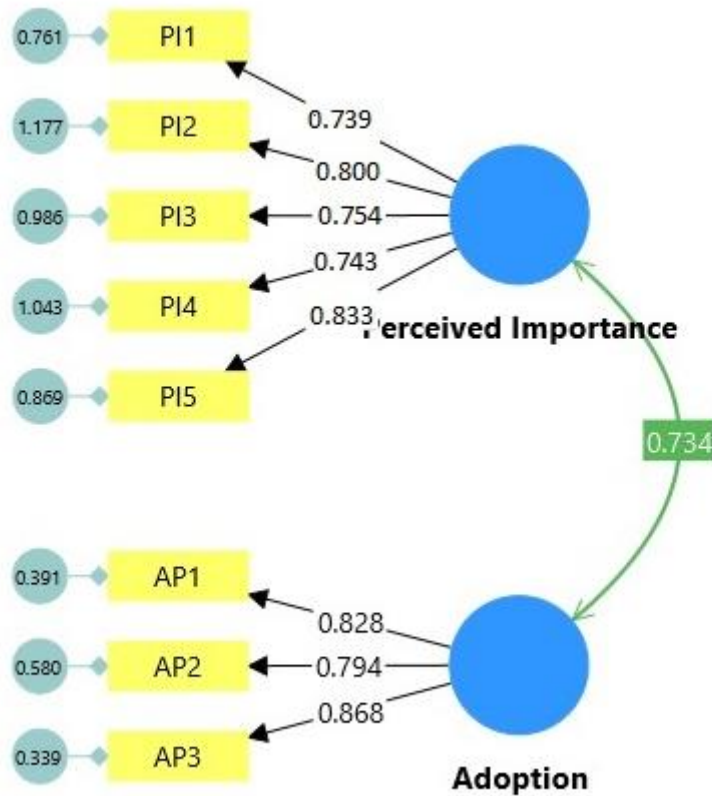


Figure 4.4
Confirmatory Factor Analysis related to Patient's Perceived Importance and Adoption
towards Generic Medicines.

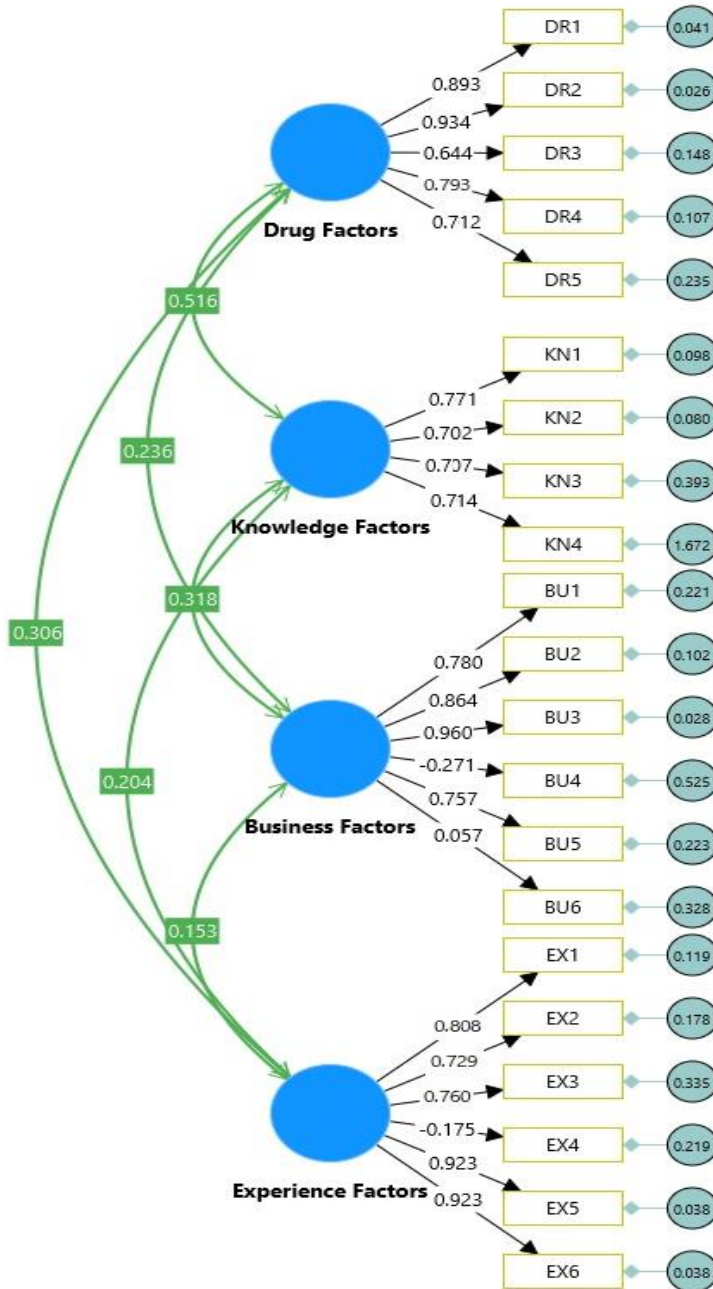


The model of Confirmatory Factor Analysis (CFA) presented in Figure 4.2 examines patient-related influences, including Awareness Factors, Drug Factors, Marketing Factors, and Experience Factors. Regarding the Awareness Factors construct, the observed variables (AW1 through AW4) display generally strong factor loadings, all at 0.70 or above, indicating good correspondence to the latent construct. However, AW5 shows a considerably lower standardized loading, signifying a weak correlation with the Awareness Factors construct and calling into question its efficacy as the observed indicator. The Drug Factors construct exhibited mixed values among the observed variables (DG1 through DG4). While DG2 (0.870) and DG4 (0.726) represent strong loadings together with a good correlation with the latent indicator. DG3, however had a very low loading of (0.028), thereby potentially showing it to not be a valid indicator of Drug Factors and as such

would require reconsideration or ultimately be deleted from the model. Marketing Factors again presented a similarly satisfactory series of observed indicators of (MK1 through MK4). MK1 (0.782), MK3 (0.815), and MK4 (0.735) all showed satisfactory strength (0.70 or better) on their loading to the Marketing Factors latent indicator. However, MK2 measured weaker at 0.475, thereby showing a lesser contribution as an indicator to Marketing Factors. Experience Factors presented a generally satisfactory explanatory model with its observed variables of (EX1 through EX5). EX3 (0.811) and EX4 (0.701) were overall treated as satisfactory while EX2 measured slightly lower (0.604). However, EX5 measured very low at 0.366, generally indicative of Grade II effectiveness yet represents a weaker indicator (EX5) on the totality of the Experience Factors latent indicator.

Figure 4.3 presents a Confirmatory Factor Analysis (CFA) model on a patient-related focus, with Drug Factors, Knowledge Factors, Business Factors, and Experience Factors. In terms of Drug Factors, the observed variables (DR1 to DR5) illustrate varying associations. DR1, DR2, and DR3 show strong loadings of (0.893, 0.934, and 0.644 respectively) which strongly associate to the latent variable. Conversely, DR4 and DR5 have lower loadings (0.107 and 0.235 respectively) suggesting a weaker relation to the Drug Factors latent variable. The Knowledge Factors latent variable demonstrates consistent loadings across its observed variables (KN1 to KN4) and most of the loadings are, at or slightly above, 0.70 (KN1 to KN3) indicating a strong association to the latent variable. KN4 has a relatively high loading of 1.672, which may demonstrate an unreliable association, or an outlier that may require further investigation. The Business Factors latent variable presents much variability of loadings among the observed variables (BU1 to BU6). There are two observed variables BU1 and BU2 with strong loadings (0.780, 0.864 respectively) which suggests strong associations to the Business Factors latent variable. Whereas, BU3 has a very low loading of (0.028) and BU4 even demonstrates a negative factor loading (-0.271) indicating that these variables may not accurately represent the Business Factors latent variable.

Figure 4.5
Confirmatory Factor Analysis related to Pharmacist factors



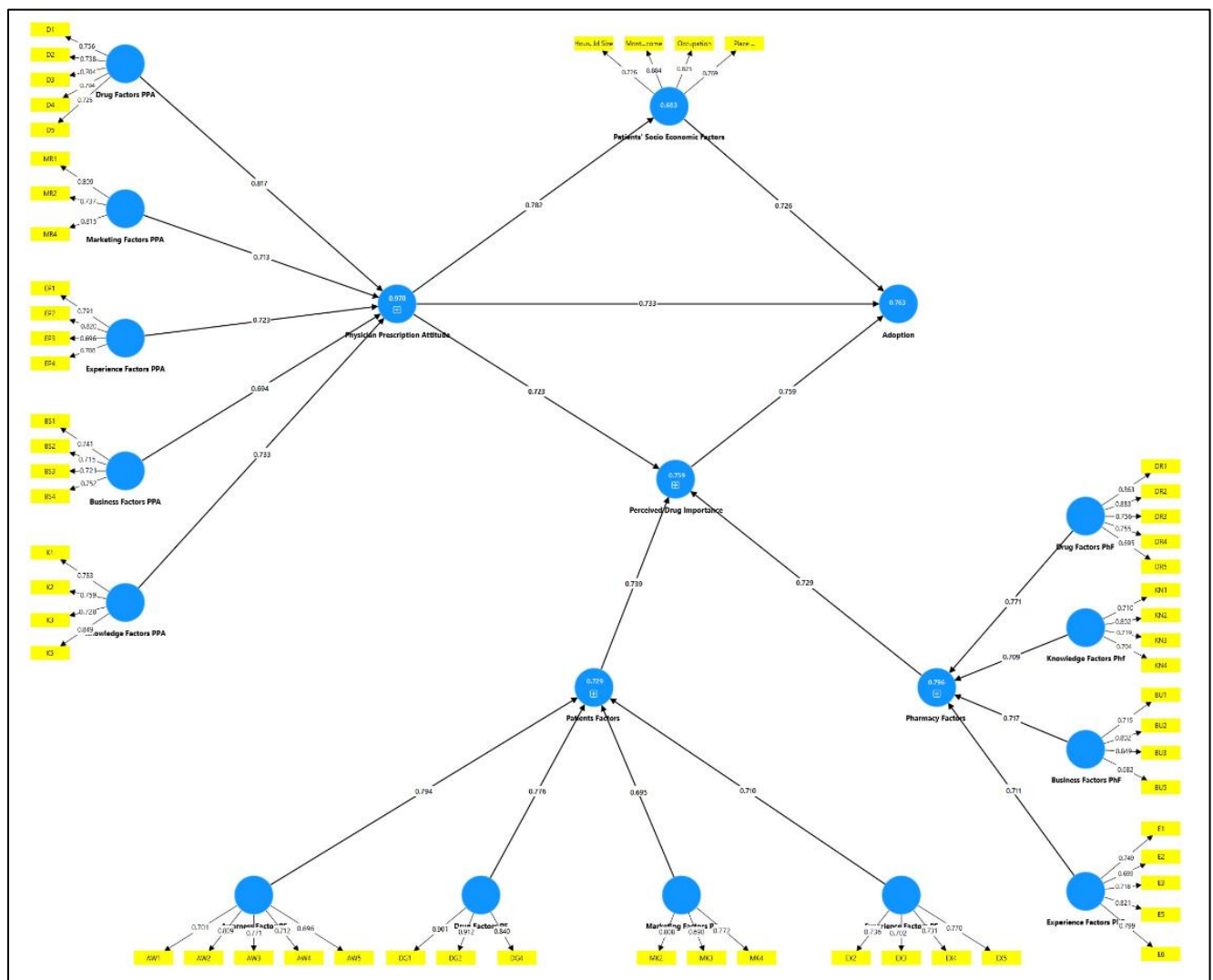
Finally, the observed variables for Experience Factors (EX1 to EX6), demonstrate variability of loading association as well. EX1, EX2, and EX5 have loading factors of (0.119, 0.178, 0.038) which suggest weak relations to the latent variable. EX3, EX4, and EX6 show stronger loadings

of EX3 and EX4 being near or above (0.70), while EX6 demonstrates a weak association if (0.038) consistently indicating variability in the Experience Factors latent variable.

4.2.4. PLS for Measurement Model & Path Coefficient

First, the measurement model was assessed using Smart PLS to assess internal consistency based on reliability and validity. Then the PLS Algorithm was used. To test the hypothesized relationship across constructs in respect to the adoption of generic prescription drugs, all constructs were classified according to the proposed conceptual model.

Figure 4.6
PLS for Measurement Model & Path Coefficient



The figure 4.6 above indicates that the Adoption of generic medicines is the dependent variables (DVs), while the independent variables (IDVs) are physician prescription attitude, patient factors, and pharmacist factors. Patient socio-economic factors such as household size, monthly income, occupation, and place of residence, are considered mediators of physician prescription attitude, in relation to the adoption of generic medicines. With regard to the adoption of generic medicines, it is also suggested that perceived drug importance is a mediator of physician prescription attitude.

4.2.5. Assessment of the Indicator Loading based on Measurement Model

The first step in the analysis of the measurement model is to find the indicator loading. An indicator loading of 0.500 or greater is considered acceptable because "constructs can account for or explain greater than 50% of the variance of the indicators" (Jr. et al., 2017). The interpretations of the indicator loading are similar for CB-SEM and PLS-SEM. However, PLS-SEM requires the researcher to be more conservative because the loading will be slightly inflated. At the same time, the researcher may retain more indicators and therefore retain a higher content validity (Black & Babin, 2019). In this study, with the exception of a few, all indicators with an indicator loading of greater than 0.500 were retained. Nonetheless, the universal threshold level for indicator loading remains at 0.500 in order to obtain higher content validity.

Table 4.7
Indicator loadings

	Drug Factor s PPA	Marketi ng Factors PPA	Experien ce PPA	Busine ss factors PPA	Knowled ge PPA	Awaren ess PF	Drug Factor PF	Marketi ng Factors PF	Experien ce PF	Drug Factor PhF	Knowled ge PhF	Busi ness Fact or PhF	Exper ience PhF
D1	0.756												
D2	0.738												
D3	0.704												
D4	0.794												
D5	0.725												
MR1		0.809											
MR2		0.737											
MR4		0.815											
EP1			0.791										
EP2			0.820										
EP3			0.696										
EP4			0.708										
BS1				0.741									
BS2				0.715									
BS3				0.721									
BS4				0.752									
K1					0.783								
K2					0.759								
K3					0.728								
K5					0.849								
AW1						0.701							
AW2						0.809							
AW3						0.771							
AW4						0.712							
AW5						0.696							

DG1							0.901						
DG2							0.912						
DG4							0.840						
MK2								0.808					
MK3								0.690					
MK4								0.772					
EX2									0.736				
EX3									0.702				
EX4									0.731				
EX5									0.770				
DR1										0.863			
DR2										0.883			
DR3										0.756			
DR4										0.755			
DR5										0.695			
KN1											0.710		
KN2											0.802		
KN3											0.719		
KN4											0.704		
BU1												0.715	
BU2												0.802	
BU3												0.849	
BU5												0.682	
E1													0.749
E2													0.699
E3													0.718
E5													0.821
E6													0.799

All indicator loadings were found to be above the Threshold level of 0.500. However, the AVE values for all constructs are above the threshold value of .50, which indicates that the constructs can explain more than 50% of the variances of indicators which justifies, retention of indicators. The significance of indicator loading after boot strapping is depicted in structural model analysis.

4.2.6. Internal Consistency Reliability Assessment

The measuring methodology begins with an evaluation of internal consistency as the primary criteria. As a gold standard, Cronbach's alpha has been around for a long time. As a novel metric, it provides a ballpark figure for dependability, but it's also been used as a bottom limit. Composite reliability (CR) is a commonly used metric for evaluating dependability, according to Hessler et al. (2014). With values ranging from 0 to 1, CR is interpreted in a manner comparable to Cronbach's alpha. According to Joseph F. Hair et al. (2019), structural equation modelling can handle CR values ranging from .70 to 0.90. The table shows the matching composite reliability, Cronbach's alpha, and rho_A for each construct. The overall dependability of all research constructs in our study was shown to be more than 0.70. This provided evidence that the scale's internal consistency is satisfactory or high.

Table 4.8
Reliability of Constructs

	“Cronbach's alpha”	“Composite reliability” (rho_a)	“Composite reliability” (rho_c)
Drug Factors PPA	0.742	0.667	0.771
Marketing Factors PPA	0.884	0.768	0.800
Experience PPA	0.759	0.775	0.789
Business factors PPA	0.771	0.761	0.787
Knowledge PPA	0.766	0.683	0.793
Awareness PF	0.711	0.726	0.815
Drug Factor PF	0.786	0.845	0.823
Marketing Factors PF	0.729	0.705	0.761
Experience PF	0.711	0.694	0.741
Drug Factor PhF	0.850	0.857	0.894
Knowledge PhF	0.720	0.724	0.779

Experience PhF	0.714	0.729	0.711
Business Factor PhF	0.784	0.698	0.739
Patients' Socio-Economic Factors	0.776	0.726	0.726
Perceived Drug Importance	0.704	0.736	0.808
Adoption	0.702	0.691	0.708

Source: Primary Data

In the study, the corresponding values of Cronbach's alpha, rho A, and Composite reliability (CR) are more than the threshold value of .700. The reliability of constructs has been established based on three dimensions.

4.2.7. Convergent Validity Assessment

Convergent validity is the measure of models through which it is possible to ascertain the "extent to which a measure positively correlates with alternate measures of same construct" (J. Hair et al., 2017). Since indicators of the reflective models are considered as "alternate approaches to measure the same constructs", it is assumed that they should share a greater degree of variance. (Sarstedt & Cheah, 2019). The convergent validity is measured through "Average Variance Extract (AVE) and outer loading of the indicators. Average variance extract is the grand mean of the squared loading of the indicators" and it must be more than 0.50 (AVE > 0.50) (Cheah et al., 2018). Indicator loading is also considered indicator reliability and for assessing convergent validity, the measures should be such that Indicator loading > 0.508 and AVE > 0.50 for all the constructs (J. Hair et al., 2017). The present study uses constructs and all the values of Average Variance Extract indicator reliability (indicator loading) is summarized in table 4.8. The AVE values for all the constructs are greater than 0.50. This confirmed the convergent validity of the all sixteen constructs.

Table 4.9
Average Variance Extracted

	Average variance extracted (AVE)
Drug Factors PPA	0.5108
Marketing Factors PPA	0.5584
Experience PPA	0.6356
Business factors PPA	0.5681

Knowledge PPA	0.6437
Awareness PF	0.5744
Drug Factor PF	0.5861
Marketing Factors PF	0.6693
Experience PF	0.5038
Drug Factor PhF	0.6297
Knowledge PhF	0.6686
Experience PhF	0.5898
Business Factor PhF	0.5823
Patients' Socio-Economic Factors	0.5429
Perceived Drug Importance	0.5668
Adoption	0.5505

Source: Primary Data

The AVE for all the constructs is greater than 0.50, the convergent validity of the constructs is established. Indicator loading of all the indicators used in our analysis is above the threshold level.

4.2.8. Discriminant Validity Assessment

The discriminant validity is defined as the extent to which a construct is empirically different from other constructs,” (J. Hair et al., 2018). It shows the “distinctiveness” of the construct (J. Hair et al., 2014). Viewed in this perspective, discriminant validity “assessment can be regarded as final step for the quality evaluation of measurement model having reflective contracts. The traditional methods used to establish discriminant validity are Cross loading and Fornell-Lacker criteria, which have been used in multivariate analysis (Cleff, 2019). Cross loading is the first approach and indicates greater loading of the indicator with its construct compared to other constructs measuring the concept. Fornell-Lacker criteria which are considered the “second approach measure the square root of Average variance Extracted (AVE) of every construct and it should be greater than its correlation with other latent constructs. This indicates that larger variance shared by the latent variable with its indicators compared to indicators of other latent variables,” (Vinzi et al., 2010; J. Hair et al., 2010). However, recent studies have pointed out the shortcoming of the performance of cross loading

and Fornell-Lacker criteria and suggested that both the methods cannot “correctly depict the discriminant validity issue,” (Voorhees et al., 2016). As a solution, Henseler et al., (2015) suggested use of heterotrait-monotrait ratio (HTMT) for the correlation which is the “ratio of the between-trait correlation to the within trait correlation. It means HTMT is the mean of all correlations of indicators across constructs measuring different constructs” (J. Hair et al., 2017). The accepted values of the HTMT ratio shall be less than that wherein it is true correlation between the constructs. The threshold value of 0.900 and above, is considered lack of discriminant value. The acceptable value of “HTMT should be less than 0.90 to establish discriminant validity,” (Henseler et al., 2015). In the present study, Heterotrait-monotrait ratio (HTMT) have been used to establish discriminant validity. Table 4.10 shows the HTMT ratios.

Table 4.10 : Heterotrait-Monotrait ratio (HTMT)

	Adop tion	Aw_ PF	BU_P hF	BS_P PA	DG_P F	DR_P hF	D_PP A	Ex_P F	EP_P PA	E_Ph F	K_PP A	KN_P hF	MK_ PF	MR_ PPA	PF	PSEF	PDI	PhF	PP A	
Adoption																				
Aw_PF	0.118																			
BU_PhF	0.251	0.115																		
BS_PPA	0.343	0.161	0.231																	
DG_PF	0.133	0.716	0.126	0.133																
DR_PhF	0.127	0.078	0.540	0.184	0.053															
D_PPA	0.724	0.076	0.214	0.615	0.083	0.104														
Ex_PF	0.188	0.723	0.129	0.185	0.722	0.087	0.157													
EP_PPA	0.837	0.142	0.228	0.793	0.106	0.140	0.698	0.121												
E_PhF	0.231	0.125	0.559	0.526	0.069	0.375	0.231	0.176	0.189											
K_PPA	0.324	0.097	0.181	0.644	0.136	0.119	0.812	0.140	0.710	0.222										
KN_PhF	0.258	0.123	0.614	0.255	0.089	0.650	0.182	0.132	0.175	0.315	0.179									
MK_PF	0.224	0.807	0.171	0.275	0.686	0.127	0.177	0.775	0.277	0.240	0.241	0.224								
MR_PPA	0.808	0.146	0.198	0.346	0.089	0.167	0.517	0.171	0.729	0.427	0.760	0.241	0.283							
PF	0.178	0.363	0.147	0.202	0.313	0.093	0.131	0.488	0.169	0.162	0.161	0.151	0.655	0.182						
PSEF	0.218	0.348	0.143	0.283	0.145	0.066	0.151	0.271	0.192	0.114	0.132	0.158	0.445	0.235	0.328					
PDI	0.327	0.155	0.181	0.633	0.186	0.106	0.825	0.212	0.685	0.268	0.609	0.173	0.222	0.552	0.213	0.157				
PhF	0.266	0.138	0.634	0.381	0.104	0.714	0.228	0.165	0.231	0.889	0.220	0.634	0.236	0.327	0.172	0.146	0.228			
PPA	0.353	0.138	0.237	0.321	0.123	0.159	0.362	0.173	0.613	0.347	0.615	0.229	0.281	0.599	0.189	0.219	0.821	0.307		

Source: Primary Data

Based on the values of HTMT ratio are the most viable method of establishing discriminant validity. The HTMT ratios are less than the threshold value of 0.900 for most of the constructs. In our study, based on the values obtained for HTMT ratios, the discriminant validity of most of the constructs has been established.

4.2.9. Assessment of Collinearity

Like multiple regression analysis, there will be bias in path coefficients in PLS-SEM in case of multi-collinearity in the exogenous constructs (independent variables). J. Hair et al., (2018) defined “multi-collinearity as the extent to which a variable can be explained by other variables in the analysis”. If multi-collinearity is high, the effect of a single variable is difficult to ascertain. Like the formative model, the results of reflective models are also accessed for collinearity, which is done by computing the variance inflation factor (VIF) for all indicators. The VIF values obtained in the present study are summarized in Table 4.19. VIF is the reciprocal of the tolerance value; small VIF values indicate low correlation among variables under ideal conditions ($VIF < 3$). However, it is acceptable if it is less than 10. In our case, VIF values of all the indicators are found to be below 10 which is below the critical level thereby indicating no multi-collinearity among predictor variables.

Table 4.11
Assessment of Collinearity (Variance Inflation Factor)

	VIF
A1	1.101541
A2	1.081783
A3	2.242136
A4	2.149271
AW1	1.143706
AW2	1.956281
AW3	2.007947
AW4	1.543835
AW5	1.22605
Age	1.384592
BS1	1.797634
BS2	1.869995
BS3	1.646684

BS4	1.155259
BS5	1.157473
BU1	1.567053
BU2	3.436181
BU3	3.592469
BU4	1.049055
BU5	1.595545
BU6	1.071714
D1	1.960484
D2	1.467213
D3	1.478054
D4	1.41596
D5	2.039603
DG1	3.045229
DG2	2.793937
DG3	1.019205
DG4	1.861708
DR2	4.041104
DR3	1.612579
DR5	1.432284
E1	2.005883
E2	1.748096
E3	1.331314
E4	1.067359
E5	4.915363
E6	5.073115
EP1	1.778789
EP2	1.767927
EP3	1.871837
EP3	1.475745
EP4	1.172215
EP5	1.853267

EX1	1.293881
EX2	1.235813
EX3	1.384165
EX4	1.368038
EX5	1.256602
K1	2.431233
K2	1.780289
K3	1.798192
K4	2.496104
K5	2.308935
KN1	1.69262
KN2	1.330895
KN3	1.183339
KN4	1.405717
MK1	1.028014
MK2	1.298007
MK3	1.412234
MK4	1.252809
MR1	1.972547
MR2	1.681713
MR3	1.125853
MR4	2.993592
MR5	1.63212
Education Level	1.822223
Gender	1.082373
Household Size	1.015887
Marital Status	1.445076
Monthly Income	2.299483
Occupation	1.576584
Place of Residence	1.333854
PDI1	1.593166
PDI2	1.283171

PDI3	1.151512
PDI4	1.871921
PDI5	1.2526

Source: Primary Data

4.2.10. Boot Strapping

Once the path coefficients have been obtained, we check the significance level of the path coefficients”. Boot strapping is used to check the significance level. It, provides the standard error. This procedure is used to check whether or not an indicator makes significant contribution to its construct (J. Hair et al., 2017). Through boot strapping, it is possible to compute “empirical t and p values for the path coefficients when the value of t is greater than the critical value of 1.96,” (critical value of t, two-tailed test at 95% confidence interval) (Ringle et al., 2012). In the present study, since the statistical significance has been tested at 95% confidence interval, the critical value of t is taken as 1.96. Another approach to test the significance level is to access p values which are obtaining a “t value at least as extreme as the one that is observed,”. In other words, “the p-value is the probability of erroneously rejecting a true null hypothesis that is assuming a significant path coefficient though it is not significant” (J. Hair et al., 2017). At a 5% significance level, the value of p must be less than 0.05 (Wong, 2013; Joe F. Hair et al., 2014). The boot strapping results of study are summarized in below tables the results are used to test the formulated hypothesis and draw conclusions for the study. The boot strapping outcomes have been used to test the significance level of all the key indicators.

Objective 1: To study the factors affecting the Physicians’ Prescription towards Generic Medicines

This objective aims to address the factors affecting physicians’ prescription practices towards generic medicines. The factors considered include Drug Factors, Marketing Factors, Experience Factors, Business Factors, and Knowledge Factors. The significance of the path coefficients for these factors, in relation to Physician Prescription Attitudes towards generic medicines, is assessed through bootstrapping. The following is the hypothesis

Null hypothesis: There is no significant effect of physician’s factors on their prescription attitude towards generic medicines.

Alternative Hypothesis: There is a significant effect of physician’s factors on their prescription attitude towards generic medicines.

Table 4.12

Bootstrap value of Factors affecting the Physician Prescription Attitude towards generic medicines

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
Business Factors -> Physician Prescription Attitude	0.698	0.694	0.063	11.130	0.000
Drug Factors -> Physician Prescription Attitude	0.747	0.740	0.050	14.963	0.000
Experience -> Physician Prescription Attitude	0.813	0.807	0.046	17.760	0.000
Knowledge -> Physician Prescription Attitude	0.776	0.780	0.051	15.341	0.000
Marketing Factors -> Physician Prescription Attitude	0.739	0.735	0.058	12.666	0.016

Source: Primary Data

The table 4.12 shows that all the factors examined: Business, Drug, Experience, Knowledge, and Marketing, all had a statistically significant positive impact on the physician prescription attitude toward generic medicines, indicated by their large T statistics and P values below the 0.05. Experience factors had the largest impact with an original sample value of 0.813, probably because physicians often rely on their professional experience in making decisions about their prescriptions. Knowledge factors (0.776) were also significant, as those physicians who were better informed were likely to feel confident in being able to prescribe generics. Drug Factors (0.747) are also important because the characteristics of the drugs themselves, such as effectiveness and safety, are also important relevant factors which influence physician attitudes. Business Factors (0.698) and Marketing Factors (0.739) also contribute significantly. It indicating that fostering positive attitudes through education, experience, and strategic marketing is crucial for increasing the use of generic medicines. Based on the p-value, which is less than 0.05 for the factors related to physician-to-physician prescription attribution, the null hypothesis is rejected, and the alternative hypothesis is accepted. This indicates that there is a significant effect of physicians’ factors on their prescription attitude toward generic medicines.

Figure 4.7
Factors effecting the Physician Prescription Attitude towards generic medicines

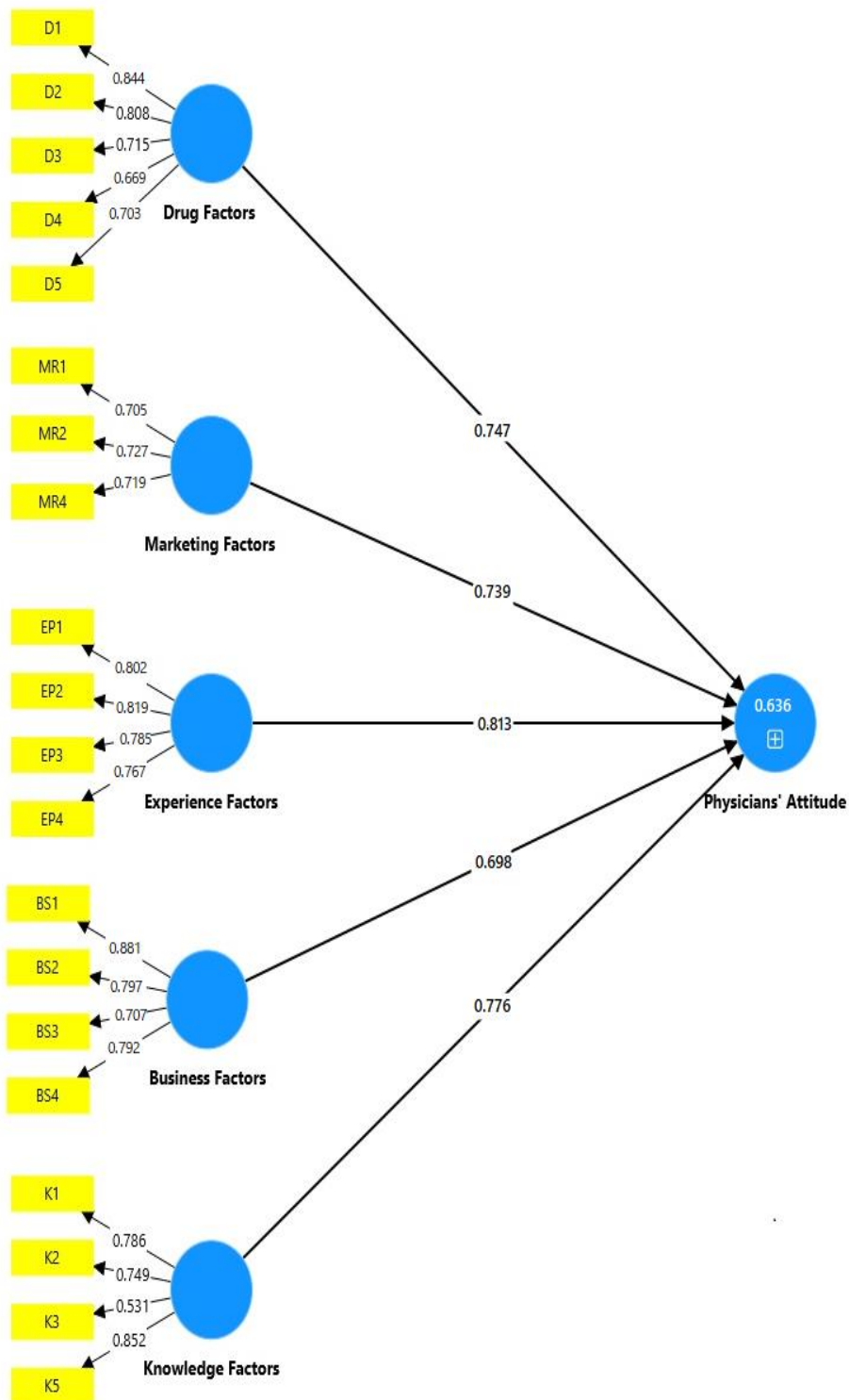


Table 4.13

Bootstrap value of items affecting the Physician prescription Attitude towards generic medicine

Particulars			Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
I am aware of the generics that are available at various pharmacies and Jan Aushadi stores - BS1	<---	Business Factors	0.881	0.870	0.060	14.800	0.000
I prescribe drugs from reputed pharmaceutical companies - BS2	<---	Business Factors	0.797	0.786	0.083	9.558	0.000
I prescribe drugs where the MRs possess sufficient knowledge of the medicine - BS3	<---	Business Factors	0.707	0.699	0.072	9.880	0.007
Repeated visits of MRs influence my drug prescription - BS4	<---	Business Factors	0.792	0.773	0.067	11.846	0.000
I consider generics to be as safe as branded ethical drugs - D1	<---	Drug Factors	0.844	0.835	0.066	12.877	0.000
I consider generics to be therapeutically as effective as branded ethical drugs - D2	<---	Drug Factors	0.808	0.802	0.053	15.153	0.000
Generics are cost efficient than branded ethical drugs - D3	<---	Drug Factors	0.715	0.705	0.056	12.767	0.000
I consider the income levels of the patient before prescribing a drug - D4	<---	Drug Factors	0.669	0.653	0.145	4.616	0.024
I analyse the cost-efficacy benefits of a drug before prescribing it to my patients - D5	<---	Drug Factors	0.703	0.683	0.131	5.358	0.000
I prescribe drugs to my patients that are easily honoured by the pharmacist - EP1	<---	Experience	0.802	0.804	0.037	21.471	0.000

I prescribe drugs which are also prescribed by my colleagues EP2	<---	Experience	0.819	0.812	0.037	21.887	0.000
The long-standing presence of the drug in the market helps me to prescribe the same - EP3	<---	Experience	0.785	0.775	0.070	11.175	0.000
I consider patient requests in prescribing particular medication - EP4	<---	Experience	0.767	0.761	0.083	9.279	0.000
I keep myself regularly updated with the latest advancements in my therapeutic area - K1	<---	Knowledge	0.786	0.782	0.043	18.074	0.000
I have read articles on safety and efficacy of generic drugs in comparison to branded ethical drugs (innovator) - K2	<---	Knowledge	0.749	0.747	0.039	19.287	0.000
I prescribe drugs with generic name to my patients - K3	<---	Knowledge	0.531	0.533	0.064	8.333	0.000
I consider that generics can be prescribed in place of branded ethical drugs - K4	<---	Knowledge	0.852	0.849	0.026	33.181	0.000
I tend to attend the symposia/conferences sponsored by pharma companies -MR1	<---	Marketing Factors	0.705	0.705	0.037	18.879	0.000
I regularly meet the medical sales representatives (MRs) of various pharma companies to understand their drug portfolio - MR2	<---	Marketing Factors	0.727	0.724	0.044	16.630	0.000
Small promotional gift items like pens, pads etc., influences my drug prescription -MR4	<---	Marketing Factors	0.719	0.717	0.029	24.562	0.000

Source: Primary Data

The table 4.13 delineates the various factors impacting physician behavior with regard to prescribing generic medicines. Factors consist of Business Factors, Drug Factors, Experience,

Knowledge, and Marketing Factors It was shown that Business Factors have a substantial influence on physician behaviors to prescribe, particularly the knowledge of generics available at pharmacies including Jan Aushadi stores (BS1), which had an original sample value of 0.881 and T stat. value of 14.800. The knowledge of generics available, shaped physician behaviors toward being receptive to prescribing generics, suggesting that the knowledge and availability of generics in facilities is the foundation of physician behaviors. The frequency of medical representatives visiting with health care professionals (BS4), with a value of 0.792 and T stat. value of 11.846, is an important time in forming and reinforcing the prescriber's behaviors, suggesting that the frequency of contact with medical representatives can influence their behaviors. Prescribing drugs from established pharmaceutical companies (BS2) had a value of 0.797 and T stat. value of 9.558 demonstrating the participant's trust in the medicine behavior changes will reinforce a decision to prescribe the medicine, and the medical representative's knowledge of the medicine (BS3) with a value of 0.707 and a T stat. of 9.880 further established the medical representative's trust in their recommendation of generics indicating the importance of a reputation and knowledge in influencing physician prescription behavior.

Drug Factors influence physician behaviors towards prescribing generics more so than other factors, particularly the safety (D1) and therapeutic benefit (D2), with an original sample value of 0.844 and 0.808 and T stat. of 12.877 and 15.153 respectively. These findings suggest practitioner confidence in the efficacy and safety of the drug is critical in peer behaviors related to prescribing generic medicines. Furthermore, the affordability of generics (D3) serves as a practical factor for physicians, particularly before prescribing patients with different levels of social class with a value of 0.715 and a T stat. of 12.767. The consideration of cost-efficacy (D5) having a value of 0.703 and a T stat. of 5.358 and taking a patient's income social class level into consideration before prescribing (D4) of a value of 0.669 and a T stat. of 4.616 speaks more to practical and ethical considerations of the prescribing context. Physicians consider the efficacy of the medication along with its affordability for their patients when prescribing decisions are made.

Experience Factors are significant constructs that influence physician prescription decisions by representing the professional and social dimensions of the prescribing context. The influence of the prescription faculty of peers (EP2) is the highest in this value having an original sample of 0.819 and a T stat. of 21.887 thus reinforcing the impression that individual prescribers are either consistent with peer prescription practices or shape their utilization reflective of a professional community. The influence of the ease in which pharmacists are able to fill prescriptions (EP1) was also high with an original sample of 0.802 and a T stat. of 21.471 thus

reinforcing the notion that practicality influences prescription decisions. Physicians also considered the length of availability of a drug in the prescription process (EP3) having an original sample of 0.785 with a T stat of 11.175 as well as whether a patient will request a medication when prescribing (EP4) having an initial sample of 0.767 and T stat. of 11.175. The differences in the original sample values indicate a clear indication of the bias of the growth in generics in the health-care system. Initial sample values of 0.852 (T stat. 33.181) of K4, and the past experience of physicians with generics reflects how generics have fostered a belief that generics can be prescription drugs instead of branded drugs. K1 of the therapeutic area advancement original sample value (0.786, T stat. 18.074) and reading articles on generics safety and efficacy (0.749, T stat. 19.287) demonstrate the learning associated with growth in generics and the significance of education in developing positive attitudes toward generics in prescription. K3, prescribing by generic name, which had a lower impact (0.531, T stat. 8.333) than K4, K1, and K2, asserts how this knowledge contributes to practice, albeit varying degrees.

The marketers that work with physicians influence their patient interactions. MR4, Small promotional gifts made a significant impact original sample value (0.719, T stat. 24.562). MR2, frequent meetings with medical representatives also ensured that the physician was well-informed about the minimum drug portfolio available to prescribers (0.727, T stat. 16.630). MR1, attendance at symposiums or conferences sponsored by pharmaceutical firms is a similar influence factor with original sample value of (0.705, T stat. 18.879).

It states that the factors in influence physician prescriber attitude toward generic medicines. The five categories: Business Factors, Drug Factors, Experience Factors, Knowledge Factors, and Marketing Factors all contribute to the physician's prescription attitude in different ways. This suggest the decision-making process for physician influencing prescriber decision making is the result of combination of issues like accessibility, patient safety, efficacy, cost of medication, business experience, knowledge, and marketing links. Based on the p-value of the factors related to physician-to-physician generic pertaining to generic medicine, they began to impacted the physician's prescriber attitudes, rejecting the null hypothesis and accepting the alternative hypothesis. There is a distinct impact by physician's factors such as Business Factors, Drug Factors, Experience Factors, Knowledge Factors, and Marketing Factors on physician's prescription attitude toward generic medicines.

Objective 2: To analyze the pharmacist influence on patients perceived importance of generic medicines.

This objective aims to address the pharmacist influence on patients perceived importance of generic medicines. The factors considered include Drug Factors, Knowledge, Business and Experience Factors. The significance of the path coefficients for these factors, in relation to Physician Prescription Attitudes towards generic medicines, is assessed through bootstrapping. The following is the hypothesis

Null Hypothesis: There is no significant influence of pharmacist on the patient’s purchase of generic medicines.

Alternative Hypothesis: There is a significant influence of pharmacist on the patient’s purchase of generic medicines.

Table 4.14

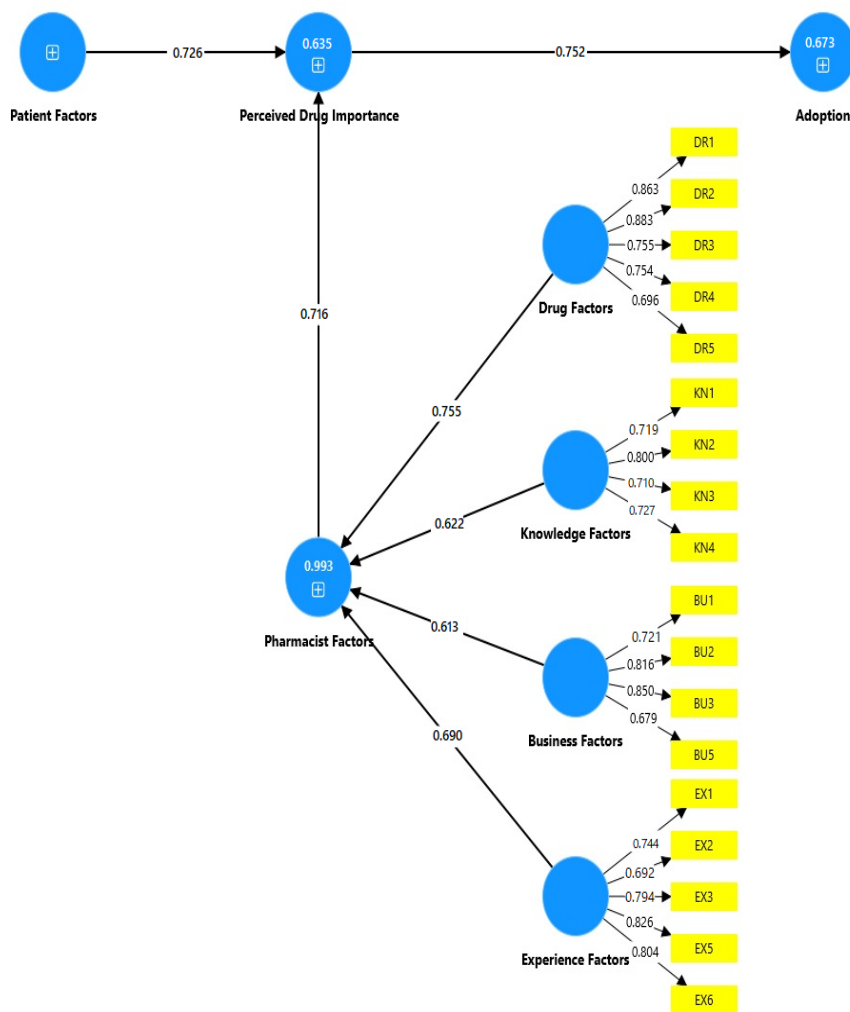
Bootstrap value of Pharmacist factors on patients perceived importance of generic medicines.

Particulars	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
Business Factors -> Pharmacist Factors	0.613	0.609	0.033	18.351	0.000
Drug Factors -> Pharmacist Factors	0.755	0.754	0.034	22.043	0.000
Experience Factors -> Pharmacist Factors	0.711	0.707	0.043	16.709	0.000
Knowledge Factors -> Pharmacist Factors	0.622	0.620	0.024	26.155	0.000
Pharmacist Factors -> Perceived Drug Importance	0.716	0.666	0.020	36.613	0.000
Patient Factors -> Perceived Drug Importance	0.726	0.683	0.097	7.500	0.000
Perceived Drug Importance -> Adoption	0.752	0.770	0.068	11.029	0.000

Source: Primary Data

Table 4.14 represents the Pharmacist factors impact on the patient's perceived importance to generic medicines. The factors are grouped into five categories: Business Factors, Drug Factors, Experience Factors, Knowledge Factors, and influence on Perceived Drug Importance and Drug Adoption.

Figure 4.8
Pharmacist influence on patients perceived importance of generic medicines.



Among the factors affecting the pharmacist, Drug Factors are shown to be the most impactful by having the highest original sample value of 0.755, with a T stat. of 22.043 and P-value of 0.000. This highlights drug factors have a significant influence on the behavior of pharmacists. Experience Factors were also quite significant having an original sample value of 0.711. Knowledge Factors come in third at 0.622, with both still falling under excellent T stat. scores and low P-value, showing that a pharmacist's experience and knowledge are quite important in instilling their influence unto patients respectively. Business Factors, although slightly lower still have a significant impact at an original sample value of 0.613. The most significant factor that influences perceived drug importance is Patient Factors at an original sample value of 0.726. Pharmacist Factors come in second but are very similar at 0.716. Both factors showcase

significant influence for the patient to perceive the importance of the generic medicine. The perceived importance of the drug shows strong influence and signifies a positive impact on the adoption of the drug at an original sample value of 0.752, suggesting influence on the adoption of generic medicines. Finally, with a p-value less than 0.05 for the factors related to pharmacist on the patient's purchase of generic medicines, the null hypothesis is rejected, while the alternative hypothesis is accepted, which indicates a significant influence of pharmacist on the patient's purchase of generic medicines.

Table 4.15

Bootstrap value of Pharmacist factor items influence on patients perceived importance of generic medicines.

Particulars			Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
There are a wide range of generic medicines available in my pharmacy - BU1	<---	Business factor	0.721	0.724	0.054	13.420	0.000
The credibility of generic medicine manufacturers is a concern when stocking medicines in the pharmacy - BU2	<---	Business factor	0.816	0.811	0.037	22.057	0.000
Pharmaceutical companies' product bonuses and incentives will influence the choice of medicines selection - BU3	<---	Business factor	0.850	0.845	0.031	27.316	0.000
Visual reminders provided by pharmaceutical companies influence dispensing over-the counter (OTC) medicines - BU5	<---	Business factor	0.679	0.676	0.043	15.806	0.000
Generic medicines are therapeutically effective in treating diseases - DR1	<---	Drug Factors	0.863	0.863	0.017	50.160	0.000

Generic medicines are as safe as branded ethical drugs / innovator drugs - DR2	<---	Drug Factors	0.883	0.883	0.014	63.297	0.000
Generic medicines are pocket-friendly for the patients - DR3	<---	Drug Factors	0.755	0.755	0.037	20.588	0.000
Packaging of generic medicines is of good standard - DR4	<---	Drug Factors	0.754	0.753	0.037	20.318	0.000
Generic drugs have similar side effects as their branded equivalents - DR5	<---	Drug Factors	0.696	0.697	0.040	17.301	0.000
I recommend generic alternatives for branded ethical drugs to my customers - EX1	<---	Experience	0.744	0.739	0.063	11.897	0.000
I regularly dispense generic drugs for patient's day-to day health related problems - EX2	<---	Experience	0.692	0.685	0.092	7.507	0.000
Patients accept generic substitution after they are educated about generic medicine - EX3	<---	Experience	0.794	0.787	0.072	11.026	0.000
Patients tend to buy only those drugs that are prescribed by the doctor - EX5	<---	Experience	0.826	0.823	0.048	17.156	0.000
Patients ask for cost effective drug equivalents - EX6	<---	Experience	0.804	0.804	0.047	17.164	0.000
Generic medicines are bioequivalent to branded ethical drugs and can be substituted - KN1	<---	Knowledge	0.719	0.711	0.073	9.875	0.000
Generic substitution improves compliance towards drug therapy among patients - KN2	<---	Knowledge	0.800	0.794	0.039	20.341	0.000

Substitution by generic medicines having narrow therapeutic index is inappropriate -KN3	<---	Knowledge	0.710	0.709	0.052	13.608	0.000
I keep myself regularly updated about advancements in pharmacology through books like CIMS (Current Index of Medical Specialists), MIMS (Monthly Index of Medical Specialists), etc. - KN4	<---	Knowledge	0.727	0.726	0.100	7.254	0.000

Source: Primary Data

The table 4.15 presents the various influences that other factors have on pharmacist behavior, translating to patients' perceptions of the importance of generic medicines. Under the Business Factors, the work product bonuses and/or incentives given to pharmacists from pharmaceutical companies (BU3) has the highest impact with an original sample value above .850 and a T stat. of 27.316. This indicates that compensatory payments have a high level of influence over pharmacist behavior in dispensing and selecting medicines. The influence of concerns over the credibility of generic medicine manufacturers (BU2) is the next highest influence with an original sample value of .816 and T stat. of 22.057, indicating that the credibility of the generic medicine manufacturer is critically important in pharmacists' willingness to dispense and recommend generic medicines to patients. The availability of a variety of generic medicines (BU1) has an original sample value of .721 and a T stat. of 13.420, projecting that awareness and interest in beliefs regarding availability will help meet the patients' pharmaceutical care needs of medicines. The influence of using visual reminders for OTC medicines (BU5) has an original sample value of .679 and a T stat. of 15.806, which demonstrates this is also impactful, although less than ideas regarding availability, indicating that marketing tools such as visual reminders may influence one behavior of dispensing. Regarding the Drug Factors, the safety of generic medicines compared to branded drugs (DR2) has the most significant impact with an original sample value of .883 and a T stat. of 63.297, indicating that perceptions of safety are the top consideration point for pharmacists in their decision making. The therapeutic effectiveness of generics (DR1) also demonstrates a strong influence, registering a value of 0.863 and a T statistic of 50.160 with clinical effectiveness being paramount in pharmacists'

confidence in recommending generics. The affordability of generic medicines (DR3), with a value of 0.755 and T statistic of 20.588 highlights the significance of associated cost factors for price-sensitive patients. Likewise, the quality of packaging (DR4) registered a value of 0.754 and T statistic of 20.318, indicating that pharmacists consider the drug effectiveness, whilst presentation also matters. Side effects of generics (DR5) viewed with a lower influence, value of 0.696 and T statistic of 17.301, indicates that environment or side effects have a factor, but to not as a larger degree compared to other factors. Moving on to Experience Factors, patients' preference for doctor prescribed drugs (EX5) had the biggest influence. Original sample value 0.826, T statistic of 17.156 that is indicative that trust in doctor's recommendations carry a significant influence for pharmacists dispensing behaviors. Patients asking for cost-saving alternatives (EX6) valued at 0.804 and T statistic of 17.164, shows how patients economic factors related to patients are significant factor for pharmacists' recommendations. Other factors contributing to this were acceptance of generics after educating patient (EX3) value of 0.794, T statistic of 11.026, pharmacists regularly dispense generics with (EX2) value of 0.692 and T statistic of 7.507 and overall considerations are not as influential, though still significantly impacted changing behavior, clearly showing importance of education and ingrained routine of dispensing generics to aid that behavior. Lastly within Knowledge Factors, generic substitution improves compliance to drug therapy (KN2) by highest impact, original sample value of 0.800 and T stat. of 20.341. Indicating pharmacists see value in adherence when, potentially, changing to generics. Construct as to continuous learning changes pharmacists trust to dispense generics, staying up to date on advancements with pharmacology (KN4) having a value of 0.727, T stat. of 7.254. Either would consider that bi-equivalence of generics to branded drug (KN1) valued at 0.719 T stat 38,875 to increases pharmacists trust for equivalents. Lastly, while considering narrow therapeutic index also made a contribution of its own (KN3) of value 0.710 and T statistic of 13.608 while reflecting the caution in pharmacists' decisions to ensure safety to patients taken into account. Overall. results illustrate the formidable amount of these factors as they shape pharmacists' decisions, and access ultimately influence patients' perceptions of generics as legitimate medicines. As the p-value Therefore it indicated from the p-value were low enough to reject the null hypothesis and accept the alternative hypothesis to state that there is pharmacist factors are significant, e.g. Business, Drug, Experience and Knowledge factors influence on patients perceived importance of generic medicines.

Objective 3: To study the impact of various environment factors on the patient’s perceived importance of generic medicines.

This objective made an attempt to address the impact of various environment factors/ patients’ factors on the patients perceived important of generic medicines. The following is the hypothesis.

Null hypothesis: There is no significant influence of environment factors on the patient’s perceived importance of generic medicines.

Alternative hypothesis: There is a significant influence of environment factors on the patient’s perceived importance of generic medicines.

Figure 4.9
Impact of Environment factors on the patients perceived importance of generic medicines

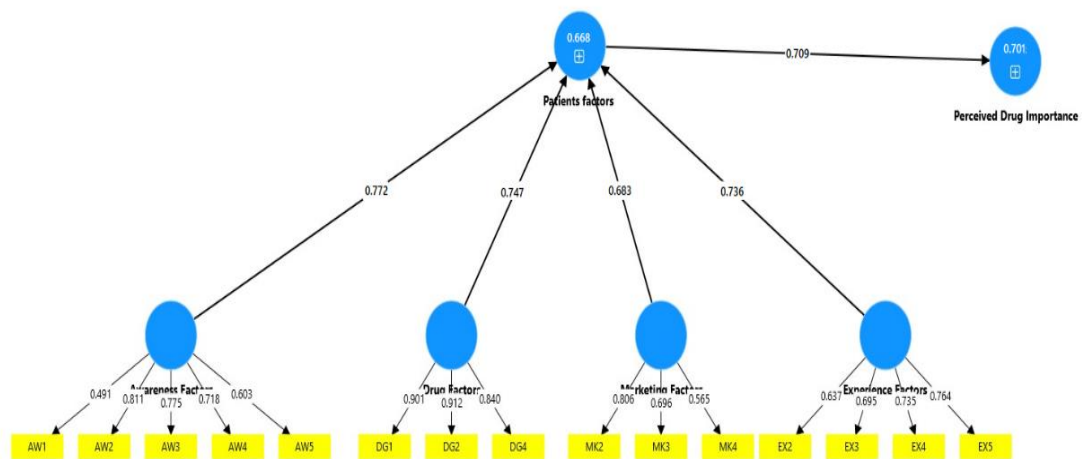


Table 4.16

Bootstrap value with respect to Impact of patients' factors on the perceived importance in adopting generic medicines.

Particulars	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
Awareness -> Patient Factors	0.772	0.771	0.061	12.740	0.000
Drug Factors -> Patient Factors	0.747	0.746	0.078	9.613	0.000
Experience -> Patient Factors	0.683	0.683	0.069	9.888	0.000
Marketing Factor -> Patient Factors	0.736	0.735	0.057	12.916	0.000
Patient Factors -> Perceived Drug Importance	0.709	0.700	0.065	10.961	0.000

Source: Primary Data

The table 4.16 highlights the major effect of several factors on patient related factors, and ultimately, their effect on perceptions of importance of generic medicines. Among the factors, awareness had the most influence on patient factors, with an original sample value of 0.772 and a T stat. of 12.740. In this regard, awareness of the patients is an important influence on attitudes towards drug factors and behaviors of the patient. Additionally, marketing factors exert a significant influence on the patient factor with an original sample value of 0.736 and a T stat. of 12.916. These results are demonstrated by the success of marketing factors as a point of influence on patients. There was a notable contribution from drug factors with an original sample value of 0.747 and T stat of 9.613, indicating that there is also a true influence of drug characteristics on their attitudes. Experience also had a notable effect on patient factors, with a value of 0.683 and a T statistic of 9.888, pointing to the impact of experiences that patients have had with medications, which results in forming their current perceptions. Last, there was a strong influence of patient factors on perceived drug importance with an original sample value of 0.709 and T stat of 10.961, signifying how the patient sees the overall drug importance and priority of drug factors can heavily impact what they view as any drug importance. Patients likely will see, based on observed behavior, whether they see drug factors as something important. In viewing the data, the p-value is below 0.05. This means that the null hypothesis can be rejected, and the alternative hypothesis can be accepted, i.e. "there is a significant influence of environment factors on the patient's perceived importance of generic medicines." Overall, both awareness and marketing factors appear to be the most influential factors that

actuate patient reaction, and these factors must be present to see the corresponding higher factor influence, that is the patient factors, which are significantly related to important observations of generic drugs.

Table 4.17

Bootstrap value of Environment factor items on the patients perceived importance of generic medicines.

			Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ((O/STDEV))	P values
I am aware that there are many generic versions of medications available. - AW1	<-- -	Awareness	0.691	0.690	0.052	13.214	0.000
I generally ask the chemist / pharmacist for generic forms for the prescribed branded drugs - AW2	<-- -	Awareness	0.811	0.811	0.069	11.802	0.000
I generally ask my doctor to prescribe generic names of medicines -AW3	<-- -	Awareness	0.775	0.775	0.064	12.059	0.000
I ask my physician to prescribe cost effective drugs - AW4	<-- -	Awareness	0.718	0.717	0.078	9.195	0.000
I am aware that drugs available at some stores like Jan Aushadhi Kendras, OneIndia Pharmacy, Dava Dost, etc., are at low prices - AW5	<-- -	Awareness	0.703	0.701	0.037	18.815	0.000
I consider generic medicines to be safe - DG1	<--	Drug Factors	0.901	0.901	0.051	17.810	0.000
I consider generic medicines to be of equal quality with their branded equivalents (Drugs) - DG2	<--	Drug Factors	0.912	0.911	0.069	13.153	0.000
I know generic medicines also cause side effects - DG3	<--	Drug Factors	0.840	0.839	0.039	21.313	0.000

I go for drug substitution when prescribed medicine is not available at the nearest pharmacy - EX2	<--	Experience	0.697	0.696	0.045	15.388	0.000
I take into consideration the suggestions of my family and friends while choosing generic medicine - EX3	<--	Experience	0.705	0.703	0.044	15.857	0.000
My previous usage of generic medicine plays an important role in me continuing with generic medicine - EX4	<--	Experience	0.735	0.734	0.051	14.330	0.000
My disease gets cured with the usage of generic medicines - EX5	<--	Experience	0.764	0.765	0.052	14.625	0.000
I am able to buy generic medicines easily from the pharmacies - MK2	<--	Marketing Factor	0.806	0.805	0.054	14.864	0.000
Price of generic medicines is pocket friendly - MK3	<--	Marketing Factor	0.696	0.694	0.045	15.330	0.000
Generic medicines are available on online pharmacies - MK4	<--	Marketing Factor	0.665	0.661	0.068	9.825	0.000

Source: Primary Data

The table 4.17 demonstrates the effect of multiple factors that contribute to a patient's awareness, drug factors, experience, and marketing factors regarding generic medicines. The highest impact within Awareness factors was for the factor of the patient asking the pharmacist for the generic form of a prescribed branded drug (AW2) with an original sample value of 0.811, a T stat. of 11.802, and a P value of 0.000, indicating that those patients who engaged the pharmacist to ask for a generic were engaging and more likely to ask. The next factor was the patient asking their physician to prescribe a generic name (AW3) with a value of 0.775, a T stat. of 12.059, and a P value of 0.000. The factor of asking their physician for more cost-effective drugs (AW4) also did have a moderate impact with a value of 0.718, a T stat. of 9.195, and a P value of 0.000. The other Awareness factor of awareness of low-cost drugs available to purchase from a specific store like Jan Aushadhi Kendras (Awareness factor 5) did play an important role with a value of 0.703, a T stat. of 18.815, and a P value of 0.000. The final

estimate encountered regarding awareness was the awareness of the availability of many generic versions (the factor called Awareness factor 1) was slightly lower at .691, T stat. of 13.214, and a P value of 0.000. By drug factors, the most affirmed perception of generic medicines being of the same quality to branded medicines is the factor coded as (DG2), which also has the highest impact value supported by the strongest evidence with an original sample value of 0.912, a T stat. of 13.153, and a P value of 0.000. The belief that generic medicines are safe (DG1) is shown to have a great deal of influence (original sample = 0.901, T stat. = 17.810, P value = 0.000). Patients also having awareness that side effects can happen with generic medicines (DG3) can influence perceptions when patients know that they may also experience side effects (original sample = 0.840, T stat. = 21.313, P value = 0.000). The experience belief that generics are effective in curing disease (EX5) had the most influence (original sample = 0.764, T stat. = 14.625, P value = 0.000), followed by previous experience of using generics will lead to continued use (EX4) (original sample = 0.735, T stat. = 14.330, P value = 0.000), suggestions from family and friends when trying generics (EX3) (original sample = 0.705, T stat. = 15.857, P value = 0.000), followed by willingness to substitute prescribed medicine when it is not available at the nearest pharmacy (EX2) (original sample = 0.697, T stat. = 15.388, P value = 0.000). The marketing factors category with purchase of generics from the pharmacy easy to buy (MK2) (original sample = 0.806, T stat. = 14.864, P value = 0.000), followed by generics are lower cost (MK3) (original sample = 0.696, T stat. = 15.330, P value = 0.000), followed by availability of generics to purchase online (MK4) (original sample = 0.665, T stat. = 9.825, P value = 0.000). The findings highlight the importance of patient awareness, trust in the quality and safety of drugs, positive past use experiences, and accessibility and affordability of generics use on patient perceptions and behavioral decision-making using generic medicines. The p-values for the factors under the heading of patient factors were less than 0.05 indicating rejection of null hypothesis and acceptance of the alternative hypothesis. This indicates there are statistically significant influence between environmental/patient factors and the use of generics among patients.

Objective 4: To investigate the mediating role of patients' socio-economic factors with the physician prescription attitude for generic drug adoption.

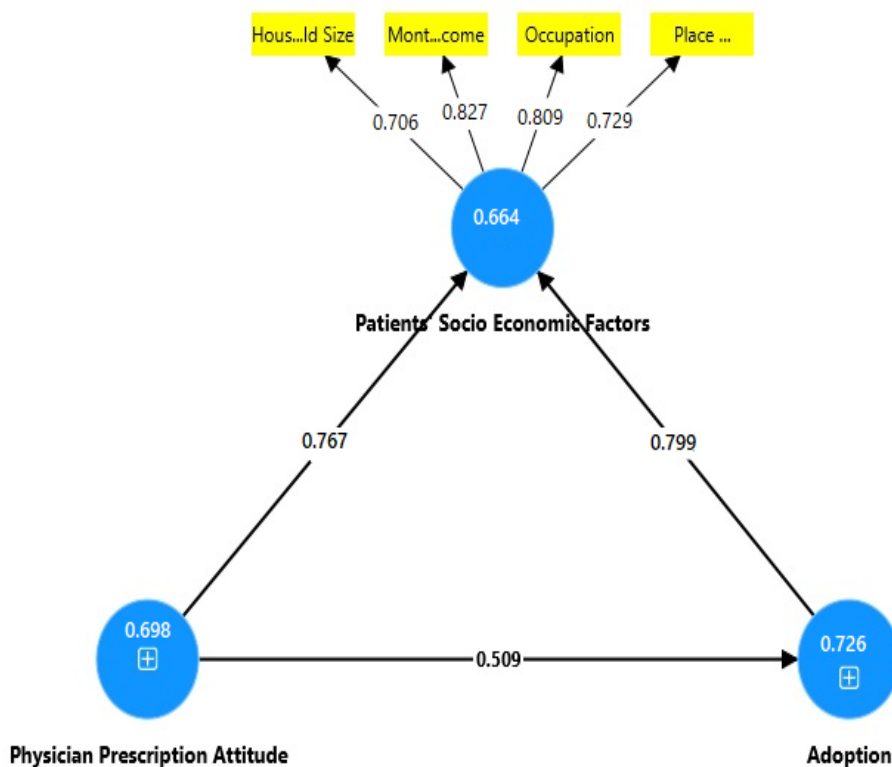
This objective made an attempt to investigate mediating role of patients' socio-economic factors with the physician prescription attitude for generic drug adoption. The following is the hypothesis.

Null hypothesis: There is no significant Mediation effect of patient's socio-economic factors on the physician prescription attitude for generic drug adoption.

Alternative hypothesis: There is no significant Mediation effect of patient's socio-economic factors on the physician prescription attitude for generic drug adoption

Figure 4.10

Mediating role of patients' socio-economic factors with the physician prescription attitude for generic drug adoption.



In order to ascertain the overall effect of physician prescription attitude on adoption of generic medications, we need to compute the total effect, which consists of the direct effect and the indirect effect. Direct effect indicates the direct impact of physician prescription attitude on

adoption without mediation, while indirect effect consider mediation by patients' socio-economic factors.

First, direct effect (DE) is calculated as, $DE = 0.509$. This is the direct path from physician prescription attitude to adoption of generic medicines.

Next, indirect effect (IE) is computing by multiplying the path coefficient from physician prescription attitude to patients' socio-economic factors labeled as, (a) and path coefficient from patients' socio-economics factors to adoption labeled as (c):

$$\text{Indirect effect} = a * c = 0.599 * 0.567 = 0.613$$

Finally, the total effect (TE) is the summation of the direct and indirect effect. This holistic measure indicates the whole impact of physician prescription attitude on adoption of generic medicines as it includes the direct pathway, as well as mediation through patients' socio-economic factors.

$$\text{Total effect} = \text{direct effect} + \text{indirect effect}, 0.509 + 0.613 = 1.122$$

Thus, the direct effect of physician prescription attitude on adoption of the generics is 0.509, yet there is an indirect effect of 0.613 through the patients' socio-economic factors. The total effect is 1,122, therefore we indicate on the significant role of the patients' socio-economic context on the adoption of generic medicines. While the effect of the physician prescription attitude is relevant, the socio-economics effect of the patient is a much greater influence.

Table 4.18

Mediating role of patients' socio-economic factors with the physician prescription attitude for generic drug adoption.

Particulars	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
Physician Prescription Attitude -> Adoption	0.509	0.563156	0.081136	6.273418	0.000
Physician Prescription Attitude -> Patients' Socio-Economic Factors	0.767	0.813053	0.061901	12.39068	0.000
Patients' Socio- Economic Factors -> Adoption	0.799	0.754842	0.058386	13.68474	0.008

Source: Primary Data

The table 4.18 depicts a mediation effect where Physician Prescription Attitude has a direct effect on the Adoption of Generic Medicines. The direct path indicates that physician attitude leads to a generic medicine adoption with a path coefficient of 0.509. This suggests that when physicians have a positive attitude, it has a meaningful effect in persuading patients to adopt generic medicines. This direct effect was included in the model, as physician attitude is an important part of the patient's process in the decision to adopt medicines.

The Patients' Socio-Economic Factors indicate the mediating effect of other variables that may ultimately lead to the Adoption of Generic Medicines. The different variables of Patients' Socio-Economic Factors included Household Size (0.706), Monthly Income (0.827), Occupation (0.809), and Place of Residence (0.729) indicating varying degrees of effect. The path between Physician Prescription Attitude and Patient Socio-Economic Factors had a path coefficient of 0.767. The socio-economic factors had a relationship with Adoption of Generic Medicines with a path coefficient of 0.799, resulting in an indirect effect of 0.613 with the adoption of generic medicines suggesting that socio-economic factors of patients are also meaningful in the mediation of Physician Prescription Attitude and Adoption of Generic Medicines.

Among the socio-economic factors, Monthly Income influences patient adoption of generic medicines the most with a path coefficient of 0.827. This suggests that the economic level of a patient may influence their decision to adopt generic medicines, perhaps concerning overall cost-effectiveness potential and more importantly, affordability. Patients' Occupation also influences, but slightly less at 0.809, showing the interactions of patients' employment status or type of work may provide influence of the potentially adopting generic medicines efforts. Place of Residence and Household Size can also contribute to the overall decision, but much less at 0.729 and 0.706, respectively.

If direct and indirect effects are combined, the total Physician Prescription Attitude effect would be 1.122 for the Adoption of Generic Medicines. The overall effect still suggests that even though Physician Prescription Attitude is an important factor, Patients' Socio-Economic Factors are also fairly more important in the general adoption of generic medicines affecting decisions more through their income and occupation factors. The p-value of < 0.05 provides rejection of the null hypothesis for acceptance of a mediation of patient's socio-economic factors of the physician prescription attitude on the general patient acceptance of generic drug adoption.

Figure 4.11

Mediating role of Perceived Drug Importance with the physician prescription attitude for generic drug adoption.

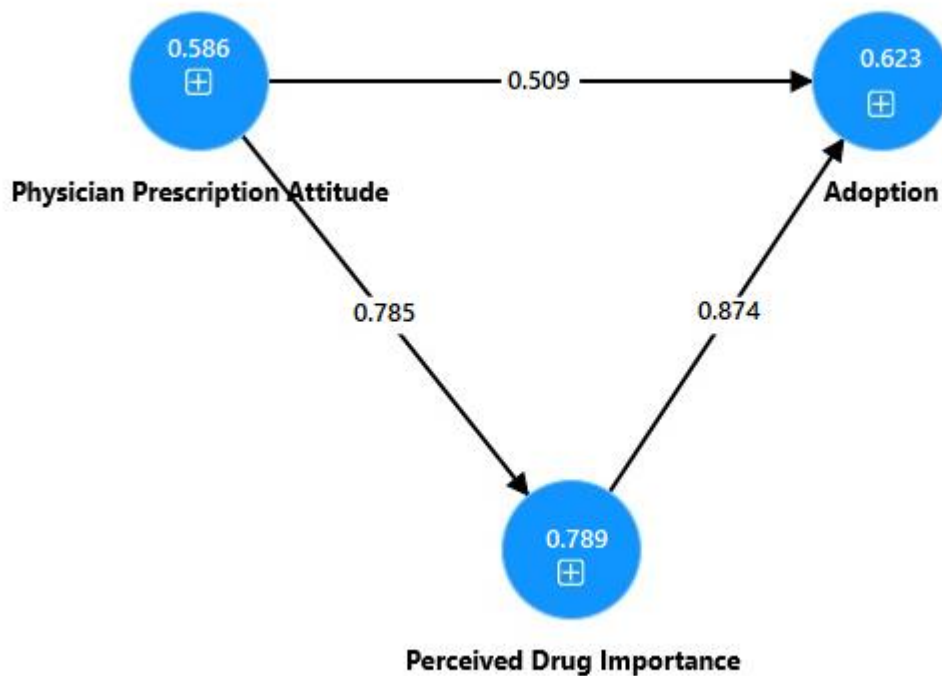


Table 4.19

Mediating role of Perceived Drug Importance with the physician prescription attitude for generic drug adoption

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ((O/STDEV))	P values
Physician Prescription Attitude -> Adoption	0.509	0.523	0.062	8.224	0.000
Physician Prescription Attitude -> Perceived Drug Importance	0.785	0.851	0.078	10.119	0.001
Perceived Drug Importance -> Adoption	0.874	0.856	0.051	17.184	0.000

Source: Primary Data

Table 4.19 delineates the mediating status of Perceived Drug Importance on the relationship between Physician prescription attitudes and Generic Drug Adoption. Specifically, we see a

path from Physician prescription attitudes to Perceived Drug Importance have a path coefficient of 0.785, indicating a strong positive effect. Thus, it can be concluded that physicians who have a favorable attitude towards prescribing generic drugs increases the perceived drug importance among patients. Next, we see that Perceived Drug Importance influences adoption of generic drugs with a path coefficient of 0.874. This indicates that patients who believe generic drugs are of importance are likely to adopt them. We see an additional direct effect of prescription attitudes on the adoption of generic drugs, with a path coefficient value of 0.509, indicating that the attitudes of physicians have a direct impact upon adoption. The overall effects of Physician prescription attitude upon the adoption of generic drugs show an overall total effect value of 0.796, indicating a sizable overall effect pathway including the direct (0.509) and indirect pathway through Perceived Drug Importance, calculated as 0.687 ($0.785 * 0.874$). Overall mediation analysis suggests that Perceived Drug Importance mediates the association between the attitudes of prescribing physicians and the adoption of generic drugs. Therefore, increasing the attitude of physicians around generic drugs and improving patients' perceived drug importance will ultimately lead to greater levels of adoption of generic medicines. Furthermore, the presence of strong mediation suggests that addressing factors for both physician and patient towards enhancing the adoption of generics potentially lies in measurement to deal with both groups. Based on p-value as approached by an operational significance threshold < 0.05 , we can reject the null hypothesis and accept the alternative hypothesis that there is a significant Mediation effect of Perceived Drug Importance on the relationship Physician Prescription Attitudes on the Adoption of Generic Drugs.

4.3 Q² Predictive Relevance

Within the context of Partial Least Squares Structural Equation Modeling (PLS-SEM), Q² (predictive relevance) is an important metric representing the extent to which the exogenous constructs in the model can predict the endogenous constructs. The values of Q² are derived using a procedure known as blindfolding, in which certain data points are removed in a systematic manner from the data matrix, the model then estimates, or predicts, the removed data. If the model can successfully reconstruct or predict the removed data the model has predictive relevance.

A Q² value greater than zero indicates the model has predictive relevance for a particular endogenous construct, while a value of zero or less indicates the model does not have predictive relevance. In accordance with the established criteria (Hair et al., 2019):

- Q^2 value of 0.02 indicates small predictive relevance.
- Q^2 value of 0.15 indicates medium predictive relevance.
- Q^2 value of 0.35 or greater indicates large predictive relevance.

Table 4.20
 Q^2 Predictive Relevance Values

	Q^2 predict
Patients Factors	0.499
Patients' Socio-Economic Factors	0.127
Perceived Importance	0.353
Pharmacy Factors	0.395
Physician Prescription Attitude	0.388

Source: Primary Data

The Q^2 values demonstrate the predictive relevance of the structural model regarding the adoption of generic medicines. All Q^2 values are greater than zero which confirms the model has predictive capability.

- Patients' Factors ($Q^2=0.499$): This construct demonstrates large predictive relevance, suggesting patient-related factors such as awareness, drug factors, experience and marketing factors are strong predictors of generic adoption.
- Patients' Socio-Economic Factors ($Q^2=0.127$): This shows small predictive relevance and demonstrates that socioeconomic factors (e.g. income, education, residence and household size) only have a little impact on generic adoption.
- Perceived Importance ($Q^2=0.353$): This shows large predictive relevance and illustrates that the physician and patient perceptions of the importance of generics are a strong explanation for adoption.
- Pharmacy Factors ($Q^2=0.395$): Pharmacy factors show large predictive relevance and highlights that pharmacy-related influences such as a pharmacists' knowledge and experience and business factors are strong predictors of adoption.
- Physician Prescription Attitude ($Q^2=0.388$): This also shows large predictive relevance and demonstrates that the physician prescribing attitude is a strong predictor of adopting generics.

To summarize, patients' factors, perceived importance, pharmacy factors, and physician prescription attitudes are all of strong predictive relevance of generic medicine adoption. Patients' socio-economic factors have a smaller impact on the adoption of generics. Overall, the model has high predictive relevance showing the important role of both the healthcare provider (physician and pharmacist) and perception of the patient in the adoption process while the demographic and socio-economic conditions play a secondary role.

CHAPTER – V
FINDINGS, CONCLUSION &
SUGGESTIONS

FINDINGS OF THE STUDY

1st Objective Findings: To study the factors affecting the Physicians' Prescription towards Generic Medicines

The study examined the factors influencing physicians' attitudes towards prescribing generic medicines. Primary data was collected from physicians in Telangana state using a questionnaire based on a five-point Likert scale. The data was then analyzed using the Structural Equation Model (SEM) statistical method. The following findings were derived from the statistical analysis.

1. The study found that male physicians (57%) have a slightly stronger inclination toward prescribing generic drugs compared to females (43%). The study found that this is attributed to male practitioners' confidence in balancing affordability and efficacy. The study found that the majority of participating physicians are in the 31–45 years age group (45.5%), and they demonstrate greater openness toward prescribing generics, reflecting their mid-career adaptability and stronger patient trust.
2. The study found that most physicians hold an MD degree (55.8%) and are cautious yet supportive of generics, leveraging their deep clinical knowledge to ensure patient safety. The study found that the largest group of specialists are in Infectious Diseases (21%), and these specialists show a higher preference for generics (60%) because their focus on long-term treatments makes affordability and continuity critical for patient care.
3. The study found that physicians with 6–15 years of practice (41.8%) adopt generics more strongly, balancing expertise with patient-centered care. The study found that less experienced doctors (<5 years; 28%) are also receptive, often due to their openness to new regulatory approvals. Additionally, the study found a preference for private practice (39.8%) and self-owned clinics (34%) among the participants, with these physicians favoring generics more strongly as they directly encounter patients' financial struggles. In contrast, the study found that government hospital doctors (9.3%) often prescribe generics due to institutional mandates rather than personal preference.
4. The study found that physicians consulting with 61–90 patients per week (37.5%) are more pragmatic toward generics. The study found that their moderate patient load allows them time to explain drug efficacy and safety to patients. A significant proportion of participants charge mid-range consultation fees (Rs. 301–500; 39.5%),

and the study found that these doctors often support generics to balance their pricing with affordability for patients, thereby ensuring long-term patient loyalty.

5. The study found that **Experience factors (0.813)** have the highest impact on generic adoption. This is because personal and peer interactions and patient feedback significantly guide prescribing behaviors. Physicians with more hands-on experience and positive feedback are more likely to develop favorable attitudes towards generics. This finding is supported by Fadare et al. (2015) and Bhattacharjee et al. (2017), who highlight the importance of practical experience and positive clinical outcomes in shaping attitudes towards generics.
6. The study found that **Knowledge factors (0.776)** are a crucial determinant. Well-informed physicians, who possess a better understanding of the bioequivalence and safety standards of generic medicines, are more likely to prescribe them. Enhanced education and training lead to increased confidence in prescribing generics. This finding is supported by studies by Hassali et al. (2014) and Kumar et al. (2015), which underscore the importance of educational interventions to improve knowledge and address misconceptions.
7. The study observed that **Drug Factors (0.747)**, which include perceptions of safety, efficacy, and cost-effectiveness, significantly impact prescribing attitudes towards generics. Physicians are more inclined to prescribe generics if they believe these drugs are as safe and effective as their branded counterparts and offer cost savings. This finding is highlighted by the studies of Mahdi et al. (2020) and Salhia et al. (2015), which emphasize the need to address concerns about drug quality and effectiveness to bolster confidence in generics.
8. The study found that **Marketing Factors (0.739)** also contribute to attitudes, although physician skepticism towards promotional tactics can temper their influence. Physicians may be wary of marketing efforts, viewing them as biased. This finding is supported by Joshi (2023) and Masood et al. (2016), who point out the negative impact of promotional practices on attitudes towards generics, suggesting that overzealous marketing can lead to distrust and resistance among physicians.
9. The study reports that **Business Factors (0.698)**, such as interactions with medical representatives and incentives, have the lowest influence on prescribing attitudes towards generic medicines. Despite this, the studies of Derek R King et al. (2002) and Hatem et al. (2022) indicate the significant impact of business interactions on

perceptions of generics. While incentives can provide valuable information, they are often viewed with skepticism, limiting their overall impact on prescribing habits.

10. Physicians' hesitation to prescribe generic medicines is largely driven by a lack of confidence in their therapeutic equivalence and perceived quality when compared to branded drugs. Commercial pressures from pharmaceutical companies, including promotional activities and incentives, further shape physicians' preferences toward branded medications, thereby limiting the adoption of generics in routine clinical practice (*Priyadarsini et al., 2023*).
11. Clinical prescribing practices were significantly shaped by peer endorsement, where recommendations and experiences shared among colleagues influenced physicians' acceptance of generic medicines. This pattern aligns with national and global studies that highlight the importance of social validation and logistical convenience in shaping prescription behavior, beyond purely clinical considerations (*Charan, et.al., 2021*).

2nd Objectives Findings: To analyze the pharmacist influence on patients perceived importance of generic medicines.

The study has been emphasized to analyse the pharmacist influence on the patients' perceived importance of generic medicines. The study applied the SEM statistical method and derived the following findings based on the results,

1. The study found that the pharmacist workforce is predominantly young and female. The study reveals that with **66.7%** of participants being **female** and **58%** being **under the age of 30**, these early-career pharmacists are more receptive to generics due to recent training and exposure to generic-promotion policies.
2. The study reveals that there is a strong preference for **clinic pharmacies (79.7%)** as the primary practice setting. The study found that clinic pharmacies emerge as the strongest adopters of generics because of their daily patient interactions and a clientele that is often more cost-conscious. In terms of employment, the study reveals that **self-or part-owners (33%)** are stronger advocates for generics, as their focus on profitability and business flexibility aligns well with the affordability of generic drugs.
3. The study also found that pharmacies in **urban areas (73.3%)** lead in the adoption of generic medicines. The study reveals that this is largely attributed to better infrastructure, greater patient awareness, and more robust distribution networks in these areas. Conversely, the study found that **rural pharmacies (26.7%)** show lower

adoption rates, likely due to limited awareness and challenges with supply chain logistics.

4. The study reveals that there is a clear correlation between a moderate customer load and the highest rate of generic adoption. The study found that pharmacies serving **21–40 customers daily (59.7%)** demonstrated the most success in balancing patient demand with the supply of generic drugs. This moderate volume allows pharmacists to have the time and opportunity to discuss the benefits of generics with their customers, fostering greater adoption.
5. The study found a varied adoption of generics across different therapeutic areas. The study reveals that **Pulmonology (17%)** and **gastroenterology (14%)** generics are the most widely sold. In contrast, the study found that **anti-infective (1.3%)** and **urology (10.3%)** generics show less adoption, which reflects hesitancy among some pharmacists and patients to substitute branded antibiotics and other specialized drugs.
6. The highest adoption rates for generic drugs were noted in specific therapeutic areas. **Pulmonology (17%)** and **gastroenterology (14%)** showed the highest acceptance and use of generics, while adoption was lower in fields such as **urology** and **anti-infectives**.
7. The study found that **Drug Factors (0.755)** are the strongest determinant, emphasizing the critical role of a generic drug's perceived **efficacy, safety, and quality**. This is a central concern for both pharmacists and patients. The findings indicate that patient acceptance is most heavily influenced by **safety perceptions (0.883)**. This concern persists even though studies, such as the one by **Grover and Stewart (2011)**, show that pharmacists may perceive branded drugs as higher quality despite acknowledging no safety differences.
8. It reports that **Experience (0.711)** plays a vital role in shaping a pharmacist's confidence in generics. The study demonstrated that **positive practical knowledge** and past dispensing encounters significantly encourage substitution. This finding is supported by Chong et al. (2011), who noted that a pharmacist's practical experience directly influences their views on the therapeutic equivalence of generics.
9. The study reveals that a pharmacist's **Knowledge (0.622)** of generics influences their attitude and ability to educate patients. The belief that generic substitution improves **treatment compliance (0.800)** due to affordability has the highest impact. The perception of a drug's **bioequivalence (0.719)** also significantly influences patient attitudes, reinforcing trust in generic efficacy and safety. As Awaisu et al. (2014) found, educational programs are crucial for improving pharmacist attitudes toward generics.

10. It indicates **Business Factors (0.613)**, which include economic and organizational elements, also significantly impact pharmacy practices. Al-Gedadi and Hassali (2008) noted the critical role of financial viability in a pharmacist's support for generics. Within this category, **financial incentives (0.850)** from pharmaceutical companies strongly drive stocking and promotion, while **trust in generic manufacturers (0.816)** is crucial for building confidence.
11. It indicates Pharmacists' efforts in educating patients had a strong positive influence on the acceptance and adherence to generic medicines (AP2 $\beta = 0.794$). This indicates that clear explanations regarding the safety, effectiveness, and cost benefits of generics significantly improve patient trust and willingness to use them. It highlights the important role of pharmacists in reducing misconceptions and encouraging consistent use of generic medicines.
12. Although pharmacists are strategically positioned to guide patients' medicine choices, the relatively low mean score (2.92) indicates that they do not actively promote generic medicines in practice. This indicates that motivational factors such as financial incentives and professional encouragement are inadequate.

3rd Objective Findings: To study the impact of various environment factors on the patient's perceived importance of generic medicines.

The study focused to know the impact of various environment factors on the patient's perceived importance of generic medicines. The study collected the primary data from the patients in the aspect perceived importance towards generic medicines. The study applied the SEM and derived the following results

1. The study found that the patient population is dominated by **private employees (51.5%)** and those with a monthly income between **Rs. 15,001 and Rs. 30,000 (49.5%)**. The study reveals that this segment, while having a steady income, is often sensitive to out-of-pocket healthcare expenses. Their financial reality makes them more inclined to consider generic medicines as a viable and cost-effective alternative to branded drugs, balancing quality with affordability.
2. The study found that the typical patient is an **urban resident (84.8%)** between **21 and 40 years old (60.5%)**, with an **Intermediate level of education (55.3%)**. The study reveals that this demographic, being well-informed and active in a modern

environment, is more likely to be aware of and receptive to the benefits of generic medicines. Their inclination toward generics is often driven by a pragmatic and evidence-based approach to healthcare choices.

3. The study found that a significant majority of patients (**77.8%**) are most likely to visit **government healthcare centers** and that **63.7%** are buying medicines for an **acute disease**. The study reveals that patients frequenting government facilities are more likely to be introduced to and prescribed generic drugs due to institutional mandates and policies aimed at cost reduction, making them more receptive to adopting these medicines for short-term illnesses.
4. The study reveals that the majority of patients are **married (61.5%)** with a household size of **4 (37.8%)**. The study found that these patients are typically responsible for their family's health and financial well-being. This financial responsibility often drives them to seek out cost-effective healthcare solutions, making them a key segment that is inclined to adopt generic medicines to manage their family's healthcare budget.
5. The study reveals that a combination of factors, including **moderate income, urban residence, and preference for government healthcare centers**, creates a patient profile that is highly receptive to generic drug adoption. The study found that this segment of patients prioritizes value and affordability, and their exposure to generics in government facilities and through financial considerations for their family makes them more likely to accept and choose these medicines over their branded counterparts.
6. The study indicates that **Drug Factors (0.747)** have a substantial impact on patients' confidence and acceptance of generics, underscoring the importance of evaluations of effectiveness and safety. It reveals that the perceptions of **quality (0.912)**, **safety (0.901)**, and **therapeutic effectiveness (0.840)** have the strongest influence on adoption. These high values suggest a strong belief among patients that generics are comparable to their branded counterparts. This finding is consistent with research by Nardi and Ferraz (2015), which found that negative perceptions can be more pronounced in certain populations, highlighting the need for quality evaluations to build trust.
7. The study found that **Awareness (0.772)** significantly impacts the perceived importance of generic medicines. **Knowledgeable patients** are more likely to recognize and embrace their benefits. It reports that patients **actively requesting generics at pharmacies (0.811)** have the most significant impact on adoption, while patients feeling comfortable asking their doctors for generics (**0.775**) also plays a

crucial role. This supports the findings of Dunne and Shannon (2014) and Almohammed and Aldwihi (2020), who noted that limited knowledge and misconceptions can reduce adoption, making education essential.

8. It indicates that **Marketing (0.736)** has a significant impact, although less than other factors, on patient opinions. The study found that the **ease of purchasing generics (0.806)** from pharmacies and the perception of them as **cost-effective (0.696)** are key drivers. This finding aligns with studies by Francisquinho (2013) and Jain and Dixit (2013), which highlight the need for targeted patient campaigns to complement physician advice.
9. The study found that **Experiences (0.683)** significantly influence patients' acceptance of generics. Positive personal experiences with generics strongly encourage their continued use, as successful outcomes build confidence in their effectiveness and safety. These findings are consistent with Kesselheim and Gagne (2016) and Shrank and Cox (2009), who revealed that patients recognized generics as being equally effective and safe as brand-name drugs. These positive experiences increase the perceived importance of generics, thereby facilitating their adoption.
10. The finding indicates that many patients continue to prefer branded medicines, as reflected by the PI2 mean score of 2.75, indicating a moderate inclination toward branded products. Such perceptions persist despite regulatory assurances of bioequivalence between branded and generic medicines, highlighting a gap between scientific evidence and consumer beliefs (*Rathi, H., & Biyani, M. 2021*).
11. Psychological barriers such as mistrust, perceived inferiority, and fear of reduced effectiveness, along with widespread misinformation about generic medicines, significantly limit their adoption among patients and healthcare providers. This finding confirms that cost savings and affordability alone are insufficient to ensure substitution unless confidence, awareness, and accurate information are simultaneously addressed (*Ruta Joshi Aradhna Gandhi 2021*).

4th Objective findings: To investigate the mediating role of patients socio economic factors with the physician prescription attitude for generic drug adoption

The study investigated the mediating role of patient's socio-economic factors on the physician's prescription attitude for generic drug adoption with the help of SEM and derived the following findings.

1. The study reveals that **patient socio-economic factors** act as a significant mediator, playing a more crucial role in generic drug adoption than a physician's prescription attitude alone. The direct effect of a physician's attitude is moderate (0.509), whereas the indirect effect, which is mediated by patient socio-economic factors, is stronger (0.618).
2. It reports that the total effect of physician's attitude and patient socio-economic factors yields a substantial **impact on adoption (1.122)**. This highlights that to effectively promote generic adoption, both the physician's attitude and the patient's socio-economic context must be considered.
3. It indicates that among all socio-economic factors, **monthly income (0.827)** and **occupation (0.809)** are the most impactful. This shows that a patient's enhanced financial stability and professional status significantly increase the likelihood of them adopting generic medicines.
4. The study found that a patient's **place of residence** had a moderate impact on adoption, while **household size** had the least influence. This suggests that the location where a patient lives is more influential than the size of their family in their decision to adopt generics.
5. The study reports that both a **physician's prescription attitude** and **patient socio-economic factors** significantly influence generic adoption. Patient socio-economic factors have a slightly stronger direct effect (0.799) on adoption compared to a physician's attitude (0.767). Additionally, a physician's attitude indirectly influences adoption through its impact on a patient's socio-economic circumstances (0.509).
6. Experiences with effective (0.747) and affordable treatment significantly reinforced the continued use of generic medicines among consumers. This indicates that when patients perceive generic medicines as both clinically effective and economically beneficial, their trust in and acceptance of these medicines increases. Positive past treatment outcomes therefore play a crucial role in shaping favorable attitudes toward generic medicine usage and encouraging repeat adoption (*Dash A., 2021*).

CONCLUSION

The present study provides a comprehensive and integrated understanding of the multifaceted determinants influencing the adoption of generic medicines, focusing on the roles of physicians, patients, pharmacists, respective environmental factors, and socio-economic mediators. By applying Structural Equation Modelling (SEM) to primary data collected from key stakeholders, the study systematically examined how knowledge, experience, drug-related attributes, marketing dynamics, business considerations, and socio-economic conditions interact to shape perceptions and behaviors related to generic medicine adoption. The findings contribute significantly to the existing literature by offering a holistic, stakeholder-driven perspective on generic drug utilization within the Indian healthcare context.

The study clearly establishes that knowledge-related factors are the most influential determinants shaping physicians' prescription attitudes toward generic medicines. Physicians who possess a strong understanding of bioequivalence principles, regulatory safety standards, and therapeutic effectiveness are more inclined to prescribe generic medicines confidently. This highlights the pivotal role of evidence-based knowledge in reducing skepticism and uncertainty surrounding generic drugs. The findings underscore that continuous medical education, access to updated clinical literature, and awareness of regulatory approvals are essential in fostering positive prescribing attitudes. When physicians are well informed, they are better positioned to evaluate generics objectively, thereby overcoming traditional biases favoring branded medicines.

Alongside knowledge, experience-related factors play a crucial role in shaping physicians' prescribing behavior. Direct clinical experiences, patient feedback, and observed treatment outcomes significantly influence physicians' confidence in generic medicines. Physicians who have witnessed positive therapeutic outcomes and received favorable patient responses are more likely to continue prescribing generics. This experiential reinforcement demonstrates that prescribing behavior is not driven solely by theoretical knowledge but is also strongly influenced by real-world clinical interactions. Peer endorsement and professional interactions further strengthen this effect, as shared experiences among colleagues serve as a form of social validation within the medical community.

Drug-related factors, particularly perceptions of safety, efficacy, and cost-effectiveness, exert a substantial influence on physicians' prescription decisions. Physicians demonstrate a willingness to prescribe generics when they are convinced that these medicines are

therapeutically equivalent to branded alternatives and offer tangible economic benefits to patients. This finding reinforces the importance of transparent clinical evidence and post-marketing surveillance data in building physician confidence. Ethical considerations also emerge as an underlying influence, with many physicians viewing generic prescribing as a means to enhance patient access and affordability without compromising treatment quality.

While marketing and business-related factors do influence prescribing attitudes, their impact is comparatively lower than knowledge and experience factors. Interactions with medical representatives, promotional activities, and incentives from pharmaceutical companies contribute to shaping physician perceptions; however, a notable degree of skepticism toward overt promotional tactics tempers their overall influence. Physicians appear increasingly cautious about marketing-driven information and place greater trust in scientific evidence and clinical outcomes. This skepticism indicates a shift toward more rational and patient-centric prescribing practices, where ethical responsibility and clinical judgment take precedence over commercial persuasion.

The study further highlights that practical aspects of clinical practice, such as ease of prescription fulfillment, availability of generics in the market, and peer endorsement, play an important supporting role in generic adoption. When generics are readily available and easily accessible through pharmacies, physicians are more inclined to prescribe them. Patient advocacy and positive treatment outcomes further reinforce this trend, demonstrating that physician behavior is influenced not only by professional considerations but also by patient expectations and experiences.

From the patient perspective, the study reveals that awareness and knowledge are the most significant factors influencing the perceived importance of generic medicines. Patients who are informed about the benefits, safety, and affordability of generics exhibit higher levels of acceptance and trust. This finding underscores the critical need for targeted educational interventions to address misconceptions and information gaps that persist among patients. Knowledgeable patients are better equipped to make informed decisions, actively request generic alternatives, and engage in meaningful discussions with physicians and pharmacists regarding their treatment options.

Drug-related factors also play a substantial role in shaping patients' confidence in generic medicines. Perceptions of effectiveness, safety, and quality strongly influence acceptance, highlighting the importance of reinforcing regulatory assurances and communicating

bioequivalence evidence in a patient-friendly manner. Patients' personal experiences with generic medicines emerge as a powerful determinant of adoption, as positive treatment outcomes significantly enhance perceptions of reliability and safety. These experiential factors demonstrate that trust in generics is often built over time through successful health outcomes rather than solely through promotional or informational efforts.

Although marketing factors exert a relatively lower influence on patient perceptions, they remain significant in shaping awareness and opinions. Targeted marketing and educational campaigns, when aligned with factual information and ethical communication, can play a supportive role in promoting generics. However, the findings indicate that cost savings alone are insufficient to drive adoption unless accompanied by confidence, awareness, and credible information. This emphasizes the need for integrated communication strategies that combine affordability messaging with reassurance about quality and efficacy.

The study also sheds light on the role of pharmacists in influencing patient perceptions and adoption of generic medicines. Pharmacists' knowledge, experience, and educational efforts significantly contribute to building patient trust and acceptance. Well-informed pharmacists who actively educate patients about safety, effectiveness, and cost benefits play a crucial role in dispelling misconceptions and encouraging adherence. However, the study identifies a disconnect between pharmacy operations and patient perceptions, as business and organizational factors influencing pharmacists do not always translate into visible impacts on patient attitudes. External influences such as media narratives and personal beliefs may partially explain this gap.

Financial incentives, trust in generic manufacturers, and organizational practices within pharmacies significantly influence the selection and promotion of generic medicines. Visual reminders and in-store displays enhance the visibility and awareness of generics, positively affecting dispensing behavior. Nevertheless, the study indicates that pharmacist-driven promotion alone may not be sufficient to alter patient perceptions unless reinforced by physician recommendations and patient education.

Patients' acceptance of generic medicines is further shaped by safety perceptions, affordability, packaging quality, and convenience of access. High-quality packaging and clear labeling enhance perceived value, while affordability strengthens the economic rationale for adoption. Physician recommendations remain a decisive factor, as patients exhibit strong trust in their doctors' advice. Proactive patient requests for cost-effective alternatives also significantly

influence adoption, indicating growing patient empowerment in treatment decisions. Pharmacist counseling complements physician guidance by reinforcing trust and understanding, particularly when pharmacists possess up-to-date knowledge and communication skills.

A major contribution of the study lies in its examination of the mediating role of patients' socio-economic factors in the relationship between physicians' prescription attitudes and generic medicine adoption. The findings reveal that while physicians' attitudes have a moderate direct influence on adoption, the indirect effect through socio-economic factors is considerably stronger. This highlights the critical role of patients' economic and social context in shaping treatment decisions. Among the socio-economic variables, monthly income and occupation emerge as the most influential factors, indicating that financial stability and occupational status significantly enhance the likelihood of adopting generic medicines. Place of residence also exerts a moderate influence, while household size has a comparatively minimal effect.

Overall, the study demonstrates that generic medicine adoption is the result of a complex interplay between professional attitudes, patient awareness, experiential factors, pharmacy practices, and socio-economic conditions. While physicians' knowledge and experience drive prescribing behavior, patients' socio-economic realities and perceptions ultimately determine adoption outcomes. The slightly stronger direct influence of socio-economic factors underscores the importance of addressing affordability, accessibility, and awareness at the community level.

In conclusion, the study emphasizes that promoting generic medicine adoption requires a multi-pronged and integrated approach. Strengthening physician education, enhancing patient awareness, empowering pharmacists through continuous training, and addressing socio-economic barriers are essential for achieving sustainable adoption of generics. The findings highlight that generic medicine adoption is not merely a clinical or economic issue but a behavioral and social process shaped by trust, experience, and contextual realities. By providing a holistic and empirically grounded understanding of these dynamics, the study offers valuable insights for policymakers, healthcare professionals, and stakeholders aiming to improve access, affordability, and equity in healthcare through the effective promotion of generic medicines.

SUGGESTIONS

1. The study stated that knowledge factors are the most significant influence on physicians' prescribing behavior. The study advised to develop and implement comprehensive educational programs and workshops focused on the bioequivalence, safety, and efficacy of generic medicines. Regular updates through webinars, seminars, and accredited courses can help dispel myths and build confidence in prescribing generics.
2. The study advised to create platforms such as discussion forums, peer review meetings, and case study presentations where physicians can share their positive experiences and success stories with generic medicines. This can help build a supportive community that values and trusts generics based on practical evidence.
3. Provide clear and transparent information about the rigorous testing and approval processes for generic drugs. Highlight clinical trials and real-world evidence that demonstrate the safety and effectiveness of generics. Additionally, promote the cost savings for patients and healthcare systems to reinforce their value proposition.
4. Adopt ethical marketing practices that prioritize transparency and evidence-based information. Focus on providing unbiased, scientifically sound data rather than aggressive promotional tactics. Collaborate with reputable medical organizations to endorse generics, thereby increasing trust among physicians.
5. Train medical representatives to provide accurate, balanced information about generic medicines and avoid high-pressure sales tactics. Encourage pharmaceutical firms to build their reputation through quality assurance and consistent communication about the benefits and equivalency of their generic products. Facilitate effective and ethical interactions between physicians and pharmaceutical firms to enhance trust and acceptance of generics.
6. It has been suggested to implement comprehensive educational programs to improve patient knowledge about generic medicines. This includes addressing misconceptions, highlighting the bioequivalence and safety standards of generics, and emphasizing their cost-effectiveness. Collaboration with healthcare professionals to conduct workshops and information sessions can further enhance patient understanding.
7. Conduct and publicize rigorous evaluations of the effectiveness and safety of generic medicines. Transparency in quality assessments can build trust among patients, particularly those from lower-income, elderly, and minority groups. Healthcare providers should actively communicate these evaluations to reassure patients about the reliability of generics.

8. Encourage patients to share their positive experiences with generic medicines through testimonials and community support groups. Peer endorsements and success stories can significantly influence patient perceptions and acceptance of generics. Healthcare providers should also discuss these positive outcomes during consultations.
9. Develop targeted marketing strategies that address specific patient demographics and their concerns. Marketing efforts should highlight the cost savings, safety, and effectiveness of generics. Educational campaigns in pharmacies, clinics, and community centers can further reinforce these messages.
10. Encourage patients to actively request generic medicines at pharmacies and during doctor visits. Educating patients on how to communicate their preferences can lead to more frequent prescriptions of generics. Pharmacists and physicians should be supportive and responsive to these requests.
11. Ensure that generic medicines are easily accessible in pharmacies and healthcare facilities. Streamline the purchasing process and maintain adequate stocks of generics to meet patient demand. Emphasizing the convenience and availability of generics can enhance their adoption.
12. Implement ongoing educational programs for pharmacists focusing on the efficacy, safety, and bioequivalence of generic medicines. This can help bridge knowledge gaps, ensuring pharmacists are well-informed and can confidently educate patients about the benefits of generics.
13. Encourage pharmacies to collaborate with reputable generic drug manufacturers and offer financial incentives that align with ethical practices. Building trust in generic manufacturers can boost patient confidence and enhance the availability and visibility of generics in pharmacies.
14. It has been Facilitate effective communication between pharmacists and patients through training in customer interaction skills. Pharmacists should actively recommend generics, provide detailed information, and address any patient concerns to positively influence their perceptions and acceptance of generic medicines.
15. Focus on enhancing the quality of generic drug packaging to improve patient perceptions of quality and reliability. Additionally, use visual reminders and displays in pharmacies to increase the visibility and awareness of generics, encouraging patients to consider them as viable options.
16. Encourage a collaborative approach between physicians and pharmacists to promote generic medicines. Since patients are more likely to accept generics when recommended

by their doctors, integrating consistent messaging from both healthcare professionals can improve patient compliance and trust.

17. The study advised to develop comprehensive marketing and educational campaigns to address misconceptions and highlight the benefits of generics. These campaigns should emphasize cost-effectiveness, safety, and therapeutic equivalence, tailored to different patient demographics to ensure a broad reach and impact.
18. Since access to specific healthcare facilities significantly influences patients' socio-economic status and decisions, increasing the availability and accessibility of healthcare centers, particularly in underserved areas, could help mitigate socio-economic barriers and promote the adoption of generic medicines.
19. It has been synchronized that the physicians' positive attitudes towards generics alone are not sufficient to drive their adoption, targeted educational campaigns and training programs can help physicians understand the socio-economic challenges faced by patients. This awareness can enable physicians to better communicate the benefits of generics, potentially reducing socio-economic barriers.
20. It has been found that the strong negative impact of socio-economic factors on the adoption of generics suggests that addressing these barriers is crucial. Implementing policies and programs that provide financial assistance, subsidized healthcare, or incentives for low-income patients can make generics more accessible and appealing.
21. The study observed that the negative influence of socio-economic factors such as marital status, monthly income, occupation, gender, education level, household size, and place of residence, community outreach and support programs tailored to these specific groups can help reduce these barriers. Educating and supporting patients through local community initiatives can enhance their understanding and acceptance of generic medicines, promoting their adoption.

SCOPE FOR FURTHER RESEARCH

- A multi-site comparative research design would enhance generalizability and capture the variation in health care infrastructure (e.g., type of insurance coverage), prescribing behavior, and patient familiarity and understanding.
- Future research could assess a broader spectrum of stakeholder involvement in policy (i.e. decision-makers), hospital administration (i.e. blocker), insurance (i.e. paid for), pharmacy (i.e. access), and pharmacovigilance (post-market surveillance) to develop a more substantial understanding of generic drug adoption.
- A longitudinal research design would provide more reliable insight into links between physician attitudinal behaviour, pharmacist action and patient perceived risk of harm over the long-term.
- Assess the role of consumer awareness (including information sessions or campaigns on the adoption of generic medicines) and professional education (the role of medical education (ME) and continuing medical education (CME) on physicians' knowledge and attitudes toward generic medicines.
- There is an opportunity for future studies to explore the role of e-health, telehealth, and digital pharmacy context in this evolving area with increasing digital health adoption.
- Focus future studies on the impact of government policy (Jan Aushadhi or price ceiling) on how those policies influence the prescribing behavior of physicians and adoption behaviour of patients.

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APPENDIX

PATIENT QUESTIONNAIRE

Hello Sir / Madam,

I am working on a PhD thesis. In order to realize the objectives of the study, I humbly request you to spare 10 minutes and complete this survey. Please be informed that this is an anonymous survey conducted for educational research purposes only.

What are Generic Medicines?

A generic drug is a medication created to be the same as an already marketed brand-name drug in dosage form, safety, strength, route of administration, quality, performance characteristics, and intended use. Which means that **a generic medicine works in the same way and provides the same clinical benefit as the brand-name medicine.** In other words, you can take a generic medicine as an equal substitute for its brand-name counterpart.

1. Email
2. Occupation * *Mark only one oval.*

Farming

Business

Private employee

Govt employee

Unemployed

Retired

Student

3. Gender (*Mark only one oval*).

Male

Female

Others

4. Age (*Mark only one oval*)

< 20 years

21 - 40 years

41 - 60 years

> 60 years

5. Marital Status *Mark only one oval.*

Unmarried

Married

Divorced

Widowed

6. Household Size (*Mark only one oval.*)

1

2

3

4

5

6

> 6

7. Education Level (*Mark only one oval.*)

8th Pass

10th Pass

Intermediate

Graduate

Post Graduate

8. Monthly Income (*Mark only one oval.*)

< Rs.15,000

Rs.15,001 - 30,000

Rs.30,001 - 45,000

Rs.45,001 - 60,000

> Rs.60,000

9. Place of Residence _____

10. Are you buying medicines for an acute disease or chronic disease?

(Past /Present) Acute - common cold, flu, injury etc./ Chronic - diabetes, high/low BP, heart disease etc

Acute

Chronic

11. Name of the acute / chronic condition _____

12. Type of the healthcare centre you are most likely to visit *Mark only one oval.*

Government

Private

Section – II: Please indicate your answer along the mentioned levels of agreeability (mark your opinion in 1 to 5 i.e., strongly disagree to strongly agree)

1. I am aware that there are many generic versions of medications available.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

2. I generally ask the chemist / pharmacist for generic forms for the prescribed branded drugs

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

3. I generally ask my doctor to prescribe generic names of medicines

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

4. I ask my physician to prescribe cost effective drugs

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

5. I am aware that drugs available at some stores like Jan Aushadhi Kendras, OneIndia Pharmacy, Dava Dost, etc., are at low prices

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

6. I consider generic medicines to be safe

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

7. I consider generic medicines to be of equal quality with their branded equivalents (Drugs.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

8. I know generic medicines also cause side effects

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

9. I consider generic medicines to be therapeutically effective

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

10. I change my medication only on the advice of my doctor

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

11. I am able to buy generic medicines easily from the pharmacies

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

12. Price of generic medicines is pocket friendly

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

13. Generic medicines are available on online pharmacies

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

14. I buy medicines that I have been using previously, irrespective of price

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

15. I go for drug substitution when prescribed medicine is not available at the nearest pharmacy

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

16. I take into consideration the suggestions of my family and friends while choosing generic medicine

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

17. My previous usage of generic medicine plays an important role in me continuing with generic medicine

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

18. My disease gets cured with the usage of generic medicines

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

19. I buy those medicines that are prescribed by the doctors

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

20. I consider price of the medicine to be an indicator of good quality

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

21. I tend to go for generic medicines as they are available in non-standard

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

22. Price is a criteria while buying prescribed medicines

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

23. I tend to buy those medicines which are easily available near my place of residence

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

24. I am comfortable taking generic versions of medications

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

25. I don't mind the pharmacist substituting the prescription medicines with generic versions

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

26. I recommend usage of generic medicines to my friends and family

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

PHARMACIST QUESTIONNAIRE

Hello Sir / Madam,

I am working on a PhD thesis. In order to realize the objectives of the study, I humbly request you to spare 10 minutes and complete this survey. Please be informed that this is an anonymous survey conducted for educational research purposes only.

1. Gender (*Mark only one oval*).

Male

Female

Others

2. Age (*Mark only one oval*).

< 30 years

31 - 40 years

41 - 50 years

> 50 years

3. Highest Education in Pharmacy (*Mark only one oval*).

Bachelor's Degree in Pharmacy

Master's Degree in Pharmacy

PharmD / Ph.D

4. Number of years in practice (*Mark only one oval*).

< 5 years

6 - 10 years

11 - 20 years

21 - 30 years

> 30 years

5. Type of Pharmacy (*Mark only one oval*).

- Hospital Pharmacy
- Clinic Pharmacy
- Independent Pharmacy (1 - 4 branches)
- Chain Pharmacy (5 and above branches)
- Community Pharmacy
- Generic Pharmacy

6. Employment Position (*Mark only one oval*)

- Self or part owner
- License holder
- Advisor
- Seller

7. Pharmacy Location _____

3. Daily average number of customers (*Mark only one oval*).

- < 20 customers
- 21 - 40 customers
- > 40 customers

4. Majority of generic drugs sold at your pharmacy belong to which therapeutic category

- Anti-infectives
- Neurology
- Cardiology
- Endocrinology
- Gynaecology

Gastroenterology

Pulmonology

Dermatology

Urology

Orthopaedics

Section -II: Please indicate your answer along the mentioned levels of agreeability (mark your opinion in 1 to 5 i.e., strongly disagree to strongly agree)

4. Generic medicines are therapeutically effective in treating diseases

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

5. Generic medicines are as safe as branded ethical drugs / innovator drugs

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

6. Generic medicines are pocket-friendly for the patients

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

7. Packaging of generic medicines is of good standard

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

8. Generic drugs have similar side effects as their branded equivalents

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

9. Generic medicines are bioequivalent to branded ethical drugs and can be substituted

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

10. Generic substitution improves compliance towards drug therapy among patients

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

11. Substitution by generic medicines having narrow therapeutic index is inappropriate

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

12. I keep myself regularly updated about advancements in pharmacology through books like CIMS (Current Index of Medical Specialties), MIMS (Monthly Index of Medical Specialties), etc.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

13. There are a wide range of generic medicines available in my pharmacy

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

14 The credibility of generic medicine manufacturers is a concern when stocking medicines in the pharmacy

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

15. Pharmaceutical companies' product bonuses and incentives influence the choice of medicines selection

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

16. Generic substitution for prescription drugs is done after consulting the prescribing physician

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

17. Visual reminders provided by pharmaceutical companies influence dispensing over-the counter (OTC) medicines

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

18. dispense those generic medicines which offer good margins

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

19. I recommend generic alternatives for branded ethical drugs to my customers

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

20. I regularly dispense generic drugs for patient's day-to day health related problems

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

27. Patients accept generic substitution after they are educated about generic medicine

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

- 28. Doctor prescriptions are written in generic names of the medicines**
1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree
- 29. Patients tend to buy only those drugs that are prescribed by the doctor**
1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree
- 30. Patients ask for cost effective drug equivalents**
1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

PHYSICIAN PRESCRIPTION QUESTIONNAIRE

Hello Doctor,

I am working on a PhD thesis. In order to realize the objectives of the study, I humbly request you to spare 10 minutes and complete this survey. Please be informed that this is an anonymous survey conducted for educational research purposes only.

Email

1. Gender

Male

Female

Others

3. Your Age in Years

< 30 years

31-45 years

46-60 years

> 60 years

4. Highest Education Qualification

MBBS

MD

MS

DM

Others

5. Therapeutic Specialization _____

6. Total years of practice

< 5 years

6 - 15 years

16-25 years

> 25 years

7. Consulting at

Govt Hospital

Govt-Medical College

Private

Charitable

Self-owned

Section – II: Physicians opinion on Generic drug Prescription (Mark your Opinion in the 5 point scale i.e, 1 to 5, Strongly Disagree to Strongly Agree)

1. prescribe drugs to my patients that are easily honored by the pharmacist

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

2. I prescribe drugs which are also being used by my colleagues.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

3. The long-standing presence of the drug in the market helps me to prescribe the same

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

4. I consider patient requests in prescribing particular medication

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

5. I prescribe those drugs whose information is published in medical and scientific journals of repute

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

6. I prescribe drugs from reputed pharmaceutical companies

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

7. I consider patient's affordability while drug prescription

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

8. I analyse the cost-efficacy benefits of a drug before prescribing it to my patients

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

9. I regularly meet the medical sales representatives (MRs) of various pharma companies to understand their drug portfolio

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

10. I prescribe drugs where the MRs possess sufficient knowledge of the medicine.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

11. Visits of medical representatives helps me remember their company's products

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

12. Sponsored medical camps / awareness events by pharma companies influences my drug prescription

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

13. Pharmaceutical companies distribute small promotional items like pens, pads, etc., to remind about their products

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

14. I tend to prescribe a drug when I get free drug samples to be distributed among patients

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

15. I prescribe drugs with generic name to my patients

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

16. I keep myself regularly updated with the latest advancements in my therapeutic area

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

17. I regularly attend the symposia/conferences to update my therapeutic drug prescription knowledge

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

18. I attend pharma company-sponsored medical education seminars to improve my medical knowledge and awareness

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

19. I have read articles on safety and efficacy of generic drugs in comparison to branded ethical drugs (innovator)

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

20. I consider generics to be as safe as branded ethical drugs (innovator drugs)

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

21. I consider generics to be therapeutically as effective as branded ethical drugs

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

22. Generics are cost efficient than branded ethical drugs

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

23. I consider generics to be bioequivalent to their innovator (branded ethical) drug

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

24. I consider that generic drugs can be prescribed in place of branded ethical * drugs

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

25. I am aware of the generic drugs that are available at various pharmacies and the Jan Aushadi drug stores

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

26. I prescribe generic drugs regularly to cure my patient's ailments

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

27. I tend to prescribe innovator (branded ethical) drug when generic drug is available

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

28. I tend to switch a patient prescribed on innovator (patented) drug to available generic drugs

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

29. My generic drug prescription is widely acknowledged by the pharmacists

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

30. Availability of Generic drugs in various Government and private pharmacies will help me to prescribe it.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

31. More bioequivalence studies showing comparison between generic and patented drugs will help to build my prescription confidence.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

32. The price of the generic drugs is patient-friendly

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

33. I prescribe generic drugs in emergency cases

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

34. I recommend usage of generic medicines to my friends/relatives

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

LIST OF PUBLICATIONS

S.no	Type of Publication	Name of Journal / Book	Journal Indexing	Title of the Paper / Book Chapter	Published Month-Year	ISSN No	Weblink
1	Journal Paper	Journal of Rare Cardiovascular Diseases	SCOPUS	Comparison of Adverse Drug Reaction Profiles Between Branded and Generic Cardiovascular Medications	Oct-2025	2299-3711	https://jrkd.eu/article/view/comparison-of-adverse-drug-reaction-profiles-between-branded-and-generic-cardiovascular-medications-453/
2	Journal Paper	International Journal of Environmental Sciences	SCOPUS	Barriers and Facilitators in the Adoption of Generic Medicines Among Pharmacists	Jun-2025	2229-7359	https://theaspd.com/index.php/ijes/article/view/646
3	Journal Paper	International Journal of Drug Delivery Technology	SCOPUS	A Comparative Study of Branded and Generic Drugs: Cost Analysis in Indian Scenario	Dec-2024	0975-4415	doi 10.25258/ijddt.14.4.55
4	Journal Paper	Journal of Generic Medicine	EBSCO	Decoding the Perception of Prescribers Towards Generic Medicine: A Bibliometric Study	Jan-2024	1741-1343	https://doi.org/10.1177/17411343231226122
5	Book Chapter	Modern Healthcare Marketing in the Digital Era	SCOPUS	Marketing Strategies of Big Pharma and Impact of Generics in Healthcare	Dec-2023	9798369306796	DOI: 10.4018/979-8-3693-0679-6.ch005

LIST OF CONFERENCES PRESENTED AT

S.no	Month - Year	Conference Name	Organized by	Presented Paper Title
1	Sep-21	International Conference on Equality, Diversity and Inclusivity: Issues and Concerns	School of Education & School of Humanities, Lovely Professional University, Punjab, India.	Jan Aushadi: A crucial step towards achieving health equity.
2	Jun-22	International Conference on Inter-Disciplinary Approaches Towards Socio-Economic Inclusiveness for Sustainable Development	University School of Business, Chandigarh University, Punjab, India.	Consumer behavior and trends in healthcare sector due to COVID 19.
3	Mar-23	International Conference on Sustainable Development Goals: Opportunities, Challenges and the Future	St. Joseph Degree & PG College, Hyderabad., in collaboration with Telangana State Council of Higher Education.	Industry 5.0: The promise that it holds for the healthcare sector.
4	Jun-23	International Conference on Innovation in Engineering & Management: Sustainability, Through Creativity & Innovation	Birla Institute of Technology, Mesra (Ranchi), Noida Campus, India.	Decoding the perception of prescribers towards Generic Medicine: A Bibliometric Study.
5	Jun-23	International Conference on Emerging Technologies and Sustainable Business Practices	University School of Business, Chandigarh University, Punjab, India.	A Comparative Study of Branded and Generic Drugs: Cost and Benefit Analysis.

LIST OF WORKSHOPS ATTENDED

S.no	Month - Year	Workshop Description	Organized by
1	May-22	Workshop on Research Methodology and Data Analysis (AMOS and Smart-PLS)	Mittal School of Business, Lovely Professional University, Punjab, India.
2	Aug-22	SFDP on Fundamentals of PLS-SEM by using Smart-PLS	NICMAR University, Pune, India and SmartPLS GmbH, Germany.
3	Mar-23	NVivo for Qualitative Research	FORE School of Management, New Delhi, India.
4	May-23	Structural Equation Modelling	FORE School of Management, New Delhi, India.
5	Jun-23	Qualitative Research with NVivo	Birla Institute of Management, Noida, India.
6	Nov-23	Psychometrics and Scale Development	Vignana Jyothi Institute of Management, Hyderabad, India.