PHARMACEUTICAL BRANDING AND VARIOUS ATTRIBUTES AFFECTING THE PRESCRIPTION BEHAVIOUR OF DOCTORS

by

SAVIO REGINALD PEREIRA

DISSERTATION

Presented to the Swiss School of Business and Management Geneva

In Partial Fulfilment

Of the Requirements

For the Degree

DOCTOR OF BUSINESS ADMINISTRATION

SWISS SCHOOL OF BUSINESS and MANAGEMENT GENEVA

<MAY, 2025>

PHARMACEUTICAL BRANDING AND VARIOUS ATTRIBUTES AFFECTING THE PRESCRIPTION BEHAVIOUR OF DOCTORS

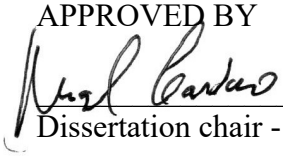
by

SAVIO REGINALD PEREIRA

Supervised by

Dr. George Latridis

APPROVED BY



Dissertation chair - Dr. Gualdino Cardoso

RECEIVED/APPROVED BY:

Admissions Director

Dedication

To the countless patients whose lives are touched by medical decisions made every day.

To the Pharmaceutical Companies whose research and innovation create possibilities for healing where none existed before.

Behind every prescription is a human story a struggle, a hope and a chance for recovery. Behind every medication is years of dedication, scientific breakthrough and perseverance.

May this research contribute to strengthening the vital bridge between pharmaceutical innovation and medical practice, ensuring that those who need healing receive the best possible care.

Science without compassion is empty and medicine without understanding is incomplete.

Acknowledgements

I'd like to express my never-ending appreciation for God, who has guided me through some of the darkest times in my life. He's given me the strength and perseverance to overcome any challenge I face.

I'm grateful for my parents, whose endless support and faith in my abilities have been a driving force throughout my education. Their unconditional love has pushed me to reach new heights.

My wife Mrs. Mellissa Janice Pereira is a true blessing. Through all the ups and downs of DBA, she's always been there with emotional support and understanding. Her patience and encouragement mean the world to me.

To all of my friends and family members who have supported me along this journey, thank you from the bottom of my heart. Your presence in my life has been a constant source of happiness and strength.

Lastly but definitely not least, I'd like to give a huge shoutout to Dr. George Latridis, my DBA mentor. His guidance, encouragement and support have been priceless during these years in SSBM. Thank you for your constant availability, especially during critical moments.

To anyone who has played even the smallest role throughout these years, thank you for your contribution. Your support hasn't gone unnoticed, and it has made a world of difference in both my academic and professional growth.

ABSTRACT

PHARMACEUTICAL BRANDING AND VARIOUS ATTRIBUTES AFFECTING THE PRESCRIPTION BEHAVIOUR OF DOCTORS

SAVIO REGINALD PEREIRA

2025

Dissertation Chair: Dr. Gualdino Cardoso

Co-Chair: Dr. Aleksandar Erceg

This quantitative, survey-based study investigates five critical factors influencing doctor's prescription behavior: Medical Representatives, Medication Branding, Medication Costing, Prior Patient Experience or Suggestion and Preferred Pharmaceutical Promotional activity. The theoretical framework used in the analysis include AIDA model, Behavioural Economics Theory, Brand Equity Theory, Diffusion of Innovations Theory, Evidence Based Medicine Theory, Information Processing Theory, Persuation Theory, Rational Choice Theory, Rational Prescribing Model, Shared Decision Making Theory, Signalling Theory and Theory of Planned Behaviour. Utilizing responses from 800 doctors and the theoretical framework, the research applies percentage analysis, chi-square tests, one-sample t-tests to comprehensively assess each factor's impact.

For Hypothesis 1, 73.9% of doctors affirmed that medical representatives influence their prescribing decisions. The chi-square test yielded x^2= 182.405 (df = 1, $p < 0.001$), while the t-test reported t = 48.981 ($p < 0.001$) with a mean difference of 0.761 (95% CI: 0.730.79). The effect size was substantial (Cohen's d = 1.732), confirming significant influence. Regarding Hypothesis 2, 77.5% acknowledged that Medication Branding affects their prescriptions. Results showed x^2= 242.000 (df = 1, $p < 0.001$) and t= 49.076 ($p < 0.001$), with a mean difference of 0.725 (95% CI: 0.700.75) and Cohen's d = 1.735, indicating strong brand impact. For Hypothesis 3, 66.9% agreed that medication cost shapes their prescribing behavior. Statistical analysis revealed x^2= 91.125 (df = 1, $p < 0.001$), t = 49.922 ($p < 0.001$), mean difference 0.831 (95% CI: 0.800.86) and Cohen's d = 1.765, emphasizing cost sensitivity. In Hypothesis 4, 72.8% reported that prior patient experience or suggestions influence prescriptions. The chi-square value was x^2= 165.620 (df = 1, $p < 0.001$), t = 49.042 ($p < 0.001$), with a mean difference of 0.773 (95% CI: 0.740.80) and Cohen's d = 1.734, confirming patient-driven influence. For Hypothesis 5, 88.1% preferred face-to-face detailing as the primary promotional method. The chi-square test (x^2= 1084.907, df = 2, $p < 0.001$) and t = 129.759 ($p < 0.001$), with a mean difference of 1.559 (95% CI: 1.541.58) and an exceptional Cohen's d = 4.588, demonstrated overwhelming preference.

Across all 5 hypotheses, null hypotheses were decisively rejected ($p < 0.001$), with consistently large effect sizes, underscoring that these factors significantly and independently shape doctors' prescription behavior.

Table of Contents

List of Tables

List of Figures

Chapter I:
INTRODUCTION

1.1 Introduction

Prescription behaviour represents a complex, multidimensional phenomenon influenced by various interrelated factors operating within contemporary healthcare systems. This thesis examines the constellation of influences shaping physician prescribing patterns, integrating perspectives on pharmaceutical marketing, economic considerations, patient dynamics and information dissemination methods. Through systematic analysis of these determinants, this research aims to develop a comprehensive framework for understanding prescription decisions within diverse healthcare contexts.

The pharmaceutical industry operates within a complex ecosystem where medical representatives (MRs) function as crucial intermediaries between pharmaceutical companies and healthcare providers (McGettigan *et al.*, 2001). These interactions embody both informational and persuasive elements, as MRs fulfil dual roles of educating providers and promoting specific medications (Al-Areefi and Hassali, 2013). This duality creates tension between educational value and potential bias introduction, raising important questions about pharmaceutical promotion ethics and healthcare outcomes (Jaruseviciene *et al.*, 2013).

Empirical evidence demonstrates that product detailing significantly shapes prescription choices through structured information delivery (Zipkin and Steinman, 2005). While physicians perceive these interactions as knowledge-enhancing, they may simultaneously foster prescribing habits favouring branded medications over generics (Fickweiler, Fickweiler and Urbach, 2017). The interpersonal dynamics between physicians and MRs reveal relationships where professional connections significantly influence prescription decisions (Alkhateeb *et al.*, 2011), with representatives employing strategic relationship-building through distinct phases from credibility establishment to relationship maintenance (Abdul, Jaleel and Laeequddin, 2011).

In contemporary healthcare environments characterized by rising costs and pervasive marketing, pharmaceutical branding exerts substantial influence on clinical decisions. brand-name drugs frequently take precedence over generic alternatives in physicians' prescribing decisions (Lieb and Scheurich, 2014). The pharmaceutical industry's significant marketing expenditures frequently exceeding research and development investments demonstrate how companies leverage brand awareness to cultivate physician loyalty (Rizwan Raheem Ahmed *et al.*, 2020).

Studies reveal that physicians influenced by promotional activities prescribe brand-name drugs at higher rates, despite evidence of bioequivalence between branded and generic medications (Gupta, Malhotra and Malhotra, 2018). Research indicates that while 75% of physicians acknowledge generics as safe, only 64.4% consider them equally effective as branded alternatives (Patidar and Singh, 2024). This perception gap is exacerbated by marketing tactics that emphasize brand value, creating persistent biases toward branded products even in competitive markets (Gupta, Nayak and Vidyarthi, 2015).

The financial dimensions of medication exert significant influence on clinical decision-making processes, creating scenarios where clinicians must navigate between optimal clinical efficacy and economic feasibility (Chandelkar and Rataboli, 2014). This economic reality often produces tension between evidence-based medicine and financial practicality, potentially directing clinicians toward economically viable options or insurance-covered alternatives, sometimes at the expense of optimal therapeutic approaches (Chandelkar and Rataboli, 2014).

Pharmaceutical pricing dynamics significantly influence clinical decision-making patterns, often promoting adherence to standardized prescribing protocols rather than individualized therapeutic approaches. When third-party payers such as national insurance programs assume medication costs, clinicians demonstrate greater price sensitivity in pharmaceutical selection, influencing therapeutic choices (Fadare *et al.*, 2020). The relationship between insurance coverage and pharmaceutical selection illustrates the economic pressures confronting both patients and providers (Miao-Sheng and Yu-Ti, 2008), with formulary design creating financial incentives that affect both provider and patient pharmaceutical selection decisions (Chou *et al.*, 2009).

Patient experience exerts substantial influence on prescription decisions beyond purely medical considerations. Traditional models of prescribing behaviour focused predominantly on clinical factors such as diagnosis, symptom presentation and drug properties. However, emerging research demonstrates that non-clinical factors, particularly those related to patient experiences and expectations, significantly impact prescription decisions (Theodorou *et al.*, 2009).

Empirical evidence supporting the influence of patient requests on prescribing behaviour is substantial. (Kappe and Stremersch, 2016) found that patient drug requests strongly and positively influence prescription decisions in the United States. The frequency of accommodation appears considerable, with (Campbell *et al.*, 2013) reporting that 43% of physicians routinely accede to patients' requests for brand-name medications. Beyond explicit requests, patient expectations regarding treatment outcomes significantly influence prescribing behaviour (Cockburn and Pit, 1997) found that patients whose physicians perceived an expectation for medication were ten times more likely to receive prescriptions, representing one of the strongest documented influences on prescribing behaviour (Meeker *et al.*, 2016).

Despite technological advancements and digital proliferation, interpersonal communication remains a significant channel for drug-related information transfer. Research indicates that 84% of physicians continue to rely on conventional information sources for pharmacological data, underscoring the persistent value of direct dialogue with knowledgeable representatives (Al-Areefi and Hassali, 2013). The effectiveness of this approach stems from representatives' ability to establish authentic relationships with physicians, customizing their communication approaches to accommodate individual practitioners' preferences and clinical focus areas (Magalhães *et al.*, 2018).

The strategic methodologies employed during information dissemination encounters include leveraging established professional relationships, utilizing visual materials and product samples and customizing presentations to address particular concerns while integrating comprehensive data regarding efficacy and safety profiles (Mali, Dudhgaonkar and Bachewar, 2010). The capacity to tailor information according to individual healthcare providers' specific clinical contexts represents a significant advantage of direct interpersonal interactions,

enhancing knowledge retention and practical application compared to standardized communications (Mali, Dudhgaonkar and Bachewar, 2010).

Contemporary research examines physician-industry interactions through theoretical frameworks including principal-agent theory and behavioural economics (Venkataraman and Stremersch, 2007). Cognitive processing of pharmaceutical information exhibits patterns influenced by confirmation bias and framing effects (Gupta, Nayak and Vidyarthi, 2015), while social network analysis reveals prescription cascades within professional communities following marketing interventions, with opinion leaders demonstrating disproportionate influence (Sohrabi *et al.*, 2021).

This thesis employs an integrated theoretical framework that synthesizes psychological, social, economic and institutional dimensions to examine prescribing behaviour. Through rigorous methodological approaches addressing social desirability bias and causal inference challenges, this research investigates the complex interplay between pharmaceutical marketing, branding, economic considerations, patient expectations and information dissemination methods across diverse healthcare contexts.

This thesis aims to contribute to the existing knowledge base by examining how these multiple influences interact and potentially reinforce each other to shape prescribing behaviour. By investigating these relationships across diverse healthcare settings, this research seeks to identify critical opportunities for enhancing prescribing quality while balancing competing priorities including patient preferences, economic constraints, brand perceptions and evidence-based practice. Through systematic analysis of these multifaceted relationships, this thesis aspires to develop evidence-based recommendations for optimizing pharmaceutical information dissemination and prescribing decisions in ways that acknowledge real-world constraints while prioritizing patient welfare and healthcare system sustainability.

1.2 Research Problem

Despite the critical role of physicians in medication prescription, prescribing behaviour remains a complex process influenced by multiple factors, including pharmaceutical marketing by medical representatives and branding activities, economic considerations, patient expectations and communication methods. Existing studies indicate that pharmaceutical representatives play a significant role in shaping prescription choices through direct engagement with physicians, raising ethical and practical concerns about the balance between education and promotional bias (Shamim-ul-Haq *et al.*, 2014). Similarly, branding strategies affect physician preference for branded medications over generics, often overriding considerations of therapeutic equivalence (Davari, Khorasani and Tigabu, 1970).

Economic factors further shape prescription decisions, as physicians must weigh cost-effectiveness against optimal therapeutic outcomes, navigating financial constraints imposed by healthcare systems and patient affordability (Rizwan R. Ahmed *et al.*, 2020). Additionally, patient exposure to marketing, direct requests and prior medication experiences contribute to prescribing trends, highlighting the patient-physician dynamic as a key determinant (Paredes *et al.*, 1996).

Moreover, while digital platforms and print materials provide alternative means of pharmaceutical information dissemination, studies indicate that physicians still prefer direct interactions with medical representatives for acquiring medication-related knowledge (Abulhaj, ELSamen and Alabbadi, 2013).

Furthermore, understanding these influences presents an opportunity for pharmaceutical companies to refine their marketing strategies and increase sales. By aligning their approaches with physician preferences, companies can optimize brand positioning, tailor cost-related strategies and enhance patient-targeted communication to drive prescription rates. Leveraging insights into the effectiveness of face-to-face detailing, pharmaceutical firms can strengthen their engagement with doctors by investing in high-quality, evidence-backed interactions that build trust and credibility. Additionally, integrating patient exposure strategies with physician education initiatives can create a more cohesive influence on prescribing decisions, ensuring that both medical professionals and patients recognize the value of specific medications (Theodorou *et al.*, 2009).

Given these multifaceted and fundamentally influences, this particular research study essentially seeks to critically examine and thoroughly investigate how these five major factors pharmaceutical representative influence, branding considerations, cost-related factors, patient exposure variables and preferred communication methodologies individually shape and ultimately determine prescribing behaviour among healthcare professionals. By systematically and comprehensively investigating these determinants within a structured analytical framework, this study fundamentally aims to provide robust and evidence-based insights into potentially optimizing prescription practices to effectively balance ethical considerations, economic constraints and patient-centered outcomes, while simultaneously offering practical and implementable recommendations for pharmaceutical companies to substantially enhance and maximize their market impact in a sustainable manner.

Furthermore, the comprehensive analysis of these interrelated factors will presumably contribute to the existing body of knowledge regarding prescribing patterns and, in essence, facilitate a more nuanced understanding of the complex decision-making processes that undoubtedly characterize contemporary pharmaceutical prescription behaviours. Indeed, the thorough examination of these variables will, in all likelihood, elucidate certain patterns and correlations that may, in fact, provide valuable guidance for both clinical practice and industry strategy in the context of evolving healthcare paradigms and emerging market dynamics.

1.3 Purpose of Research

This research aims to comprehensively analyze the multifaceted factors influencing physician prescription decisions across clinical contexts. The research examines five determinants hypothesized to shape prescription behaviour, each representing distinct but complementary dimensions of clinical decision-making. The study first explores the influence of pharmaceutical representatives on prescription patterns, investigating the mechanisms through which representative-physician interactions potentially modify clinical decisions. This component examines relationship dynamics between representatives and physicians, analyzing how information exchange, product education and interpersonal factors potentially affect prescription outcomes in various therapeutic contexts.

The research further investigates how pharmaceutical branding operates within prescription frameworks, examining whether brand considerations influence clinical decisions independently of therapeutic equivalence. This analysis seeks to identify the cognitive and behavioural mechanisms through which brand recognition, perception and positioning potentially shape physician preferences when selecting between therapeutic alternatives. By examining these brand-related decision processes, the study aims to illuminate how marketing strategies interact with clinical judgment in prescription contexts.

Cost considerations represent another critical dimension of this research, examining how economic factors integrate with clinical assessment during prescription decision-making. The research explores how physicians navigate financial constraints, insurance considerations and patient economic circumstances when selecting therapeutic options. This component analyzes the potential tension between optimal clinical care and economic realities, investigating how physicians balance therapeutic efficacy with cost considerations across different patient populations and healthcare environments.

The research further examines how patient experience factors modify prescription behaviour, particularly focusing on how previous therapeutic responses, patient preferences and relationship continuity influence clinical decisions. This dimension explores the bidirectional nature of doctor-patient interactions, examining how patient feedback, reported outcomes and expressed preferences become integrated into prescription decisions. By analyzing these experiential factors, the research seeks to understand how physicians incorporate patient-centered considerations into their clinical judgment processes.

The final component investigates physician preferences regarding information delivery methodologies, specifically examining the comparative effectiveness of face-to-face detailing relative to alternative communication channels such as printed materials, digital platforms and remote interactions. This analysis explores why certain information transmission approaches may demonstrate superior effectiveness, investigating the underlying mechanisms that make particular communication modalities more influential within pharmaceutical information ecosystems. By examining these preference structures, the research aims to identify optimal approaches for knowledge transfer within professional medical contexts.

Through simultaneous examination of these five critical determinants, this research endeavours to construct a comprehensive framework for understanding prescription behaviour. The research employs a mixed-methods approach integrating quantitative survey analysis with comparative literature validation to establish robust empirical foundations. By illuminating the complex interplay between representative influence, brand impact, cost considerations, patient experience and communication preferences, the research aims to inform evidence-based policy development while enhancing understanding of clinical decision architectures. The findings hold potential significance for medical education, healthcare delivery optimization and pharmaceutical communication strategies, ultimately contributing to improved patient outcomes through enhanced understanding of prescription determinants.

1.4 Significance of Study

This research holds substantial significance across multiple domains within healthcare, pharmaceutical policy and medical education. By systematically analyzing the factors influencing prescription decisions, the research addresses a critical knowledge gap with far-reaching implications for patient care, healthcare economics and public health outcomes. Understanding how medical representatives influence prescription patterns provides essential insights for developing ethical guidelines governing physician-representative interactions. This knowledge enables healthcare organizations to implement appropriate policies that maintain professional relationships while minimizing potential conflicts of interest that could compromise clinical decision-making.

The examination of pharmaceutical branding's impact on prescription choices carries significant implications for drug pricing policies and healthcare expenditure optimization. By identifying how brand considerations potentially shape clinical decisions independently of therapeutic factors, the research provides regulatory agencies with evidence-based foundations for developing marketing oversight frameworks that promote cost-effective prescribing practices. This dimension of the research directly addresses growing concerns regarding healthcare expenditure sustainability, offering pathways for potential cost containment without compromising therapeutic efficacy.

Investigating cost considerations in prescription behaviour holds particular significance for healthcare accessibility and equity. By illuminating how physicians navigate financial constraints when making therapeutic decisions, the research provides valuable insights for insurance design, formulary development and patient assistance programs. Policymakers can leverage these findings to develop reimbursement structures that facilitate optimal clinical care while acknowledging economic realities faced by both healthcare systems and patients. This component addresses fundamental questions regarding resource allocation within constrained healthcare environments.

The analysis of patient experience integration into prescription decisions carries significant implications for patient-centered care initiatives and shared decision-making models. By understanding how physicians incorporate patient feedback and preferences into clinical judgments, the research informs the development of communication frameworks that enhance therapeutic partnerships between doctors and patients. Medical educators can utilize these insights to develop training protocols that equip physicians with enhanced capabilities for integrating patient perspectives into prescription decisions, potentially improving treatment adherence and patient satisfaction.

The research of communication modality preferences addresses critical questions regarding knowledge transfer efficacy within medical contexts. As healthcare information delivery increasingly diversifies across digital and traditional channels, understanding which approaches most effectively influence physician behaviour carries significant implications for continuing medical education, pharmaceutical communication strategies and health information dissemination. These findings enable stakeholders to optimize communication investments while ensuring physicians receive accurate, timely information necessary for evidence-based prescribing.

Beyond these specific domains, the research's integrated approach to examining multiple determinants simultaneously represents a methodological advancement with significant implications for understanding complex clinical decision architectures. By acknowledging the nature of these influences, the research provides a comprehensive framework that more accurately reflects the multifaceted reality of prescription decision-making. This holistic perspective enables targeted interventions across multiple leverage points within healthcare systems, potentially yielding synergistic improvements in prescribing quality, cost-effectiveness and patient outcomes. The findings ultimately contribute to healthcare system optimization through enhanced understanding of the behavioural mechanisms underlying one of medicine's most fundamental clinical activities.

1.5 Research Purpose and Questions

The primary purpose of this research is to conduct a comprehensive analysis of the multifaceted factors that influence physician prescription decisions across diverse clinical contexts. This research represents a systematic examination of the complex decision-making architecture that governs how physicians select therapeutic interventions for their patients. The research is designed to illuminate the intricate interplay between various determinants that collectively shape prescription behavior, moving beyond simplistic cause-and-effect relationships to explore the nuanced dynamics of clinical decision-making.

The study aims to construct a comprehensive framework for understanding prescription behavior through the simultaneous examination of five critical determinants. These determinants represent distinct but complementary dimensions of clinical decision-making, each contributing unique insights into the prescription process. The research employs a mixed-methods approach that integrates quantitative survey analysis with comparative literature validation to establish robust empirical foundations for understanding physician behavior.

The research seeks to bridge the gap between theoretical understanding and practical application by examining how multiple factors interact within real-world clinical environments. By analyzing these interactions, the research aims to inform evidence-based policy development while enhancing understanding of clinical decision architectures. The findings hold potential significance for medical education, healthcare delivery optimization and pharmaceutical communication strategies, ultimately contributing to improved patient outcomes through enhanced understanding of prescription determinants.

The research comprehensively explores the influence of pharmaceutical representatives on prescription patterns, investigating the mechanisms through which representative-physician interactions potentially modify clinical decisions. This component examines the relationship dynamics between representatives and physicians, analyzing how information exchange, product education and interpersonal factors potentially affect prescription outcomes across various therapeutic contexts.

The study also investigates how pharmaceutical branding operates within prescription frameworks, examining whether brand considerations influence clinical decisions independently of therapeutic equivalence. This analysis seeks to identify the cognitive and behavioral mechanisms through which brand recognition, perception and positioning potentially shape physician preferences when selecting between therapeutic alternatives.

Cost considerations represent a critical dimension of this research, examining how economic factors integrate with clinical assessment during prescription decision-making. The research explores how physicians navigate financial constraints, insurance considerations and patient economic circumstances when selecting therapeutic options.

The research examines how patient experience factors modify prescription behavior, particularly focusing on how previous therapeutic responses, patient preferences and relationship continuity influence clinical decisions. This dimension explores the bidirectional nature of doctor-patient interactions, examining how patient feedback, reported outcomes and expressed preferences become integrated into prescription decisions.

The final component investigates physician preferences regarding information delivery methodologies, specifically examining the comparative effectiveness of face-to-face detailing relative to alternative communication channels such as printed materials, digital platforms and remote interactions. This analysis explores why certain information transmission approaches may demonstrate superior effectiveness.

Based on the comprehensive research purpose outlined above, this research addresses five primary research questions, each corresponding to the key determinants of prescription behavior.

Research Question 1: Pharmaceutical Representative Influence- To what extent do interactions with medical representatives influence physician prescription behavior and what are the specific mechanisms through which this influence operates across different clinical contexts?

Research Question 2: Brand Impact on Prescription Decisions- How does pharmaceutical branding independently influence physician prescription decisions beyond therapeutic equivalence and what cognitive and behavioral mechanisms drive brand preferences in clinical settings?

Research Question 3: Economic Considerations in Prescription Decisions- How do cost considerations and economic factors integrate with clinical assessment in physician prescription decision-making and how do physicians balance therapeutic efficacy with financial constraints?

Research Question 4: Patient Experience Integration- To what extent do prior patient experiences, preferences and feedback influence physician prescription behavior and how do physicians incorporate patient-centered considerations into their clinical judgment processes?

Research Question 5: Communication Methodology Effectiveness- What are physician preferences regarding pharmaceutical information delivery methodologies and why is face-to-face detailing potentially more effective than alternative communication channels for knowledge transfer in medical contexts?

To systematically address these research questions, the study employs a comprehensive hypothesis testing framework consisting of five paired null and alternative hypotheses:

Null Hypothesis 1: Medical Representatives do not influence the prescription behavior of doctors

Alternative Hypothesis 1: Medical Representatives do influence the prescription behavior of doctors

Null Hypothesis 2: Brand of medication does not influence the prescription behavior of doctors

Alternative Hypothesis 2: Brand of medication does influence the prescription behavior of doctors

Null Hypothesis 3: Cost of medication does not affect the prescription behavior of doctors

Alternative Hypothesis 3: Cost of medication does influence the prescription behavior of doctors

Null Hypothesis 4: Prior patient experience or suggestion does not influence the prescription behavior of doctors

Alternative Hypothesis 4: Prior patient experience or suggestion does influence the prescription behavior of doctors

Null Hypothesis 5: Face-to-face detailing is not the most preferred form of pharmaceutical promotional activity by doctors for latest information on medication

Alternative Hypothesis 5: Face-to-face detailing is the most preferred form of pharmaceutical promotional activity by doctors for latest information on medication

Through this comprehensive examination of research purpose and questions, the study aims to contribute meaningful insights to the understanding of physician prescription behavior, ultimately supporting improved healthcare delivery and patient outcomes through evidence-based knowledge of clinical decision-making processes.

Chapter II:
REVIEW OF LITERATURE

2.1 Theoretical Framework

The prescription behaviour of doctors in the pharmaceutical sector is a complex phenomenon influenced by clinical, psychological, social and economic factors. To comprehensively capture these multifactorial influences, this study adopts an integrative approach based on twelve interrelated theoretical frameworks. Each theory or model provides a distinct lens for analyzing how pharmaceutical branding and other attributes shape prescribing decisions.

AIDA Model (Attention, Interest, Desire, Action)- The AIDA model offers a foundational structure for understanding how pharmaceutical promotions capture doctors' attention, generate interest, create desire and prompt prescription action. Personalized detailing, visual aids and sample distribution are key strategies that align with this sequential persuasion process (Hincapie *et al.*, 2021; Nagarathinam *et al.*, 2024)

Behavioural Economics Theory- This theory examines how prescribing decisions deviate from pure rationality due to cognitive biases such as availability heuristics, loss aversion and framing effects. Physicians often respond to cost-transparency interventions and marketing nudges, adjusting prescriptions based on perceived economic implications (Rice, 2009; Dash *et al.*, 2019; Monsen *et al.*, 2019a)

Brand Equity Theory- Brand equity, encompassing brand recognition, loyalty and perceived quality, significantly influences physicians' preferences. Repeated exposure to pharmaceutical branding forms mental associations that bias decisions toward branded medications over generics (Shamim-ul-Haq *et al.*, 2014; Mehralian *et al.*, 2017)

Diffusion of Innovations Theory- This theory explains how new pharmaceutical products are adopted over time. Medical representatives act as key change agents who disseminate innovation through trusted, face-to-face interactions, especially in environments where digital overload diminishes information effectiveness (Lotfi *et al.*, 2016; Sawad and Andrews, 2022).

Evidence-Based Medicine (EBM) Theory- EBM emphasizes clinical decisions grounded in the best available evidence. However, real-world dynamics—such as perceived patient expectations—often lead to deviations from strict evidence-based protocols (Cockburn and Pit, 1997; Theodorou *et al.*, 2009; Meeker *et al.*, 2016)

Rational Choice Theory- Rational Choice Theory posits that clinicians act as rational agents who weigh therapeutic benefits against costs and constraints. With rising pharmaceutical prices and limited budgets, prescribers often adjust medication choices to achieve economically viable clinical outcomes (García-Pérez *et al.*, 2013; Chandelkar and Rataboli, 2014)

Shared Decision-Making (SDM) Theory- SDM theory highlights the collaborative nature of prescribing. Physicians often accommodate explicit or perceived patient preferences, leading to increased prescription rates—especially when patients request specific brands (Kravitz *et al.*, 2005; Stremersch, Landsman and Venkataraman, 2013)

Signalling Theory- This theory addresses information asymmetry in the physician–pharmaceutical company relationship. Branding, detailing and sample distribution serve as

signals of drug quality, influencing doctors to favour branded products despite clinical equivalence with generics (Morse, Hanna and Mehra, 2019; Hadia *et al.*, 2022)

Information Processing Theory- This cognitive theory explores how doctors process and retain promotional information. Factors like message framing, timing and repetition significantly affect recall and prescription decisions. Physicians may unknowingly develop implicit biases after repeated exposure to marketing materials (Gupta, Nayak and Vidyarthi, 2015; Sohrabi *et al.*, 2021).

Persuasion Theory- Persuasion Theory explains how pharmaceutical representatives use systematic communication strategies to influence prescribing. Emotional appeals, comparative framing and rapport-building techniques are deployed to shape preferences and develop long-term brand loyalty (Abdul, Jaleel and Laeequddin, 2011; Datta and Dave, 2017).

Rational Prescribing Model- This model promotes evidence-based, ethical and cost-effective prescribing, prioritizing patient outcomes. It encourages clinicians to consider economic constraints without compromising therapeutic efficacy, often supported through pharmacist integration and adherence support systems (García-Pérez *et al.*, 2013; Batko and Ślęzak, 2022).

Theory of Planned Behavior (TPB)- TPB links behavioural intentions with attitudes, subjective norms and perceived control. In the context of prescribing, doctors' intentions are shaped by attitudes toward branded drugs, perceived social expectations (e.g., patient or peer influence) and constraints like cost or availability (Ajzen, 1991)

Together, these theoretical models provide a rich, multidimensional foundation to analyze the interplay between pharmaceutical branding strategies and doctors' prescribing behaviours. They allow this study to systematically explore how clinical, cognitive, economic and social factors converge to influence prescription outcomes.

2.2 AIDA Model

The AIDA model provides a comprehensive framework for understanding how pharmaceutical promotion methods capture healthcare professionals' attention, generate interest, create desire and ultimately drive action in prescribing behaviors.

The pharmaceutical industry employs diverse approaches to communicate drug-related information, ranging from traditional methods such as printed materials and face-to-face interactions to more contemporary digital platforms. Understanding the relative efficacy of these methodologies is essential for optimizing information transfer in a complex healthcare landscape characterized by time constraints, information overload and evolving regulatory frameworks (Nagarathinam *et al.*, 2024).

Face-to-face interaction between pharmaceutical representatives and healthcare providers represents a significant channel for drug-related information transfer. This approach involves direct, personal meetings where pharmaceutical representatives present comprehensive information regarding medication efficacy, safety profiles and appropriate clinical applications. The strategic advantage of this methodology lies in its capacity to facilitate targeted communication within a competitive market environment (Nagarathinam *et al.*, 2024).

Research indicates that despite technological advancements, many healthcare professionals continue to value in-person discussions for acquiring nuanced clinical information, reflecting preferences established during traditional medical training paradigms (Yonemori *et al.*, 2012). The strategic utilization of visual materials and product samples serves as a powerful engagement mechanism, not only demonstrating a product's clinical value but also facilitating immediate practical application (Al-Hamdi, Hassali and Ibrahim, 2012).

Medical representatives function as essential intermediaries in the dissemination of pharmaceutical information, significantly influencing physicians' knowledge base and prescribing patterns. As pharmacological products increase in complexity, representatives maintain their crucial position as connectors between manufacturers and clinicians, providing expedient updates regarding medication mechanisms, safety considerations and therapeutic applications. Research by (Al-Hamdi, Hassali and Ibrahim, 2012) indicates that despite digital proliferation, 84% of physicians continue to rely on conventional information sources for pharmacological data, underscoring the persistent value of direct dialogue with knowledgeable representatives.

Item	N (%)	Item	N (%)
Sources of drug information *		Paper-based information *	
Pharmaceutical representative direct communication	70 (85.3)	Pamphlets	51 (62.2)
Look up online, using search engines, for example, Google	61 (74.4)	Presentation over drug company-sponsored lunch	48 (58.5)
Other sources (Medscape, Up to date, epocrates)	39 (47.6)	Package inserts/explanation	40 (48.8)
Pharmaceutical manufacturers	36 (43.9)	Formulary inclusion or coverage of products from pharmaceutical representatives	36 (43.9)
Pharmaceutical representative indirect communication	26 (31.7)	Detail aids (marketing materials)	35 (42.7)
Payors	9 (10.1)	Postal mail or courier from pharmaceutical manufacturers	34 (41.4)
Other	5 (6.1)	Postal mail or courier from pharmaceutical representatives	29 (34.1)
Drug information received at office*		Postal mail or courier from payors	21 (25.6)
Direct drug representatives giving presentations in the office	72 (87.8)	Business reply cards	8 (9.75)
Manually (paper-based)	60 (73.1)	Fax	2 (2.4)
Electronically (email)	32 (39.0)	Electronically information*	
Digitally via opted-in brand or manufacturer websites	18 (21.9)	Emails directly from pharmaceutical representatives	18 (22)
Digitally through medical social sharing sites (Sermo, Doximity)	10 (12.2)	Emails directly from pharmaceutical manufacturers	13 (15.8)
Methods to obtain new information		Emails from other sources such as Physicians Interactive, Peer Direct	12 (14.6)
Contact pharmaceutical representative (phone call, email)	48 (58.5)	Fax directly from pharmaceutical manufacturers	10 (12.2)
Look up online, using search engines (eg, Google)	22 (26.8)	Fax from drug reps directly	8 (9.7)
Request information from company-sponsored website	6 (7.32)	Emails from payors	6 (15.8)
Other sources (Medscape, Web MD, Up to date, epocrates, etc)	6 (7.32)	Fax from other sources such as Physicians Interactive, Peer Direct	6 (7.3)

Table 1
Sources of Drug Information (Hincapie et al., 2021)

The empirical evidence presented in (Hincapie *et al*., 2021) demonstrates a marked preference among physicians for face-to-face pharmaceutical detailing as their primary source of medication information (As per Table 1). Their findings reveal that 85.3% of respondents (n=70) identified direct communication with pharmaceutical representatives as their predominant information source, substantially outranking alternative channels (Hincapie *et al.*, 2021).

When examining specific information delivery mechanisms, 87.8% of respondents (n=72) reported that "direct drug representatives giving presentations in the office" constituted their primary method of receiving drug information. Furthermore, when actively seeking new

medication information, 58.5% (n=48) of respondents indicated they would specifically contact pharmaceutical representatives, either via telephone or email (Hincapie *et al.*, 2021). These findings from the (Hincapie *et al.*, 2021), study suggest that despite the proliferation of digital information channels, healthcare professionals continue to prioritize interpersonal pharmaceutical detailing for obtaining medication information, highlighting the enduring value of face-to-face communication in this context.

The efficacy of personal interactions stems from the representatives' ability to establish authentic relationships with physicians, customizing their communication approaches to accommodate individual practitioners' preferences and clinical focus areas. This personalization represents a distinctive competitive advantage in pharmaceutical marketing strategies (Magalhães *et al.*, 2018). Furthermore, the dynamic nature of face-to-face communication enables real-time clarification of complex pharmacological concepts and immediate addressing of clinicians' specific inquiries, enhancing information retention and application in clinical practice.

Pharmaceutical representatives employ diverse strategic methodologies during information dissemination encounters to effectively communicate medication data to healthcare professionals. Primarily, they leverage established professional relationships with physicians, which enhance trust and receptivity to presented information (Yonemori *et al.*, 2012). By comprehending the specific requirements of each healthcare context, representatives can customize their presentations, addressing particular concerns while integrating comprehensive data regarding efficacy and safety profiles (Mali, Dudhgaonkar and Bachewar, 2010).

The capacity to customize information according to individual healthcare providers' specific clinical contexts represents a significant advantage of direct interpersonal interactions. Research indicates that physicians value personalized discussions that address their particular patient populations and clinical specialties (Fickweiler, Fickweiler and Urbach, 2017). This targeted approach enables representatives to emphasize medication attributes most relevant to a practitioner's clinical focus, enhancing the practical utility of the information provided.

Studies demonstrate that tailored information significantly improves knowledge retention and practical application compared to standardized communications. When representatives adapt their presentations to align with physicians' existing knowledge levels and clinical priorities, the resulting information transfer demonstrates greater efficiency and clinical relevance (De Ferrari *et al*., 2014). This personalization extends beyond content to include communication timing and frequency, with representatives strategically scheduling interactions to accommodate healthcare providers' professional constraints while ensuring sufficient information exposure for optimal learning.

The psychological advantages of interpersonal communication in pharmaceutical knowledge dissemination significantly enhance overall effectiveness. Direct interactions cultivate trust and rapport, which are essential for effective communication and learning processes (Gandhi and Jadhav, 2017). Research highlights that physicians often prefer in-person exchanges for acquiring nuanced information that may be diminished in digital communications, as evidenced in studies where representatives' engagements facilitated improved comprehension of medication efficacy and safety profiles (Gandhi and Jadhav, 2017).

Additionally, the positive emotional responses generated through personal interactions can motivate healthcare professionals to adopt novel therapeutic approaches more readily. These exchanges can stimulate critical evaluation of medication selection and patient care methodologies, aligning with ethical considerations surrounding pharmaceutical marketing practices (Sawad and Andrews, 2022). Consequently, fostering meaningful dialogue not only facilitates enhanced information retention but also cultivates a collaborative environment conducive to ethical decision-making in patient care, reinforcing the enduring value of personal interaction in medical communication (Lotfi *et al.*, 2016).

Establishing effective professional relationships with healthcare providers is essential in ensuring that medical representatives can successfully communicate critical medication information. Interpersonal information exchange creates opportunities for customized discussions that foster trust and collaboration, as demonstrated by studies showing that a majority of medical residents prefer traditional sources for medication information, indicating their reliance on established educational interactions (Gandhi and Jadhav, 2017).

The influence of medical representatives on healthcare professionals' knowledge base and prescribing behaviours is substantial, frequently shaping treatment decisions through strategically focused interactions. Research indicates that physicians regularly rely on representatives for information about medication efficacy and safety profiles, though this relationship necessitates careful ethical consideration (De Ferrari *et al.*, 2014).

Research investigating the effectiveness of different pharmaceutical information dissemination methods underscores their distinctive role in enhancing physicians' prescribing behaviours and knowledge acquisition. Case studies reveal that personal visits from medical representatives significantly increase brand recognition and can facilitate more informed decision-making regarding therapeutic approaches among healthcare professionals. Similarly, research highlights the reliance of medical residents on traditional information sources, revealing limitations in electronic resource utilization due to time constraints (De Ferrari *et al.*, 2014).

This further emphasizes the necessity for direct engagement, as personal interactions provide contextual insights that contribute to informed prescribing decisions, thereby enhancing patient care quality in complex healthcare environments (Yaqub *et al.*, 2024). The evidence suggests that effective information dissemination strategies must acknowledge practitioners' varied preferences and practice constraints, offering complementary approaches that address diverse information needs and learning styles.

Follow-up encounters by medical representatives play a crucial role in reinforcing information retention among healthcare professionals, enhancing the effectiveness of initial information exchange sessions. These subsequent interactions provide opportunities for representatives to reinforce previously shared knowledge, addressing emerging questions or misconceptions that may develop following initial discussions (Othman, Halboup and Battah, 2021).

2.3 Behavioural Economics Theory

The Behavioural Economics Theory framework reveals how psychological factors, cognitive biases and heuristic shortcuts influence prescribing decisions beyond pure rational calculation. Pharmaceutical pricing dynamics significantly influence clinical decision-making patterns, often promoting adherence to standardized prescribing protocols rather than individualized therapeutic approaches. Research demonstrates that the economics of standard prescriptions may induce clinicians to adhere to broad treatment guidelines, as evidenced by norm-following behaviour in healthcare settings (Rice, 2009).

This adherence to standardized protocols represents a cognitive heuristic where clinicians rely on established patterns rather than engaging in complex individualized decision-making for each patient encounter. The tension between standardized protocols and personalized medicine represents a significant dimension of pharmaceutical economics. While standardized approaches may promote cost-effectiveness through economies of scale and predictable formulary management, they may simultaneously constrain clinical decision-making and limit therapeutic individualization (Allan, Lexchin and Wiebe, 2007).

Information asymmetry regarding pharmaceutical pricing creates additional challenges for healthcare providers attempting to incorporate cost considerations into clinical decision-making. Research indicates that clinicians frequently lack accurate and accessible information regarding medication costs, particularly considering the complex variations introduced by different insurance coverage models (Rice, 2009). This information gap can significantly impede clinicians' ability to consider economic factors when selecting therapeutic options, potentially resulting in prescribing decisions that create unexpected financial burdens for patients.

The lack of transparent cost information forces clinicians to rely on incomplete data and approximations when making prescribing decisions, leading to systematic biases in pharmaceutical selection. Issues such as limited price transparency and market inelasticity significantly disrupt normal market functions, prompting greater caution in prescribing practices (Dash *et al.*, 2019). This uncertainty creates conditions where behavioral biases and mental shortcuts become more influential in decision-making processes.

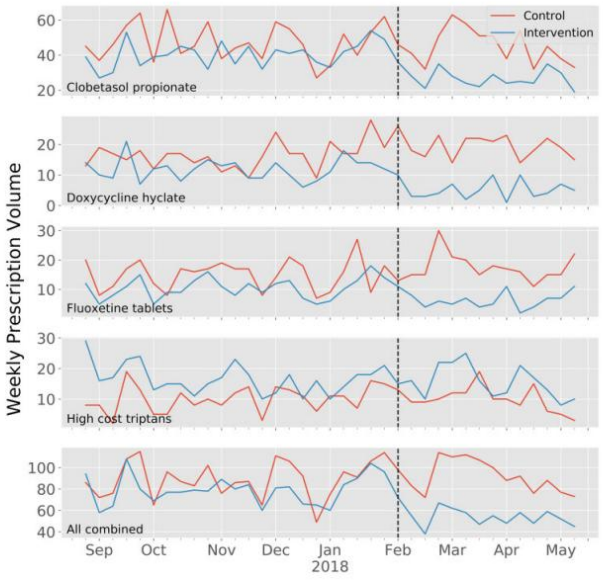


Figure 1
Weekly prescribing volume during baseline and intervention periods (Monsen et al., 2019)

The most compelling evidence for behavioral economics principles in prescribing behavior comes from cost transparency interventions. In the study by (Monsen *et al.*, 2019), a key figure illustrates the impact of cost transparency alerts on physicians' prescribing behaviours over time (Figure 2- Weekly prescribing volume during baseline and intervention periods). Initially, during the baseline period, the diagram shows a consistent weekly prescribing volume for high-cost medications, reflecting routine clinical practices without any cost-related prompts. However, at the point when cost transparency alerts are introduced, there is a marked and immediate decline in the number of prescriptions for these expensive drugs (Figure 2).

This clear shift in the trend, as depicted by the downward movement of the line in the intervention period, provides compelling visual evidence that when physicians are presented with real-time cost information, they become more cost-conscious and adjust their prescribing patterns accordingly. The statistical analysis further confirmed that this reduction was significant, suggesting that the intervention effectively 'nudged' prescribers toward more cost-effective decision-making (Monsen *et al.*, 2019). Such findings underscore the potential for cost transparency tools to not only influence individual prescribing behaviours but also to contribute to broader strategies aimed at reducing overall drug expenditures without compromising the quality of patient care.

This intervention demonstrates classic behavioral economics principles, where simple changes in information presentation (nudges) can significantly alter decision-making without restricting choices or changing underlying economic incentives. The immediate and sustained response to cost transparency alerts shows how behavioral factors, rather than purely rational calculations, drive prescribing patterns.

Marketing strategies employed by pharmaceutical manufacturers create additional dimensions of influence on prescribing patterns that operate through behavioral rather than purely rational mechanisms. Detailing activities, educational programs and direct-to-consumer advertising

represent mechanisms through which industry stakeholders attempt to influence both provider and patient pharmaceutical preferences (Chandelkar and Rataboli, 2014). Research demonstrates that these marketing activities can significantly impact prescribing behaviours, sometimes promoting utilization of more expensive brand-name medications even when therapeutically equivalent alternatives exist at lower costs (Kim *et al.*, 2021).

These marketing strategies exploit various cognitive biases including availability heuristic (recent or memorable information influences decisions), authority bias (influence of perceived experts) and social proof (following the behavior of peers). The effectiveness of these strategies demonstrates how non-rational factors significantly influence prescribing decisions.

Public funding for pharmaceutical trials may potentially alter this landscape by providing clearer assessments of therapeutic efficacy and safety profiles, potentially facilitating more cost-effective prescribing practices (Deaton and Cartwright, 2018). However, the way information about costs and benefits is presented significantly influences how clinicians perceive and respond to this data.

The trajectory of pharmaceutical pricing over the past decade has transformed clinical prescribing patterns (Kim *et al.*, 2021). Research indicates that increasing pharmaceutical expenses have prompted many patients to forego necessary medications or select less expensive alternatives, directly influencing clinical treatment decisions (González López-Valcárcel *et al.*, 2011). This response pattern demonstrates loss aversion, where the fear of financial loss (high medication costs) leads to avoidance behaviors that may not be optimal from a purely rational health outcome perspective.

Educational attainment influences novel pharmaceutical utilization, indicating that more educated patients demonstrate greater likelihood of accepting newer therapies, illustrating the complex interrelationship between cost, access and prescribing patterns. This demonstrates how social and educational factors create systematic biases in pharmaceutical selection that operate independently of clinical efficacy or cost-effectiveness considerations.

Healthcare providers face intensifying challenges as they navigate evolutionary changes in pharmaceutical economics (Allan, Lexchin and Wiebe, 2007a). The emergence of biosimilars represents a significant development in mitigating some of these pressures, but as highlighted in various European policy frameworks, biosimilar adoption varies considerably and often depends on local healthcare systems and economic incentives (Moorkens *et al.*, 2017). These variations often reflect behavioral factors such as status quo bias (preference for current treatment approaches) and neo-phobia (fear of new treatments) rather than rational cost-benefit analysis.

The complexities surrounding the ethics of prescribing expensive medications create significant challenges for healthcare providers. Situations such as Mylan's significant price increases for EpiPen highlight the ethical concerns associated with corporate pricing strategies that potentially prioritize profit over accessibility (Slater and Sanchez-Vives, 2016). Acceptance of pharmaceutical industry incentives raises concerns regarding bias, potentially influencing clinical decision-making toward more expensive therapies (Chou *et al.*, 2009).

A survey examining healthcare provider perspectives on pharmaceuticals demonstrated that while efficacy remains paramount in medication selection, cost considerations and marketing efforts can influence decision-making processes. Professional ethical frameworks increasingly

acknowledge the importance of resource stewardship alongside traditional principles of beneficence and non-maleficence. Research indicates that clinicians increasingly recognize dual obligations to individual patients and broader societal interests in sustainable healthcare resource allocation (Riise *et al.*, 2016).

These ethical considerations often create cognitive dissonance where clinicians must reconcile their professional identity as patient advocates with broader economic and social responsibilities, leading to decision-making patterns that may not follow pure rational choice models.

Ethical concerns regarding pharmaceutical pricing frequently permeate the doctor-patient relationship, transforming trust dynamics and communication patterns (Deaton and Cartwright, 2018). As patients become increasingly informed about medication costs, clinicians must balance medical decisions against financial constraints (Batko and Ślęzak, 2022). When patients possess knowledge regarding appropriate medication utilization, this can result in reduced unnecessary prescriptions and enhanced understanding of potential adverse effects, influencing patient satisfaction and provider trust.

Communication regarding pharmaceutical costs represents a particularly challenging aspect of the doctor-patient relationship. Research indicates significant variations in clinician comfort and practices regarding cost discussions, with many providers reporting limited training and confidence in navigating these conversations (Zafar *et al.*, 2013). This discomfort with cost discussions can lead to avoidance behaviors and suboptimal communication patterns that influence prescribing decisions.

This challenge has been exacerbated by Direct-to-Consumer Pharmaceutical Advertisements (DTCPA), wherein more affluent patients may demonstrate greater awareness and assertiveness regarding treatment options, potentially pressuring clinicians to prescribe costlier pharmaceuticals regardless of necessity (Chandelkar and Rataboli, 2014). These advertisements create demand through emotional appeals and availability bias, where patients request specific medications based on advertising exposure rather than clinical appropriateness.

Patient requests for expensive medications, often exacerbated by misconceptions regarding therapeutic efficacy, further complicate prescribing decisions. The recent emphasis on judicious antibiotic utilization exemplifies this challenge, highlighting the necessity for knowledgeable providers who can counter misconceptions with evidence-based practices (Slater and Sanchez-Vives, 2016).

Health literacy represents another dimension of socioeconomic disparity that influences pharmaceutical selection and utilization. Research indicates that limited health literacy can compound the challenges associated with high medication costs, creating scenarios where patients may be unable to navigate assistance programs or identify more affordable therapeutic alternatives (Zafar *et al.*, 2013).

Limited health literacy creates systematic biases in how patients process cost and benefit information, leading to decisions that may not optimize health outcomes or financial well-being. These cognitive processing limitations interact with pharmaceutical pricing in ways that demonstrate behavioral rather than rational decision-making patterns.

The pervasive issue of antimicrobial resistance underscores the necessity for sustainable healthcare practices, a matter further complicated by financial considerations (Wang *et al.*, 2013). Clinicians often use initial cost information or familiar pricing as anchors for evaluating the relative cost-effectiveness of alternative treatments, leading to systematic biases in pharmaceutical selection.

The relationship between pharmaceutical pricing and prescribing practices represents a critical issue in contemporary healthcare, influencing both provider behaviour and patient outcomes (Dash *et al.*, 2019). As healthcare providers navigate the complexities of insurance mechanisms particularly the influence of public insurance on expenditure patterns they find themselves in situations where financial factors may inadvertently influence therapeutic decisions (Miao-Sheng and Yu-Ti, 2008).

The concept of "financial toxicity" has emerged as a framework for understanding the multidimensional impacts of high medication costs on patient wellbeing. Research demonstrates that financial distress associated with medication costs can produce psychological, social and physical consequences that extend beyond simple economic burden (Batko and Ślęzak, 2022). This creates temporal discounting effects where immediate financial concerns override long-term health considerations in decision-making.

The intersection of socioeconomic status and ethical prescribing represents a multifaceted issue reflecting broader societal disparities in healthcare access (Allan, Lexchin and Wiebe, 2007). Clinicians navigating this landscape must confront the reality that patients with lower socioeconomic status often face substantial barriers to necessary medications, potentially compromising treatment efficacy (Batko and Ślęzak, 2022). These socioeconomic disparities create present bias where immediate financial constraints take precedence over long-term health optimization.

2.4 Brand Equity Theory

Brand Equity Theory focuses on brand awareness, brand associations, perceived quality, brand loyalty and other proprietary brand assets that influence prescribing decisions.

The cognitive mechanisms underlying brand preference in prescription behaviour merit detailed examination. Studies demonstrate that brand recognition operates through both explicit and implicit memory pathways, with established pharmaceutical brands benefiting from enhanced cognitive accessibility during prescribing decisions (Shamim-ul-Haq *et al.*, 2014). The phenomenon of "cognitive availability" explains how extensively marketed pharmaceutical brands become mentally accessible reference points during prescribing moments, increasing the probability of selection independent of objective clinical criteria.

Quantitative analyses reveal that exposure to pharmaceutical branding creates persistent memory associations that influence subsequent prescribing decisions, with functional magnetic resonance imaging (fMRI) studies demonstrating enhanced activation in reward-processing brain regions when physicians encounter familiar pharmaceutical brands (Rizwan R. Ahmed *et al.*, 2020). This neurological response pattern demonstrates how branding transcends rational clinical decision-making, creating emotional and subconscious influences on prescription

behaviour that favour established pharmaceutical products over generic alternatives, despite bioequivalence demonstrations (Mehralian *et al.*, 2017).

Marketing expenditures frequently exceeding research and development investments illustrate how pharmaceutical companies leverage brand awareness to cultivate physician loyalty (Rizwan R. Ahmed *et al.*, 2020). The pharmaceutical industry's substantial investment in marketing reportedly exceeding $57 billion by U.S. pharmaceutical companies in 2004 demonstrates the scale of efforts to establish brand loyalty among medical providers (Gebresillassie *et al.*, 2018).

Marketing approaches such as detailing (face-to-face promotion) and sample distribution can distort perceptions of drug efficacy, contributing to preferences for branded medications over bioequivalent generics (Kariuki, 2020). (Gönül *et al.*, 2001) observed that promotional activities significantly influence physicians' choice behaviour, while (Shamim-ul-Haq *et al.*, 2014) found that detailing practices frequently result in increased prescriptions for specific drugs.

The effectiveness of these marketing strategies is well-documented. The temporal relationship between promotional campaigns and subsequent prescribing behaviour further substantiates the efficacy of branding strategies in modifying clinical decision-making, with peak prescribing frequencies often observed 30-60 days following intensive promotional periods (Mehralian *et al.*, 2017).

Quality perception represents a critical factor in medication selection. (Mehralian *et al*., 2016) identified that reputable medicines and strong corporate images are essential in enhancing physician loyalty, often outweighing the benefits of more economical generic alternatives. This quality perception manifests in prescribing decisions that favour branded medications despite comparable efficacy in generics, demonstrating how entrenched such beliefs become in clinical practice.

Experimental research utilizing decision simulation models demonstrates that physicians exposed to repeated brand messaging exhibit measurable alterations in prescribing thresholds, requiring lower levels of clinical justification to prescribe heavily marketed medications compared to their generic counterparts (Gupta, Malhotra and Malhotra, 2018). This cognitive bias manifests through heuristic decision-making patterns that systematically favour recognized brands - a phenomenon described as the "familiarity heuristic" in prescribing literature.

Econometric analyses reveal that pharmaceutical branding exhibits pronounced market power through several distinct mechanisms. First, differential pricing elasticities between branded and generic medications highlight the market distortion effects of successful branding campaigns, with branded products demonstrating significantly lower price elasticity of demand (typically -0.2 to -0.6) compared to generic alternatives (-0.7 to -1.2) (Datta and Dave, 2017).

Second, entry deterrence effects manifest through brand loyalty programs that establish barriers against generic substitution, effectively perpetuating market share advantages despite patent expiration (Mehralian *et al.*, 2017). Third, market segmentation strategies that target high-prescribing physicians with intensified promotional activities create disproportionate brand influence within key prescriber demographics (Morse, Hanna and Mehra, 2019).

Longitudinal studies indicate that marketing expenditures demonstrate a positive elasticity coefficient of 0.06-0.12 on brand-specific prescription volumes, confirming the causal relationship between marketing activities and prescribing patterns (Datta and Dave, 2017). A study by (Gupta, Nayak and Vidyarthi, 2015) found a modest elasticity of 0.06 in new prescriptions attributable to detailing, effectively increasing branded drug demand while suppressing generic market share.

2.5 Diffusion of Innovations Theory

The Diffusion of Innovations theory provides a framework for understanding how pharmaceutical innovations and information spread through the healthcare professional network, examining the characteristics of innovations, communication channels, social systems and time factors.

As pharmacological products increase in complexity, representatives maintain their crucial position as connectors between manufacturers and clinicians, providing expedient updates regarding medication mechanisms, safety considerations and therapeutic applications. The professional preparation and specialized knowledge of pharmaceutical representatives constitute fundamental elements underpinning the effectiveness of interpersonal information transfer in the pharmaceutical sector. Well-trained representatives not only communicate essential medication information but also establish trust-based relationships with healthcare providers, significantly influencing clinical decision-making processes. These professionals typically undergo extensive education in pharmacology and regulatory compliance, enabling them to address physicians' requirements for reliable, current information (Sawad and Andrews, 2022).

Their capacity to customize discussions according to the specific challenges encountered by physicians, particularly in resource-constrained environments, enhances the impact of their communication strategies (Lotfi *et al.*, 2016). Moreover, ongoing educational initiatives are essential for representatives to remain current with evolving medical standards and ethical marketing practices, ensuring they maintain credibility while disseminating information (Yamada *et al.*, 2012). Ultimately, a comprehensive training framework promotes not only the representatives' professional competence but also contributes to improved patient outcomes through informed prescribing practices (Magalhães *et al.*, 2018).

A comparative examination of different pharmaceutical information dissemination methodologies reveals distinctive advantages of interpersonal interactions in pharmaceutical marketing. While digital platforms offer extensive information distribution capabilities, the nuanced communication facilitated by medical representatives generates superior engagement, fostering trust and immediacy in conveying essential medication updates. According to (Lotfi *et al.*, 2016), medical residents continue to gravitate toward traditional information sources for pharmacological data and adverse reaction profiles, indicating a persistent preference for direct insight.

Moreover, (Gandhi and Jadhav, 2017) emphasize that reliance on promotional materials from representatives plays a crucial role in shaping physicians' prescribing behaviours. Unlike static information formats, interpersonal information exchange enables dynamic discussions, allowing healthcare professionals to clarify uncertainties and receive customized information,

elements frequently absent in alternative formats. Consequently, as indicated by (De Ferrari *et al.*, 2014), ethical considerations emerge when marketing influences prescribing decisions, necessitating responsible information dissemination practices that prioritize patient welfare and informed decision-making, thereby establishing personal engagement as an essential strategy for effective pharmaceutical knowledge transfer (Ryvak and Denysiuk, 2019).

Research indicates significant variations in healthcare professionals' preferences regarding information sources. A study by (Gandhi and Jadhav, 2017) found that 52% of medical residents favoured traditional non-electronic resources such as textbooks for pharmacological information, while only 36% utilized electronic databases. This preference pattern suggests that despite technological proliferation, many practitioners maintain attachment to conventional information sources that offer perceived reliability and comprehensive coverage.

Digital platforms offer advantages in information volume and accessibility but frequently lack the nuanced context and interactive clarification possible through interpersonal communication. Healthcare providers report challenges in evaluating the credibility and relevance of digital information without expert mediation, particularly regarding complex pharmacological data (Al-Hamdi, Hassali and Ibrahim, 2012). This challenge is compounded by time constraints in clinical practice, which may limit practitioners' capacity for comprehensive independent research and critical evaluation of digital information sources.

According to research, consistent interactions significantly enhance the retention of medication-related information, as demonstrated by the preference for non-electronic sources like textbooks, which emphasize the importance of repeated exposure (Mali, Dudhgaonkar and Bachewar, 2010). Furthermore, follow-up engagements enable personalized learning experiences, accommodating physicians' varying comprehension levels and facilitating more profound discussions regarding prescribing practices (Kamal *et al.*, 2015).

By establishing ongoing dialogue, representatives reinforce the material's relevance and applicability within clinical contexts, ultimately leading to improved prescribing behaviours and patient outcomes. This iterative process establishes follow-up visits as integral components of pharmaceutical marketing strategies focused on compliance with ethical standards and maximizing informational value (Murshid, 2023).

The effectiveness of different pharmaceutical information dissemination methods represents a critical consideration in enhancing medical professionals' awareness of current medication-related information (Gandhi and Jadhav, 2017). The concrete and immediate nature of interpersonal discussions fosters trust and clarity, essential elements in mitigating the frequently complex and overwhelming characteristics of pharmaceutical data. Furthermore, direct engagement enables customized communication that addresses the specific requirements of healthcare professionals, counteracting misinformation challenges prevalent in alternative platforms (Al-Hamdi, Hassali and Ibrahim, 2012).

2.6 Evidence Based Medicine Theory

Evidence-Based Medicine Theory represents the gold standard for clinical decision-making, emphasizing treatment decisions based on the best available clinical evidence combined with clinical expertise and patient values. Traditional models of prescribing behaviour focused predominantly on clinical factors such as diagnosis, symptom presentation and drug properties. However, this traditional approach faces significant challenges when patient experience factors exert substantial influence on prescription decisions.

Emerging research demonstrates that non-clinical factors, particularly those related to patient experiences and expectations, exert substantial influence on prescription decisions (Theodorou *et al.*, 2009). This finding represents a significant challenge to pure evidence-based practice, as it suggests that clinical decisions are influenced by factors beyond scientific evidence and clinical judgment.

Understanding the factors that influence physician prescribing behaviour has become increasingly important amid growing concerns about irrational prescribing a health issue with potential to harm individuals and society, particularly in developing countries (Adorka *et al.*, 2013). This concern directly relates to evidence-based medicine principles, as irrational prescribing represents a deviation from evidence-based practice with potentially serious consequences.

Medication prescription represents one of the most common healthcare interventions globally, with significant implications for patient outcomes, healthcare costs and public health. The global scope and impact of prescribing decisions emphasize the importance of maintaining evidence-based approaches to ensure optimal outcomes across diverse populations and healthcare systems.

Evidence-based medicine faces significant challenges when patient preferences conflict with clinical evidence. This creates implicit pressure for physicians to accommodate patient preferences, potentially influencing prescription decisions in ways that may diverge from strictly clinical considerations (Thistlethwaite, Ajjawi and Aslani, 2010). This pressure represents a fundamental tension between evidence-based practice and patient-centered care.

Both mechanisms create social and psychological dynamics that influence clinical decision-making beyond purely medical considerations (Adorka *et al.*, 2013). These dynamics challenge the evidence-based medicine framework by introducing non-clinical factors that can override or modify evidence-based treatment recommendations.

The influence of patient experience on prescribing behaviour operates through complex social and psychological mechanisms beyond purely clinical considerations. Physicians navigate tensions between patient satisfaction, therapeutic relationships, clinical guidelines and evidence-based practice when responding to patient requests and expectations (Arney, Street and Naik, 2014). These competing priorities create decision-making environments where non-clinical factors significantly impact treatment selections.

A critical challenge for evidence-based medicine lies in the subjective nature of clinical decision-making. From the clinical perspective, patient expectation is conceptualized as the physician's perception of a patient's treatment needs during medical consultations (Lado *et al.*, 2008). Critically, research reveals that the impact on prescribing stems not directly from

patients' actual expectations but from physicians' perception of these expectations (Cockburn and Pit, 1997).

This distinction highlights the subjective interpretive process underlying clinical decision-making, which can significantly deviate from objective evidence-based approaches. The subjective nature of physician perceptions introduces variability and potential bias into clinical decision-making that may compromise evidence-based practice principles.

The magnitude of non-clinical influences on prescribing decisions presents substantial challenges for evidence-based medicine. The magnitude of influence exerted by perceived patient expectations appears substantial and represents one of the most significant documented deviations from pure evidence-based practice. (Cockburn and Pit, 1997) found that patients who expected prescriptions were three times more likely to receive them, but patients whose physicians perceived an expectation for medication were ten times more likely to receive prescriptions.

This tenfold increase in prescribing probability based on perceived expectations represents one of the strongest documented influences on prescribing behaviour (Meeker *et al.*, 2016). The magnitude of this effect (10x increase) demonstrates how physician perceptions can dramatically override evidence-based decision-making processes, representing a significant challenge to maintaining evidence-based practice standards.

(Britten and Ukoumunne, 1997) further demonstrated this pattern, finding that physicians observed prescription expectations in 56% of patients and subsequently prescribed medications to 59% of patients during consultations. These high percentages (56% and 59%) indicate that patient expectation perception and subsequent prescribing represent common occurrences in clinical practice, suggesting systematic deviation from pure evidence-based decision-making.

Evidence-based medicine principles should produce consistent outcomes across different healthcare systems when similar clinical evidence is available. However, research reveals significant variations in how patient influence affects prescribing across different contexts. This pattern extends across different healthcare systems, with (Cockburn and Pit, 1997) demonstrating in Australia that physicians' perception of patient expectations strongly drives prescription decisions.

Multiple studies have confirmed the strength of influence that patient expectations exert on prescribing decisions, representing a global challenge to evidence-based practice. (Britten and Ukoumunne, 1997), (Little *et al.*, 2004) and (Webb and Lloyd, 1994) all found that physicians' perceptions of patient expectations strongly determine prescribing patterns. The consistency of these findings across different research groups and contexts suggests that deviation from pure evidence-based decision-making represents a systematic rather than isolated phenomenon.

(Hummers-Pradier *et al.*, 1999) and (Kotwani *et al.*, 2010) reported that physicians considered patient expectations crucial factors in medication selection, particularly for respiratory infections. This acknowledgment of non-clinical factors as "crucial" in medication selection represents a significant departure from evidence-based medicine principles, which should prioritize clinical evidence and scientific reasoning.

Evidence-based medicine recognizes that clinical evidence must be applied within specific contexts, but the extent of contextual modification observed in patient-influenced prescribing

may exceed appropriate bounds. Contextual moderators play crucial roles in determining how patient experience translates into prescribing decisions. Drug characteristics, cost-benefit considerations and physician practice patterns all affect the relationship between patient requests or expectations and subsequent prescriptions.

These moderating factors help explain the varying strength of patient influence observed across different studies and clinical settings (McKinlay *et al.*, 2014). However, the extent of this variation may indicate insufficient adherence to evidence-based principles, as clinical evidence should provide more consistent guidance regardless of patient preferences.

Contextual factors moderate the relationship between patient expectations and prescribing behaviours. Drug characteristics influence how physicians respond to perceived expectations, with greater willingness to accommodate expectations for medications with favourable safety profiles and established efficacy (Tušek-Bunc *et al.*, 2010). While this consideration of safety profiles represents appropriate evidence-based thinking, the accommodation of patient expectations regardless of clinical necessity may compromise evidence-based practice.

Similarly, the cost-benefit profile of medications affects physicians' receptiveness to patient expectations, particularly in healthcare systems where cost considerations significantly impact patient access (Al-Areefi and Hassali, 2013). Economic considerations represent legitimate factors in evidence-based medicine, but their interaction with patient expectations may produce prescribing patterns that deviate from optimal evidence-based choices.

Evidence-based medicine emphasizes the importance of implementing effective interventions to improve clinical outcomes. However, efforts to maintain evidence-based prescribing practices face significant challenges when patient influence factors are not adequately addressed. Numerous administrative procedures and educational interventions have been developed to regulate inappropriate prescriptions (Roque *et al.*, 2014).

However, these efforts have shown limited success in improving prescribing behaviour, possibly due to insufficient understanding of the underlying factors influencing prescription decisions. The limited success of traditional evidence-based interventions suggests that patient influence represents a more fundamental challenge to evidence-based practice than previously recognized.

Patient-related factors that affect prescribing decisions may be vital for developing effective responses to overprescribing concerns (Lucas *et al.*, 2015). This recognition suggests that evidence-based medicine frameworks may need to evolve to better account for patient influence factors while maintaining commitment to scientific evidence and clinical reasoning.

Evidence-based medicine depends on high-quality research evidence to guide clinical decisions. Studies investigating these influences have employed diverse methodologies including surveys, experimental designs, qualitative interviews and observational approaches across various healthcare settings and cultural contexts. The diversity of research methods provides comprehensive evidence about patient influence on prescribing, but it also reveals the complexity of maintaining evidence-based practice in real-world clinical settings.

The cumulative evidence reveals a significant impact of patient experience on prescribing patterns, though the magnitude and consistency of this impact vary based on contextual factors and study designs (Murshid, Mohaidin and Yen Nee, 2016). This variability in research findings

reflects the challenge of maintaining consistent evidence-based approaches when multiple non-clinical factors influence decision-making.

The relationship between patient experience and prescribing behaviour has been investigated across various healthcare settings, revealing a complex interaction between clinical judgment, patient desires and contextual factors. Several studies have analyzed how patient characteristics influence physician prescription decisions (El-Dahiyat, Kayyali and Bidgood, 2014), but with varying conclusions regarding the strength and consistency of this influence.

2.7 Information Processing Theory

The pharmaceutical marketing landscape encompasses both informational and persuasive elements, as MRs fulfil dual roles of educating healthcare providers and promoting specific medications (Al-Areefi and Hassali, 2013). The pharmaceutical industry deploys medical representatives to engage in product detailing, a process where MRs provide targeted information about specific medications to physicians. Research demonstrates that these interactions can significantly shape prescription choices through structured information delivery (Zipkin and Steinman, 2005).

Studies suggest that while physicians perceive these interactions as beneficial for acquiring knowledge, they may simultaneously foster prescribing habits that favour branded medications over generics (Fickweiler, Fickweiler and Urbach, 2017). Evidence from a Nigerian study found that 87% of private physicians had prescribed antibiotics influenced by promotional activities, although this did not consistently correlate with actual prescribing patterns (Offor, Abubakar and Joda, 2022).

The cognitive processing of detailing information exhibits systematic patterns influenced by confirmation bias, availability heuristics and framing effects (Gupta, Nayak and Vidyarthi, 2015). Physicians demonstrate greater receptivity to information aligned with existing clinical beliefs and practice patterns, potentially reinforcing therapeutic inertia (Gupta, Nayak and Vidyarthi, 2015).

Experimental studies employing cognitive task analysis methodologies reveal that information provided during detailing sessions disproportionately impacts prescribing decisions when presented during formative stages of clinical decision-making algorithms, highlighting the importance of timing in pharmaceutical marketing strategies (Krunal, Singh and Solanki, 2021).

Pharmaceutical companies strategically distribute promotional materials employing principles from cognitive psychology, including availability heuristics, cognitive priming and peripheral route persuasion (Krunal, Singh and Solanki, 2021). Materials utilizing visual mnemonics, simplified clinical algorithms and frequent brand reinforcement demonstrate enhanced recall and preference formation among physicians (Krunal, Singh and Solanki, 2021).

Longitudinal studies examining detailing frequency and prescription volume demonstrate temporal relationships between representative visits and subsequent prescribing behaviours, with elasticity coefficients ranging from 0.03 to 0.09 across different therapeutic categories (Datta and Dave, 2017).

Experimental studies examining promotional material effectiveness reveal greater impact when materials connect product attributes to existing clinical frameworks, patient-centered outcomes and simplified decision pathways, thereby reducing cognitive burden in clinical decision-making (Gupta, Nayak and Vidyarthi, 2015).

Research exploring implicit cognitive processes reveals that even physicians who explicitly reject marketing influence demonstrate measurable implicit biases following exposure to pharmaceutical promotion (Sohrabi *et al.*, 2021). Studies utilizing implicit association testing methodologies show unconscious brand preferences developing through repeated low-involvement exposure to promotional materials, even among practitioners who actively discount explicit marketing messages (Sohrabi *et al.*, 2021).

This unconscious preference formation operates through associative learning processes and heuristic development, creating decision shortcuts that physicians may employ without conscious awareness of marketing influence (Krunal, Singh and Solanki, 2021a).

Historical perspectives on pharmaceutical marketing reveal an evolving relationship between industry and healthcare practitioners. Early interactions were characterized by minimal regulation and significant information asymmetry, with physicians heavily reliant on industry sources for new drug information (McGettigan *et al.*, 2001).

Research indicates that physicians often utilize drug samples as learning aids, viewing them as valuable resources for making informed prescription choices despite recognizing ethical concerns (Sawad and Andrews, 2022). This finding illuminates the paradoxical nature of product detailing while it potentially enhances knowledge acquisition, it simultaneously introduces potential biases into clinical decision-making processes (Zipkin and Steinman, 2005).

Consequently, product detailing functions as both an educational channel and a possible source of bias in physicians' choices, necessitating careful consideration of its implications for healthcare delivery (Zipkin and Steinman, 2005). Significant variations exist between developing and developed nations regarding the influence of medical representatives on prescribing patterns (Zipkin and Steinman, 2005). In countries like Nigeria and Bangladesh, pharmaceutical promotions exert substantial influence on physician prescribing behaviours, with strong reliance on representatives for information and aggressive marketing approaches (Zipkin and Steinman, 2005). Research indicates widespread physician perception of promotional materials as beneficial educational resources (Offor, Abubakar and Joda, 2022).

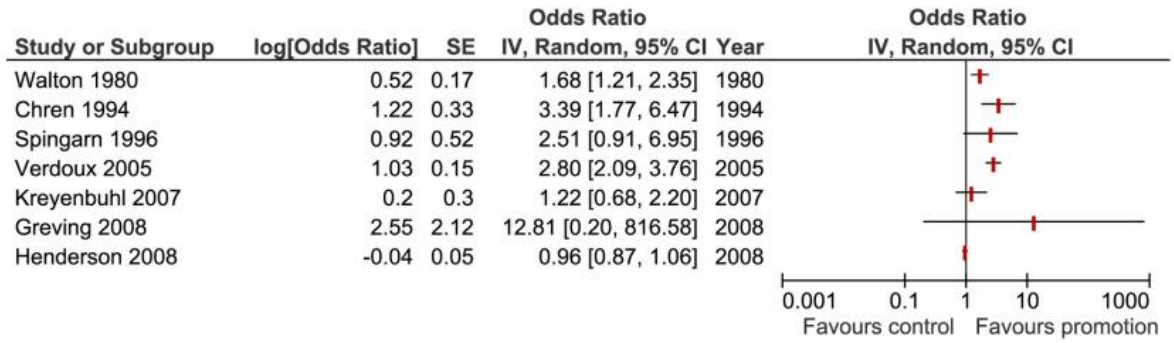


Figure 2
Forest Plot Displaying the effect of promotional information on physicians prescribing of Promoted Medication (Spurling et al., 2010)

The forest plot analysis (Figure 2) provides quantitative evidence supporting these theoretical frameworks (Spurling *et al.*, 2010). A forest plot is a graphical summary of individual studies included in a meta-analysis (Spurling *et al.*, 2010). Each study's effect (e.g., an odds ratio showing how much more likely a physician is to prescribe a drug when exposed to a representative) is depicted along with its 95% confidence interval (Spurling *et al.*, 2010). Each square on the plot represents one study, with the size of the square proportional to the weight the study contributes to the overall analysis (larger squares indicate studies with more precise estimates, usually due to larger sample sizes). The line extending from each square shows the 95% confidence interval for that study's effect size. If this line does not cross the vertical line (which represents "no effect"), the study's finding is considered statistically significant. This line usually represents an odds ratio of 1 (or a difference of 0, depending on the measure used). Studies with confidence intervals that lie entirely to one side of this line suggest that exposure to pharmaceutical promotion (including visits by medical representatives) is either associated with increased or decreased prescribing. In this context, most studies show a shift to the right (OR > 1), indicating an association with higher prescribing rates (Spurling *et al.*, 2010).

At the bottom of the plot, a diamond represents the overall or pooled effect estimate from combining the results of all the studies (Spurling *et al*., 2010). The center of the diamond shows the combined effect size and its width shows the overall 95% confidence interval. If this diamond does not cross the vertical null line, the overall effect is statistically significant (Spurling *et al*., 2010). A statistic (often labelled I^2) may be shown to indicate how much the study results vary from one another. A high I^2 means that there is substantial variability, which might be due to differences in study populations, settings, or methods of measuring exposure and prescribing behaviour (Spurling *et al*., 2010).

The majority of individual studies show a point estimate (square) with a confidence interval that lies to the right of the no-effect line, indicating that physicians who are exposed to promotional activities, such as visits from medical representatives, tend to have higher odds of prescribing the promoted medications (Spurling *et al*., 2010). The diamond at the bottom (the pooled estimate) summarizes the overall finding, confirming that, on average, these interactions are statistically associated with an increase in prescribing behaviour (Spurling *et*

al., 2010). The fact that many of the confidence intervals do not cross the null line provides strong statistical evidence that the effect is not due to chance (Spurling *et al*., 2010).

The forest plot visually supports the argument that there is a reliable link between exposure to pharmaceutical representatives and changes in how often doctors prescribe certain medications, with more frequent or intense interactions with medical representatives associated with increased prescription rates (Spurling *et al*., 2010). While some studies might show a larger effect and others a smaller one, the overall pooled effect (along with heterogeneity measures) tells us that, despite differences in study design and settings, the general trend remains consistent: More frequent or intense interactions with medical representatives are associated with increased prescription rates (Spurling *et al*., 2010). The forest plot is a powerful visual tool that aggregates data from multiple studies, showing that, overall, when physicians are exposed to pharmaceutical promotional activities especially interactions with medical representatives their prescribing behaviour tends to shift toward higher prescription rates, often with increased costs or sometimes with lower prescribing quality (Spurling *et al*., 2010). Each element, from the size of the squares to the pooled diamond, helps us understand both the strength and consistency of this association across the literature (Spurling *et al*., 2010).

The pervasive impact of pharmaceutical marketing on prescription patterns underscores the necessity for robust governance frameworks regulating interactions between medical representatives and physicians (Alowi and Kani, 2019). These frameworks aim to minimize inappropriate practices and enhance decision-making quality (Alowi and Kani, 2019). Research by (Jaruseviciene *et al.*, 2013) emphasizes the importance of leadership promoting responsible antibiotic stewardship to counteract the effects of over-the-counter antibiotic availability and aggressive marketing strategies.

Similarly, (Alowi and Kani, 2019) demonstrate that marketing tactics, particularly from sales representatives, significantly influence physician prescribing, necessitating clearer guidelines regarding acceptable marketing practices. The normalization of physician-industry interactions ultimately creates conditions where marketing objectives may supersede ethical obligations to patients, calling for stringent regulatory measures to protect clinical independence (Sawad and Andrews, 2022). Developing ethical self-regulation and comprehensive training programs for pharmaceutical sales representatives can reduce unethical practices such as bribery, fostering trust between physicians and the industry (Sawad and Andrews, 2022).

2.8 Persuation Theory

Relationship-building strategies employed by medical representatives follow systematic patterns designed to establish trust and reciprocity (Alkhateeb *et al.*, 2011). Qualitative research utilizing structured interviews and observational methodologies has documented progression through distinct relationship phases: initial credibility establishment, value demonstration, trust development and relationship maintenance (Alkhateeb *et al*., 2011).

Representatives strategically employ self-disclosure, professional identity alignment and targeted problem-solving to develop rapport and establish perceived value beyond mere product information (Abdul, Jaleel and Laeequddin, 2011). Longitudinal analysis indicates that established relationships demonstrate greater resilience to competitive marketing and

heightened receptivity to new product information from familiar representatives (Abdul, Jaleel and Laeequddin, 2011).

Product detailing employs sophisticated communication techniques designed to maximize information retention and preference formation. These techniques include repetitive messaging, strategic framing of clinical data and emphasis on key product differentiators (Datta and Dave, 2017). Research utilizing structured observational methodologies has documented specific detailing strategies, including selective presentation of clinical evidence, strategic comparative framing and emotional appeals based on patient narratives (Datta and Dave, 2017).

The application of behavioural economics principles provides further insight into physician decision-making processes when interacting with pharmaceutical marketing (Venkataraman and Stremersch, 2007). Prospect theory suggests that physicians demonstrate risk aversion when considering potential therapeutic failures, creating opportunities for pharmaceutical messaging that emphasizes risk mitigation (Venkataraman and Stremersch, 2007).

Experimental studies using clinical vignettes demonstrate that framing identical clinical information as potential losses versus gains significantly impacts therapeutic choices, with risk-averse behaviours more prominent when outcomes are framed as potential losses rather than equivalent gains (Shimura, 2018).

Research demonstrates that accepting promotional gifts and incentives from pharmaceutical companies can create implicit reciprocity expectations for physicians to respond by prescribing specific medications (Offor, Abubakar and Joda, 2022). Many physicians, while cognizant of ethical implications, justify engagement with these marketing tactics, perceiving them as enhancing their medical practice (Barbaroux, Pourrat and Bouchez, 2022).

The distribution and utilization of drug samples represents a particularly effective marketing strategy with multidimensional impacts on prescribing behaviours. Systematic reviews indicate that sample availability influences medication selection in up to 70% of prescribing decisions when samples are readily accessible (Salmasi, Ming and Khan, 2016). Physicians frequently initiate therapy with available samples, subsequently continuing patients on the sampled medication due to convenience, perceived patient preference and therapeutic inertia (Salmasi, Ming and Khan, 2016).

Research employing quasi-experimental designs comparing prescribing patterns before and after sample availability demonstrates statistically significant shifts toward branded products, with effect sizes ranging from 8-42% depending on therapeutic category and healthcare setting (Fickweiler, Fickweiler and Urbach, 2017).

Many physicians experience cognitive dissonance when attempting to reconcile their ethical principles with the influence of MRs, often justifying their interactions despite acknowledging biases toward pharmaceutical advertising (Krunal, Singh and Solanki, 2021a). This dissonance leads physicians to rationalize accepting gifts or attending sponsored events while maintaining beliefs that such actions do not compromise their ability to make unbiased clinical decisions (Shimura, 2018).

Ethical considerations in these relationships have gained increasing attention, as many physicians navigate the challenge of extracting valuable insights from sales representatives while recognizing the risk of inappropriately influencing patient care (Sohrabi *et al.*, 2021).

2.9 Rational Choice Theory

The Rational Choice Theory framework provides a comprehensive lens through which to understand how healthcare providers make systematic cost-benefit calculations when prescribing medications. In contemporary healthcare, the economic dimensions of medication significantly influence clinical decision-making processes. Financial constraints associated with pharmaceutical options create a complex environment where healthcare providers must navigate between optimal clinical efficacy and economic feasibility (Chandelkar and Rataboli, 2014). The increasing financial burden of pharmaceuticals has transformed the prescribing landscape, creating scenarios where clinicians must consider not only therapeutic efficacy and safety profiles but also affordability considerations (García-Pérez *et al*., 2013).

The significance of this economic reality has intensified in recent years as pharmaceutical expenditures continue to represent an increasing proportion of overall healthcare costs globally. The complex interplay between manufacturer pricing strategies, regulatory frameworks, insurance coverage models and clinical decision-making has created a healthcare ecosystem where economic considerations frequently exert substantial influence on therapeutic choices (Batko and Ślęzak, 2022). Understanding this relationship requires examination of multiple stakeholder perspectives and consideration of both macro-economic factors and micro-level clinical decision-making processes.

The complex economics of pharmaceutical pricing significantly influences prescribing behaviours, often compelling healthcare providers to navigate between clinical recommendations and financial constraints. Research indicates that clinicians frequently operate within a complicated framework where medication costs may influence prescribing decisions more substantially than clinical guidelines or individualized patient requirements (Chandelkar and Rataboli, 2014). With escalating prices, particularly for novel and specialized therapies, physicians struggle to balance therapeutic efficacy against financial implications for both patients and healthcare systems (García-Pérez *et al*., 2013).

This systematic response to economic pressures demonstrates how rational actors in healthcare settings make calculated decisions based on available financial information. The economic burden of pharmaceuticals varies substantially across therapeutic categories, with particularly pronounced implications for chronic disease management and specialty medications. Research demonstrates that clinicians prescribing for conditions requiring long-term pharmacotherapy demonstrate heightened price sensitivity compared to those managing acute conditions (Wang *et al.*, 2013). This differential response reflects the cumulative financial impact of chronic medication regimens on both healthcare systems and individual patients, highlighting how economic considerations may disproportionately influence certain therapeutic domains.

The economic implications of pharmaceutical costs extend beyond direct patient expenditure, affecting healthcare systems' capacity to deliver quality care. Rising pharmaceutical expenses can alter both prescribing and utilization patterns, potentially leading to suboptimal patient outcomes. Research demonstrates that financial distress significantly impacts treatment

adherence, with studies revealing that a substantial proportion of insured cancer patients seek copayment assistance, with 75% indicating critical need due to high financial stress (Batko and Ślęzak, 2022).

Evidence suggests that excessive pharmaceutical expenditure can divert resources from other essential healthcare services, potentially creating opportunity costs that affect overall system performance (Moorkens *et al.*, 2017). This rational allocation of limited resources demonstrates how healthcare systems and individual providers must make strategic decisions about resource deployment in the face of escalating pharmaceutical costs.

Pharmaceutical pricing dynamics significantly influence clinical decision-making patterns, often promoting adherence to standardized prescribing protocols rather than individualized therapeutic approaches. Payment structures also play a crucial role; when third-party payers such as national insurance programs assume medication costs, clinicians demonstrate greater price sensitivity in pharmaceutical selection, influencing therapeutic choices including TNF-alpha inhibitors (Fadare *et al.*, 2020).

Formulary design represents a powerful mechanism through which insurance coverage influences prescribing patterns. Tiered formulary structures create financial incentives that significantly impact both provider and patient pharmaceutical selection decisions (Chou *et al.*, 2009). Research demonstrates that clinicians frequently modify prescribing practices in response to formulary constraints, often selecting preferred formulary options even when alternative medications might offer marginal clinical benefits (Wang *et al.*, 2013).

The relationship between insurance coverage and pharmaceutical selection is highlighted by the economic pressures faced by both patients and providers (Miao-Sheng and Yu-Ti, 2008). With increasing enrolment in high-deductible health plans, the cost-sharing components of these plans can significantly impact prescribing decisions (Zafar *et al.*, 2013). Patient decision-making is influenced not merely by direct pharmaceutical costs but also by perceptions of insurance coverage, which is significant for demand in the Medicare Advantage market, thus affecting clinical prescribing patterns.

Insurers often design marketing strategies to emphasize coverage components that appeal to specific demographics, potentially inadvertently influencing both patient expectations and physician behavior (Newman, 1957). This creates a complex web of economic incentives that rational actors must navigate when making prescribing decisions.

Geographic variations in pharmaceutical pricing create additional complexity for prescribing decisions. International price differentials for identical medications highlight market inefficiencies and regulatory disparities that may directly influence clinical decision-making in different regions (Moorkens *et al*., 2017). These variations create scenarios where identical clinical presentations may receive different pharmacological management based primarily on regional economic factors rather than clinical considerations.

The complexity of healthcare expenditure patterns indicates that prescribing frequency is significantly influenced by pharmaceutical pricing structures. This relationship is particularly evident when examining funding mechanisms and insurance coverage models (Moorkens *et al*., 2017). For instance, in Norway, price sensitivity among clinicians varies depending on whether payment responsibility rests with hospitals or the national insurance system, with higher sensitivity observed when payments are managed by hospitals.

Socioeconomic factors play a significant role in prescribing patterns; individuals with public insurance typically demonstrate higher healthcare expenditure, suggesting that financial incentives influence pharmaceutical demand, as noted by (Miao-Sheng and Yu-Ti, 2008). Educational attainment influences novel pharmaceutical utilization, indicating that more educated patients demonstrate greater likelihood of accepting newer therapies, illustrating the complex interrelationship between cost, access and prescribing patterns.

Clinical practice setting represents another variable that influences the relationship between pharmaceutical pricing and prescribing patterns. Research demonstrates significant variations in prescribing behaviours between clinicians practicing in different settings, with differential responses to economic incentives observed between fee-for-service environments and capitated systems (González López-Valcárcel *et al*., 2011). These variations highlight how structural economic factors can influence clinical decision-making processes, creating system-level effects on pharmaceutical utilization patterns.

These systematic variations demonstrate how rational actors respond predictably to different economic incentive structures, adapting their behavior based on the financial framework within which they operate.

Clinicians employ diverse strategies to facilitate patient access to necessary therapies while maintaining economic viability. To manage medication accessibility, clinicians often incorporate cost considerations into clinical evaluations, ensuring prescribed therapies remain financially viable for patients (Newman, 1957). This approach may lead physicians to explore generic alternatives or therapeutic substitutions that maintain efficacy while reducing financial burden.

Integration of clinical pharmacists into care teams enhances medication management by identifying polypharmacy issues and potential interactions, promoting safer prescribing practices (Allan, Lexchin and Wiebe, 2007). Implementation of evidence-based guidelines tailored for specific populations, such as geriatric patients or those with multiple comorbidities, represents a proactive approach to addressing access challenges posed by high medication costs.

The complex relationships between pharmaceutical corporations and drug pricing significantly influence prescribing behaviours (Twillman, Kirch and Gilson, 2014). Current litigation and settlements have catalyzed significant policy changes, imposing constraints on pharmaceutical pricing strategies that influence clinician perspectives regarding the cost and accessibility of prescribed medications (Fadare *et al.*, 2020). Prosecutorial actions have worked to transform corporate responsibilities within the pharmaceutical industry, establishing new legal standards that impact pricing and marketing regulations (Chou *et al*., 2009).

The mechanisms employed in reference pricing demonstrate that elevated pharmaceutical prices often result in cost increases rather than high prescription rates, prompting insurers to modify purchasing practices, which subsequently affects clinical pharmaceutical selection (Wood *et al.*, 2017). These market responses demonstrate rational economic behavior at the systemic level, where various stakeholders adjust their strategies based on economic pressures and opportunities.

Policy and regulatory frameworks exert critical influence on prescribing patterns in the pharmaceutical domain. Reference pricing has emerged as a mechanism to manage

pharmaceutical expenditure by establishing price benchmarks and promoting utilization of more cost-effective alternatives while addressing market inefficiencies (Rizwan R. Ahmed *et al*., 2020). State-driven litigation has begun establishing new national standards regarding pharmaceutical pricing, compelling manufacturers to enhance transparency in marketing practices and reducing the impact of promotional activities on clinical decision-making.

This litigation has transformed corporate accountability within the pharmaceutical industry, creating an environment where prescribing decisions are increasingly influenced by regulatory frameworks rather than pharmaceutical marketing (Chou *et al*., 2009). Variations in pharmaceutical characteristics, including efficacy profiles and adverse effect incidence, significantly influence clinician responses to these policies, subsequently affecting prescribing behaviours (Fadare *et al*., 2020).

Value-based pricing models represent an emerging policy approach that may significantly influence prescribing patterns. These models attempt to align pharmaceutical costs with demonstrated clinical value, potentially addressing market inefficiencies associated with traditional pricing structures (Moorkens *et al*., 2017).

The pharmaceutical pricing landscape appears poised for substantial transformation, with significant implications for prescribing behaviours (Korn *et al.*, 2003). Increasing market concentration, characterized by notable mergers, raises concerns regarding reduced competition and innovation, potentially limiting therapeutic options. The emergence of consumer-driven price indices demonstrates substantial variation in treatment costs (González López-Valcárcel *et al*., 2011).

While prices for acute conditions such as depression have demonstrated greater stability, actual treatment costs have shown considerable variation, as noted by (Moorkens *et al*., 2017). Evidence suggests that generic pharmaceuticals do not consistently reduce brand-name drug prices, as discussed by (Wang *et al*., 2013). Pharmaceutical withdrawals, exemplified by the fen-phen case, illustrate a market scenario where remaining pharmaceuticals may experience increased utilization, further influencing prescriber choices in an increasingly constrained economic environment.

The emergence of precision medicine creates additional economic dimensions that may significantly influence future prescribing patterns. Targeted therapies based on genetic profiles often command premium prices, creating scenarios where cost-benefit calculations become increasingly complex and individualized (Kim *et al.*, 2021). This trend may potentially exacerbate disparities in pharmaceutical access while simultaneously creating new ethical dilemmas for clinicians attempting to balance optimal therapeutic selection against financial constraints.

2.10 Rational Prescribing Model

The Rational Prescribing Model framework emphasizes the maintenance of clinical quality and evidence-based decision-making while navigating economic constraints. This model prioritizes therapeutic efficacy, safety and patient-centered care as primary considerations in prescribing decisions, with economic factors considered within the context of optimal clinical outcomes rather than as primary drivers.

The trajectory of pharmaceutical pricing over the past decade has transformed clinical prescribing patterns (Kim *et al*., 2021), but the Rational Prescribing Model maintains that clinical evidence and patient welfare should remain paramount in therapeutic decision-making. Research indicates that increasing pharmaceutical expenses have prompted many patients to forego necessary medications or select less expensive alternatives, directly influencing clinical treatment decisions (González López-Valcárcel *et al*., 2011).

Within this framework, the proliferation of counterfeit pharmaceuticals introduces further complications, creating additional challenges for clinicians attempting to ensure that prescribed medications are both authentic and economically viable (Fadare *et al*., 2020). The Rational Prescribing Model emphasizes the critical importance of medication authenticity and quality as non-negotiable factors in prescribing decisions, regardless of economic pressures.

Research demonstrates that financial distress significantly impacts treatment adherence, with studies revealing that a substantial proportion of insured cancer patients seek copayment assistance, with 75% indicating critical need due to high financial stress (Batko and Ślęzak, 2022). The Rational Prescribing Model addresses this challenge by emphasizing the need for clinicians to identify and address adherence barriers while maintaining therapeutic effectiveness.

(García-Pérez *et al.*, 2013) found that rising medication costs correlate with reduced adherence, particularly among patients with chronic conditions such as diabetes. Less than 50% of such patients achieve recommended glycaemic targets, largely attributed to financial constraints. The Rational Prescribing Model responds to this challenge by advocating for comprehensive adherence support strategies that address both clinical and economic barriers to optimal therapy.

The model recognizes that suboptimal adherence due to cost concerns can lead to worse clinical outcomes, increased healthcare utilization and ultimately higher overall costs. Therefore, it emphasizes the importance of considering total cost of care rather than focusing solely on pharmaceutical acquisition costs.

Integration of clinical pharmacists into care teams enhances medication management by identifying polypharmacy issues and potential interactions, promoting safer prescribing practices (Allan, Lexchin and Wiebe, 2007). The Rational Prescribing Model strongly advocates for interdisciplinary collaboration as a mechanism to optimize therapeutic outcomes while managing economic constraints.

Implementation of evidence-based guidelines tailored for specific populations, such as geriatric patients or those with multiple comorbidities, represents a proactive approach to addressing access challenges posed by high medication costs. These guidelines provide frameworks for

maintaining clinical quality while considering economic factors in therapeutic decision-making.

The model emphasizes that comprehensive medication reviews and therapeutic optimization can often identify opportunities to reduce costs while maintaining or improving clinical outcomes through elimination of unnecessary medications, identification of therapeutic duplications and optimization of dosing regimens.

Understanding the relationship between pharmaceutical pricing and patient outcomes becomes increasingly critical in contemporary healthcare. Escalating medication costs can reduce accessibility, resulting in treatment non-adherence and subsequent health deterioration (Zafar *et al.*, 2013). The Rational Prescribing Model addresses this challenge through patient-centered approaches that consider individual patient circumstances, preferences and financial capacity in therapeutic planning.

This situation is exacerbated when considering the extent to which clinical prescribing decisions are influenced by patient financial distress a critical factor in provider-patient relationships. The model advocates for open communication about treatment costs and collaborative development of treatment plans that balance clinical effectiveness with financial feasibility.

The Rational Prescribing Model emphasizes shared decision-making processes where patients are fully informed about treatment options, including their relative costs and benefits, enabling them to make informed choices that align with their values and circumstances.

Medication assistance programs represent another mechanism through which clinicians attempt to navigate pharmaceutical economic challenges while maintaining therapeutic quality. Research demonstrates that familiarity with and utilization of pharmaceutical manufacturer assistance programs, charitable foundations and government subsidies significantly influence prescribing patterns, particularly for high-cost specialty medications (Batko and Ślęzak, 2022).

The Rational Prescribing Model incorporates knowledge of these assistance programs as an essential component of comprehensive pharmaceutical care, ensuring that economic barriers do not prevent patients from accessing clinically appropriate therapies. This includes systematic approaches to identifying eligible patients, facilitating program enrollment and monitoring program effectiveness.

The relationship between pharmaceutical pricing and prescribing patterns is clearly illustrated through several case examples that demonstrate the application of Rational Prescribing Model principles. In Nigeria, research indicates that 72% of antibiotic prescriptions were administered without adherence to clinical guidelines, primarily due to cost constraints and resource limitations (Fadare *et al*., 2020).

These situations reflect broader patterns documented in literature, where medication costs influence provider adherence to treatment guidelines, as evidenced by recommendations for increased generics availability to enhance access. The Rational Prescribing Model addresses these challenges by emphasizing the importance of maintaining guideline adherence while working within economic constraints through creative therapeutic approaches and resource optimization.

The case of diabetes management provides another illustrative example of how pharmaceutical economics influence clinical decision-making and patient outcomes while demonstrating Rational Prescribing Model approaches. Research demonstrates that clinicians frequently modify insulin regimens based on cost considerations, sometimes selecting less physiologic insulin formulations primarily due to economic factors (García-Pérez *et al*., 2013).

These modifications can result in suboptimal glycaemic control and potentially increased long-term complications, highlighting the profound clinical implications of pharmaceutical pricing structures. The Rational Prescribing Model advocates for comprehensive diabetes management approaches that consider both short-term medication costs and long-term complication prevention in therapeutic planning.

The complex interplay between financial considerations and ethical responsibilities significantly impacts contemporary prescribing practices. Clinicians frequently encounter situations where optimal therapeutic options remain financially prohibitive, influencing pharmaceutical selection decisions (Fadare *et al*., 2020). The Rational Prescribing Model provides ethical frameworks for navigating these challenges while maintaining professional integrity and patient advocacy.

Research indicates that prescribers confront ethical dilemmas when attempting to prioritize patient-centered care while navigating healthcare expenditure realities and medication accessibility challenges (Kim *et al*., 2021). Professional ethical frameworks increasingly acknowledge the importance of resource stewardship alongside traditional principles of beneficence and non-maleficence. Research indicates that clinicians increasingly recognize dual obligations to individual patients and broader societal interests in sustainable healthcare resource allocation (Riise *et al*., 2016).

Emerging legal frameworks may potentially address these challenges by promoting development of affordable therapies that serve societal interests. The Rational Prescribing Model incorporates these ethical considerations into decision-making frameworks that balance individual patient needs with broader healthcare sustainability concerns.

Medication non-adherence represents a critical mechanism through which pharmaceutical pricing influences health outcomes. Research demonstrates that cost-related non-adherence follows a dose-response relationship, with higher out-of-pocket costs associated with increased rates of non-adherence across multiple therapeutic categories (García-Pérez *et al*., 2013).

This relationship has significant implications for population health management, particularly for chronic conditions where consistent pharmacotherapy is essential for optimal disease control and prevention of complications. The Rational Prescribing Model addresses adherence challenges through comprehensive approaches that include cost considerations, patient education, simplified dosing regimens and regular monitoring and support.

The relationship between medication adherence and hospital admission rates illustrates the financial challenges confronting both patients and providers in managing chronic conditions; improved adherence can reduce hospitalizations and decrease overall healthcare expenditure, highlighting the necessity for clinicians to consider both therapeutic efficacy and economic factors (Riise *et al*., 2016).

Research demonstrates that patient knowledge regarding appropriate antibiotic utilization can prompt clinicians to reconsider prescribing habits, reducing unnecessary prescriptions and associated costs that could potentially compromise health outcomes (Moorkens *et al*., 2017). The Rational Prescribing Model emphasizes the importance of evidence-based prescribing practices that are supported by robust clinical decision support systems.

The implementation of reference pricing strategies can alter price differentials among pharmaceutical options, affecting both clinical selection and patient access to necessary therapies (Chou *et al*., 2009). The model advocates for the use of comparative effectiveness research and pharmacoeconomic data to inform prescribing decisions within reference pricing frameworks.

The Rational Prescribing Model emphasizes continuous quality improvement in pharmaceutical care through systematic monitoring of prescribing patterns, patient outcomes and cost-effectiveness. This includes regular assessment of prescribing practices against evidence-based guidelines and adjustment of therapeutic approaches based on emerging evidence and patient response.

Safety considerations remain paramount within this model, with recognition that cost-cutting measures should never compromise patient safety or therapeutic effectiveness. The model advocates for systematic approaches to identifying and mitigating medication-related risks while maintaining cost-effectiveness.

The model incorporates technological solutions to support rational prescribing, including electronic health records with integrated clinical decision support, medication interaction checking and cost transparency tools. These technologies can help clinicians make informed decisions that balance clinical effectiveness with economic considerations.

The integration of pharmacoeconomic data into clinical decision support systems represents an important advancement in supporting rational prescribing practices while maintaining awareness of economic implications.

The emergence of precision medicine creates additional economic dimensions that may significantly influence future prescribing patterns. Targeted therapies based on genetic profiles often command premium prices, creating scenarios where cost-benefit calculations become increasingly complex and individualized (Kim *et al*., 2021).

This trend may potentially exacerbate disparities in pharmaceutical access while simultaneously creating new ethical dilemmas for clinicians attempting to balance optimal therapeutic selection against financial constraints. The Rational Prescribing Model must evolve to incorporate precision medicine approaches while maintaining accessibility and equity in therapeutic access.

Healthcare providers face intensifying challenges as they navigate evolutionary changes in pharmaceutical economics (Allan, Lexchin and Wiebe, 2007). The emergence of biosimilars represents a significant development in mitigating some of these pressures, but as highlighted in various European policy frameworks, biosimilar adoption varies considerably and often depends on local healthcare systems and economic incentives (Moorkens *et al*., 2017).

The Rational Prescribing Model emphasizes the importance of system-level approaches to pharmaceutical management that consider population health outcomes and resource

optimization across healthcare systems. This includes coordinated approaches to formulary management, therapeutic guideline development and quality measurement.

Value-based pricing models represent an emerging policy approach that may significantly influence prescribing patterns. These models attempt to align pharmaceutical costs with demonstrated clinical value, potentially addressing market inefficiencies associated with traditional pricing structures (Moorkens *et al*., 2017).

The pharmaceutical pricing landscape appears poised for substantial transformation, with significant implications for prescribing behaviours (Korn *et al*., 2003). The Rational Prescribing Model advocates for evidence-based policy development that supports both clinical effectiveness and economic sustainability in pharmaceutical care.

2.11 Shared Decision Making Theory

The Shared Decision Making Theory framework emphasizes collaborative treatment decisions between patients and physicians, representing a fundamental shift from paternalistic medical models toward partnership-based care. Patient experience in healthcare encompasses multiple dimensions, from communication quality to participation in decision-making. Within the context of medication prescribing, two primary components of patient experience emerge as particularly influential: explicit requests for specific medications and expectations regarding prescription outcomes (Lucas *et al*., 2015).

These components represent distinct but ways in which patients' preferences and perceptions shape clinical encounters and subsequent prescribing decisions (Venkataraman and Stremersch, 2007). This interconnection reflects the collaborative nature of shared decision-making, where patient input becomes integrated into clinical reasoning processes.

Shared Decision Making requires active patient participation in treatment choices. Patients may articulate preferences for specific medications through direct verbal requests (Kravitz *et al.*, 2005) or by describing symptoms suggestive of particular treatments. These requests play a significant role in prescription decision-making (Stremersch, Landsman and Venkataraman, 2013) and generally exert a positive influence on physicians' likelihood of prescribing the requested brand.

The mechanism through which patient experience influences prescribing behaviour operates at both explicit and implicit levels within the shared decision-making process. Explicitly, patients may directly request specific medications, providing physicians with clear indications of their preferences (Adorka *et al.*, 2013). This explicit communication represents the ideal form of shared decision-making, where patient preferences are clearly articulated and can be directly integrated into treatment planning.

Empirical evidence supporting the influence of patient requests on prescribing behaviour is substantial and demonstrates the effectiveness of explicit patient participation. In a comprehensive analysis, (Stremersch, Landsman and Venkataraman, 2013) found that patient drug requests strongly and positively influence prescription decisions in the United States. This strong positive influence validates the shared decision-making principle that patient input should meaningfully impact treatment decisions.

The success of Shared Decision Making depends heavily on effective communication between patients and physicians. Implicitly, physicians interpret patients' unstated expectations based on verbal and non-verbal cues, previous interactions and contextual factors. Both mechanisms create social and psychological dynamics that influence clinical decision-making beyond purely medical considerations (Adorka *et al*., 2013).

The mechanisms through which expectations influence prescribing involve both explicit and implicit communication patterns characteristic of shared decision-making processes. Patients may indirectly signal expectations through symptom descriptions, questions about treatment options, or non-verbal cues. Physicians interpret these signals based on prior experiences, professional training and contextual factors, often overestimating patients' desire for medications (McKinlay *et al.*, 2014). This perceptual gap creates opportunities for misalignment between patient needs and treatment decisions, highlighting the importance of clear communication in shared decision-making.

Shared Decision Making requires informed patient participation, which depends on patient access to healthcare information. The diverse sources of patient medication knowledge demonstrate the information-gathering aspect of shared decision-making. These diverse influences shape patient expectations and communicate preferences that ultimately impact clinical decision-making. Additionally, cultural norms, media messages and social influences contribute to patients' expectations regarding appropriate treatment approaches.

Patient empowerment through information access creates more informed participants in shared decision-making processes, though it also creates challenges when patient information sources may not align with clinical evidence or when patients arrive with predetermined treatment preferences based on incomplete information.

Beyond explicit requests, patient expectations regarding treatment outcomes and prescription practices significantly influence physician prescribing behaviour within the shared decision-making framework. Prescription decisions frequently occur without specific patient requests, as physicians regularly prescribe medications based on their perception of patient expectations to maintain therapeutic rapport (Thistlethwaite, Ajjawi and Aslani, 2010).

This pattern demonstrates how shared decision-making operates even when patients do not explicitly voice treatment preferences. Physicians attempt to incorporate perceived patient preferences into treatment decisions, representing an implicit form of shared decision-making that may or may not accurately reflect actual patient desires.

The clinical environment significantly impacts the quality and effectiveness of shared decision-making processes. The clinical environment and time constraints further moderate how patient expectations translate into prescribing decisions. In high-volume, time-limited settings, physicians may be more susceptible to perceived expectations as a mechanism for efficiently concluding consultations (Cutts and Tett, 2003).

Conversely, practice settings that emphasize shared decision-making and patient education may foster different approaches to addressing patient expectations beyond medication prescribing. This contrast highlights how organizational factors can either support or constrain effective shared decision-making, with implications for how patient preferences are incorporated into treatment decisions.

The most compelling evidence for the effectiveness of shared decision-making (SDM) stems from rigorous experimental research that highlights how patient communication directly influences treatment outcomes. Empirical studies consistently demonstrate a strong relationship between patient experience factors and physician prescribing behaviour. One particularly influential study that exemplifies this phenomenon is the randomized controlled trial conducted by (Kravitz *et al.*, 2005), which offers powerful statistical support through a carefully controlled experimental design.

In their study, Kravitz and colleagues employed a methodology involving standardized patients—trained actors who presented identical clinical symptoms across all experimental conditions. The only variable that differed was the nature of the patients' medication request: no request, a general request for medication, or a brand-specific request. This methodological approach is considered a gold standard for evaluating SDM because it isolates the effect of patient communication on physician decision-making while controlling for clinical presentation.

		No. (%) [95% Confidence Interval]			
	No. of Encounters	Referred for Mental Health Consultation	*P* Value	Advised to Return for Primary Care Follow-up Within 2 wk	*P* Value
Major depressive disorder					
Brand-specific request	51	23 (45.1) [31.1-59.7]	<.001	12 (23.5) [12.8-37.5]	.68
General request	50	27 (54.0) [39.3-68.2]		9 (18.0) [8.6-31.4]	
No request	48	9 (18.8) [8.9-32.6]		12 (25.0) [13.6-39.6]	
Adjustment disorder					
Brand-specific request	49	17 (34.7) [21.7-49.6]	.88	6 (12.2) [4.6-24.8]	.77
General request	49	16 (32.7) [19.9-47.5]		7 (14.3) [5.9-27.2]	
No request	51	15 (29.4) [17.5-43.8]		9 (17.7) [8.4-30.9]	

Table 2
Patient request leading to prescription changes (Kravitz et al., 2005)

The quantitative results from the study, specifically those presented in Table 2 of Kravitz *et al.* (2005), underscore the significant influence of patient requests on prescribing patterns. Among patients exhibiting symptoms of adjustment disorder, physicians prescribed antidepressants to only 10% when there was no specific request. This rate increased to 39% when patients made a general request for medication and jumped to 53% when they requested a specific brand (Paxil). A similar trend was observed for patients presenting with major depression: prescriptions were given to 31% of those in the no-request group, 56% in the general request group and 76% in the brand-specific request group.

These variations clearly illustrate the impact of patient engagement on treatment decisions. The progressive increase in prescribing rates—from no request to general request to brand-specific request—demonstrates the power of active patient participation. This pattern confirms that higher levels of patient involvement in SDM can lead to more favourable treatment outcomes. It also supports the notion that physician decisions are shaped not just by clinical factors, but also by patient-driven communication and preferences.

A major strength of this study lies in its experimental design, which allows for the isolation of a causal relationship between patient behaviour and physician prescribing decisions. Despite identical clinical symptoms, physicians altered their treatment recommendations based on how patients communicated their needs, reinforcing the idea that patient experience plays a crucial

role in clinical outcomes. This provides compelling validation for the SDM model, affirming that patients' input should meaningfully influence medical decisions.

The implications for clinical practice are profound. This research contributes to a more nuanced understanding of decision-making in healthcare, suggesting that it is not a strictly biomedical process but rather a complex interaction shaped by social and behavioural factors. The findings of (Kravitz *et al.*, 2005) make a strong case for integrating SDM more fully into routine medical care. When patients are encouraged and empowered to participate—whether through general inquiries or specific treatment requests—they are more likely to receive their preferred treatments, thereby enhancing satisfaction and potentially improving health outcomes.

The quality of shared decision-making depends heavily on the therapeutic relationship between patients and physicians. Physician survey data confirms this pattern, with respondents identifying patient expectations as a primary motivation for prescribing decisions, particularly for antibiotics (Faber *et al.*, 2010). This acknowledgment of patient expectations as a legitimate factor in prescribing decisions reflects the shared decision-making principle that patient preferences should be incorporated into treatment planning.

Multiple studies have confirmed the strength of influence that patient expectations exert on prescribing decisions within collaborative care frameworks. (Britten and Ukoumunne, 1997), (Little *et al.*, 2004) and (Webb and Lloyd, 1994) all found that physicians' perceptions of patient expectations strongly determine prescribing patterns. This pattern demonstrates how effective shared decision-making requires physicians to be attentive to patient preferences and expectations, even when these are not explicitly stated.

2.12 Signalling Theory

Signalling Theory examines how pharmaceutical branding serves as signals of quality, efficacy and reliability that influence physician prescribing decisions, addressing information asymmetries in the healthcare market.

Empirical evidence indicates that physicians influenced by corporate promotional activities tend to prescribe branded drugs at higher rates, consequently increasing healthcare costs and affecting patient access to treatments (Morse, Hanna and Mehra, 2019). This ambivalent perspective is complicated by marketing efforts that typically promote established brands and influence physician behaviours, placing generics at a competitive disadvantage (Morse, Hanna and Mehra, 2019).

Furthermore, physician perceptions of generics are influenced by professional experiences and training backgrounds. Quality concerns regarding generic medications create prescribing hesitancy, resulting in continued branded prescribing despite economic advantages of generics (Hadia *et al*., 2022). Even amid rising branded product costs, which might logically encourage generic consideration, factors including peer influence and individual patient expectations continue to shape these complex prescribing decisions (Shamim-ul-Haq *et al*., 2014).

The relationship between pharmaceutical companies and prescribers represents a significant pathway for brand influence. Research by (Brax *et al.*, 2017) demonstrated substantial associations between physician interactions with pharmaceutical representatives and subsequent prescribing patterns, with branded medications frequently benefiting from these

professional relationships. These interactions create strong brand associations that persist in clinical decision-making.

(Martin and Hunt, 2021) examined how industry relationships influence prescribing patterns, finding that branded pharmaceutical interactions correlate with increased prescription rates for specific products marketed during these engagements. This relationship between professional connections and prescribing behaviour underscores the effectiveness of brand-building strategies that target prescribers directly.

Quantitative analyses further demonstrate the magnitude of this relationship, with systematic reviews revealing that physicians receiving pharmaceutical company payments prescribe approximately 30% more branded medications compared to non-recipient colleagues, controlling for relevant covariates (Morse, Hanna and Mehra, 2019). The temporal sequence between industry payments and subsequent prescription behaviour changes establishes a causal framework, with studies documenting significant prescribing pattern alterations within 60-90 days following pharmaceutical representative interactions (Brax *et al*., 2017).

The mechanisms through which these professional relationships influence prescribing behaviour include multiple pathways beyond direct persuasion. First, the reciprocity principle creates implicit obligations following the receipt of branded educational materials or samples, with psychological research demonstrating that even nominal gifts generate significant reciprocity effects (Rizwan R. Ahmed *et al*., 2020).

Second, informational asymmetries between pharmaceutical representatives and prescribers create opportunities for branded messaging to fill knowledge gaps regarding treatment options, particularly for newer therapeutic categories (Lieb and Scheurich, 2014). Additionally, the impact of marketing activities such as detailing and sample distribution further complicates this dynamic, often directing physicians toward branded prescriptions that may not produce superior clinical outcomes (Shamim-ul-Haq *et al*., 2014).

Examination of prescribing behaviours reveals the complex relationship between brand loyalty and generic acceptance. A comprehensive study demonstrated that pharmaceutical representative marketing primarily increases prescriptions for specific branded drugs rather than expanding the overall market for therapeutic innovations, suggesting relatively inelastic demand for these products (Hadia *et al.*, 2022).

The economic consequences of pharmaceutical marketing investments often exceeding research and development expenditures warrant consideration (Colgan *et al.*, 2015). Physician-directed marketing, including detailing and sample distribution, demonstrably alters prescribing patterns, directing physicians toward branded medications and increasing aggregate pharmaceutical expenditures.

Despite recognition of generic bioequivalence and safety, misconceptions propagated through pharmaceutical advertising slow their adoption (Shamim-ul-Haq *et al*., 2014). Research suggests that regular exposure to pharmaceutical promotions leads many physicians to select branded medications over economical alternatives, as evidenced in multiple physician studies (Morse, Hanna and Mehra, 2019). This branding emphasis increases patient expenditures and restricts access to essential medications, ultimately compromising healthcare system cost-effectiveness (Gönül *et al*., 2001).

The relationship between pharmaceutical branding and prescription patterns reveals a complex ecosystem influenced by market factors and physician perspectives (Iizuka and Jin, 2007). Research demonstrates that marketing strategies significantly influence prescribing habits, with practices such as detailing and sample distribution increasing likelihood of branded prescribing, as evidenced by (Morse, Hanna and Mehra, 2019).

Brand loyalty influenced by marketing initiatives frequently supersedes clinical considerations, resulting in physician preference for branded medications despite generic availability, as elucidated by (Patidar and Singh, 2024). (Stremersch, Landsman and Venkataraman, 2013) identified significant variations in response to pharmaceutical marketing, demonstrating that prescribing patterns are shaped not only by marketing activities but also by the intensity and approach of branding efforts across different contexts.

This discrepancy suggests that more experienced physicians, who are potentially more exposed to pharmaceutical marketing, system defaults in electronic health records and established prescribing habits, tend to favour brand names despite the therapeutic equivalence of generic alternatives (Kisamo *et al.*, 2020). The consistent preference for brand names across different clinical settings indicates that the influence of a medication's brand extends beyond individual practice environments and may be embedded in institutional practices (Kisamo *et al*., 2020).

Such a pattern not only reflects a systemic inclination towards brand-specific prescribing but also has broader implications for healthcare costs, as branded medications are generally more expensive than their generic counterparts (Kisamo *et al*., 2020). This evidence reinforces the notion that external factors ranging from marketing strategies to entrenched prescribing behaviours, significantly influence physicians' choices, a finding that is critical for understanding and potentially reforming prescription practices (Kisamo *et al*., 2020).

The cognitive mechanisms through which pharmaceutical branding influences prescription decisions operate through multiple pathways, including memory accessibility, heuristic decision-making, affective responses and social validation dynamics. These mechanisms create persistent prescribing patterns that favour branded medications, often independent of objective clinical considerations. Professional relationships between pharmaceutical representatives and prescribers further reinforce these patterns through reciprocity principles, information asymmetries and opinion leadership dynamics.

2.13 Theory of Planned Behaviour

The pharmaceutical industry operates within a complex ecosystem where information dissemination, marketing strategies and healthcare decision-making intersect, with medical representatives (MRs) functioning as crucial intermediaries between pharmaceutical companies and healthcare providers (McGettigan *et al*., 2001). Research indicates that these interactions are characterized by nuanced educational exchanges, psychological processes and institutional frameworks that collectively influence clinical decision-making (McGettigan *et al*., 2001).

Many physicians view MRs as valuable information sources, particularly when facing time constraints, leading to a dependency that may foster biased prescribing patterns (Khazzaka, 2019). The ambivalent attitudes that healthcare providers hold toward pharmaceutical marketing reflect a tension between maintaining professional autonomy and accessing convenient, yet potentially biased, information (Barbaroux, Pourrat and Bouchez, 2022). French general practitioners, despite expressing scepticism toward the pharmaceutical sector, valued the accessibility and perceived reliability of information provided by sales representatives, suggesting a cognitive rationalization of these engagements as beneficial for patient care (Barbaroux, Pourrat and Bouchez, 2022).

Physician prescribing behaviour is substantially influenced by peer pressure and prevailing social norms, which shape interactions with pharmaceutical representatives (Venkataraman and Stremersch, 2007). Physicians navigate a complex social ecosystem where professional relationships inform prescribing practices, as evidenced by their utilization of pharmaceutical sales representatives for information and resources (Venkataraman and Stremersch, 2007). This reliance reflects an emerging consensus among physicians regarding the normalization of marketing practices in healthcare settings (Venkataraman and Stremersch, 2007).

Such social norms effectively discourage dissenting perspectives within the profession, leading to conformity that frequently prioritizes pharmaceutical interests over patient-centered care (Jaruseviciene *et al*., 2013). Social network analysis methodologies reveal distinct prescription cascades within professional communities following pharmaceutical marketing interventions (Sohrabi *et al*., 2021). Opinion leaders within physician networks demonstrate disproportionate influence on subsequent prescribing patterns among network members, with influence metrics showing stronger predictive capacity than individual marketing exposure (Sohrabi *et al.*, 2021).

Studies examining prescription initiation patterns within hospital systems and practice groups identify threshold effects, where adoption rates accelerate dramatically once certain penetration levels are achieved within professional networks, suggesting complex social contagion mechanisms in prescribing behaviours (Datta and Dave, 2017).

The relationship between medical representatives and physicians' prescribing behaviours involves significant psychological dimensions, particularly cognitive dissonance and self-efficacy (Gupta, Nayak and Vidyarthi, 2015). Additionally, physician self-efficacy plays a crucial role, affecting confidence in resisting marketing influences (Khazzaka, 2019). Research indicates that less experienced physicians, particularly those early in their careers, demonstrate greater vulnerability and frequently seek educational support from MRs due to perceived knowledge deficits (Barbaroux, Pourrat and Bouchez, 2022).

This dependency raises a critical concern: diminished self-efficacy may correspond with decreased capacity to make unbiased prescribing decisions, potentially affecting patient care priorities (Venkataraman and Stremersch, 2007). The increasing frequency of interactions between medical representatives and physicians reveals complex relationships influenced by demographic factors including age, gender and specialty (Alkhateeb *et al.*, 2011). Research indicates that younger physicians demonstrate greater receptivity to marketing influences, often turning to sales representatives for pharmaceutical information due to perceived knowledge gaps and showing heightened responsiveness to promotional efforts (Khazzaka, 2019).

Studies further suggest that female physicians typically demonstrate greater awareness of ethical concerns associated with pharmaceutical promotions, yet continue to value these interactions for continuing education purposes (Venkataraman and Stremersch, 2007).

Institutional culture significantly modulates marketing effectiveness through establishment of formal and informal norms regarding industry interactions (Fickweiler, Fickweiler and Urbach, 2017). Research comparing prescribing patterns across academic and community settings reveals systematic differences in responsiveness to pharmaceutical marketing, with academic environments demonstrating smaller marketing effects, particularly in institutions with explicit industry interaction policies (Fickweiler, Fickweiler and Urbach, 2017).

Qualitative research utilizing ethnographic methodologies documents how organizational leadership, peer modeling and institutional policies collectively shape normative expectations regarding appropriate engagement with pharmaceutical representatives (Jaruseviciene *et al*., 2013).

Research demonstrates that established brand recognition often leads physicians to prefer well-known medications, perpetuating prescribing habits even when comparable generic alternatives exist (Datta and Dave, 2017). Despite widespread recognition of generic bioequivalence, substantial scepticism persists regarding quality attributes, with many physicians expressing concerns about generic equivalence to branded counterparts (Mehralian *et al*., 2016).

A study by (Patidar and Singh, 2024) revealed that over 75% of physicians viewed generics as safe, but only 64.4% considered them therapeutically equivalent to brand-name medications. This discrepancy between safety perception and efficacy belief demonstrates the nuanced attitudes influencing prescribing behaviours. (Alghasham, 2009) investigated perceptions toward generic prescribing in Saudi Arabia, finding that while physicians acknowledged the cost advantages of generics, concerns about quality and reliability remained prevalent.

Physician trust in generic medications is influenced by various factors, including perceived quality and experiential history (Martin and Hunt, 2021). Research indicates that while many physicians acknowledge the bioequivalence of generics to branded alternatives, concerns regarding efficacy and manufacturing standards persist (Gupta, Malhotra and Malhotra, 2018).

The intersection of patient expectations and physician prescribing behaviours is substantially shaped by pharmaceutical marketing efforts. Research indicates that branded drug advertising often aligns with patient perceptions of efficacy and quality, creating expectational dynamics that physicians must navigate (Wood *et al*., 2017). Despite bioequivalence between generic and branded medications, many patients maintain preferences for branded products based on

quality perceptions, expecting physicians to accommodate these preferences (Gupta, Malhotra and Malhotra, 2018).

Studies further suggest that patient beliefs regarding treatment success often reflect perceived advantages of branded medications over generics, creating a self-reinforcing cycle that elevates healthcare costs (Gupta, Nayak and Vidyarthi, 2015). (Ferrari *et al*., 2014) demonstrated that patient-physician interactions regarding medication costs can influence prescribing patterns, particularly when patients express concern about rising pharmaceutical prices, yet brand preferences often persist despite these economic considerations.

Social validation mechanisms operate when opinion leaders within medical communities visibly adopt branded preferences, establishing prescribing norms that influence broader professional networks (Mehralian *et al*., 2016). As physicians navigate financial pressures and ethical considerations, the tension between brand loyalty and prescription economics becomes increasingly evident, highlighting the need for enhanced education regarding generics and policies promoting their utilization over brand-name medications frequently driven by aggressive pharmaceutical marketing (Kisamo *et al*., 2020).

A substantial proportion of physicians rely on marketing and promotional activities that shape perceptions of generics, as evidenced by attitudes toward sampling and detailing (Mahmoud, 2016). These external influences often supersede clinical guidelines, as physicians frequently hesitate to prescribe generics without sufficient knowledge regarding therapeutic equivalency (Gebresillassie *et al.*, 2018).

Establishing more conducive professional environments through educational initiatives and misconception clarification can build confidence in generic medications, facilitating more equitable prescribing practices that balance patient needs with healthcare economics (Kariuki, 2020; Patidar and Singh, 2024). Studies suggest that educational interventions designed to enhance understanding of generic medications may mitigate some biases favouring branded products (Hadia *et al.*, 2022).

Research demonstrates that marketing strategies can substantially impact prescriber actions, with many clinicians acknowledging that they regularly prescribe advertised medications rather than evaluating therapeutic equivalency (Brax *et al*., 2017). Quantitative analyses reveal that physician exposure to pharmaceutical representatives correlates with a 16% increase in prescribing the promoted medication (Brax *et al.*, 2017).

Variable	Brand name status, *n* (%)		*p*-value
Prescription category	Yes	No	
Outpatients	357 (71.3)	144 (28.7)	0.79
Inpatients	360 (72.0)	140 (28.0)	
Prescribers			
Specialists	272 (37.9)	113 (39.8)	0.108
Medical doctors	282 (39.3)	104 (36.6)	
Interns	149 (20.8)	54 (19.0)	
Residents	14 (2.0)	13 (4.6)	

Table 3
The Categorical analysis of Branded Medication Prescription patterns as stratified by patient care setting (inpatient versus outpatient contexts) and the professional credentials of prescribing clinicians (Kisamo et al., 2020)

In a study conducted at Muhimbili National Hospital in Tanzania, researchers found that a strikingly high proportion of prescriptions approximately 71% in outpatient settings and 72% in inpatient settings were written using brand names rather than generic names (Kisamo *et al.*, 2020). The study details that among prescribers (As per Table 3 - The Categorical analysis of Branded Medication Prescription patterns as stratified by patient care setting (inpatient versus outpatient contexts) and the professional credentials of prescribing clinicians), specialists and medical doctors contributed 37.9% and 39.3% of brand name prescriptions respectively, whereas interns and residents accounted for only 20.8% and 2.0% (Kisamo *et al*., 2020).

The Theory of Planned Behaviour provides a comprehensive framework for understanding how physician attitudes, subjective norms and perceived behavioral control shape prescribing intentions and subsequent behaviors. Medication prescription represents one of the most common healthcare interventions globally, with significant implications for patient outcomes, healthcare costs and public health. Understanding the factors that influence physician prescribing behaviour has become increasingly important amid growing concerns about irrational prescribing a health issue with potential to harm individuals and society, particularly in developing countries (Adorka *et al.*, 2013).

Recent studies attribute prescribing to physician behavioural factors (Adorka *et al*., 2013) with patient characteristics increasingly recognized as significant influencers. This behavioral perspective aligns with the Theory of Planned Behaviour's emphasis on how external factors influence behavioral intentions through their impact on attitudes, subjective norms and perceived control.

Within the Theory of Planned Behaviour framework, physician attitudes toward accommodating patient requests represent a crucial determinant of prescribing behavior. Evidence suggests these requests can negatively influence prescribing decisions (Venkataraman and Stremersch, 2007), with physicians often citing patient demand for specific brands as a crucial reason for prescription choices (Holloway *et al.*, 2002). These attitudes reflect the complex evaluation process physicians undergo when balancing clinical judgment with patient preferences.

Qualitative research corroborates behavioral findings, with physicians acknowledging that patient requests represent important factors influencing their prescribing decisions (Kotwani *et al.*, 2010). (Mintzes *et al.*, 2013) reported in their cross-sectional survey that physicians viewed patients' requests for medications as powerful drivers of prescribing specific drugs. This acknowledgment demonstrates how physician attitudes toward patient influence have evolved to recognize its legitimacy as a behavioral determinant.

The complexity of physician attitudes is further revealed through uncertainty patterns. In approximately 40% of cases where prescriptions were based on patient requests, physicians reported uncertainty about the appropriateness of the requested medication (Mintzes *et al.*, 2013). This substantial percentage highlights the tension between patient-centered care, which values patient preferences and evidence-based practice, which prioritizes clinical indications—a fundamental challenge in contemporary healthcare delivery that directly impacts physician attitudes and subsequent behavioral intentions.

The subjective norm component of the Theory of Planned Behaviour is particularly evident in how physicians perceive social expectations and pressures within the clinical encounter. In practice, physicians frequently report feeling pressure from patient requests and expectations, potentially leading to overprescribing (Meeker *et al.*, 2016). This pressure represents a powerful subjective norm that influences prescribing behavior beyond pure clinical considerations.

The bidirectional nature of patient-physician dynamics creates complex subjective norms. Studies indicate that patients report lower satisfaction when physicians decline their medication requests (El-Dahiyat, Kayyali and Bidgood, 2014). (Campbell *et al.*, 2013) found that patients anticipated negative reactions if physicians refused requests for advertised medications. This creates implicit pressure for physicians to accommodate patient preferences, potentially influencing prescription decisions in ways that may diverge from strictly clinical considerations (Thistlethwaite, Ajjawi and Aslani, 2010).

These social pressures form a significant subjective norm that physicians must navigate, as the perceived expectations of patient reactions become internalized as behavioral determinants. The social dynamics create an environment where accommodation of patient requests becomes normatively expected behavior, regardless of clinical necessity.

Perceived behavioral control within the Theory of Planned Behaviour framework is demonstrated through physicians' capacity to accommodate or resist patient requests. The frequency with which physicians accommodate patient requests reveals patterns of perceived control over prescribing decisions. (Campbell *et al.*, 2013) found that 43% of physicians routinely accede to patients' requests for brand-name medications, while Arney, Street and Naik (2014) reported that 56.9% of physicians acknowledged having fulfilled specific drug requests.

These substantial percentages (43% and 56.9%) demonstrate that a significant proportion of physicians perceive they have the behavioral control to accommodate patient requests and they exercise this control regularly. This pattern suggests that perceived behavioral control operates not as a constraint but as an enabler of patient-influenced prescribing behavior.

The variation in accommodation rates across different studies (43% vs. 56.9%) may reflect different conceptualizations of patient requests or varying practice contexts, but both

percentages indicate that patient request accommodation represents a common behavioral pattern among physicians, reflecting their perceived control over prescribing decisions.

The Theory of Planned Behaviour predicts that attitudes, subjective norms and perceived behavioral control translate into actual behaviors. Experimental studies have demonstrated that patient requests dramatically increase prescribing rates (McKinlay *et al*., 2014), which may compromise optimal health outcomes. This dramatic increase represents the behavioral outcome of the complex interaction between physician attitudes, perceived social pressures and behavioral control.

More compelling evidence comes from experimental research by (McKinlay *et al.*, 2014), who demonstrated through a factorial experiment that patient requests for specific drugs dramatically increase prescription rates. This finding was further validated by (Venkataraman and Stremersch, 2007), whose experimental study confirmed that patient requests significantly influence physician prescribing patterns. The experimental nature of these studies provides strong evidence for the causal relationship between patient influence factors and prescribing behaviors.

Empirical evidence supporting the influence of patient requests on prescribing behaviour is substantial. In a comprehensive analysis, (Stremersch, Landsman and Venkataraman, 2013) found that patient drug requests strongly and positively influence prescription decisions in the United States. This strong positive influence demonstrates how behavioral intentions translate into actual prescribing behaviors when patient requests are present.

The Theory of Planned Behaviour recognizes that contextual factors can moderate the relationship between behavioral determinants and outcomes. The influence of patient requests varies across different clinical contexts, medication types and physician characteristics. (Stremersch, Landsman and Venkataraman, 2013) identified drug attributes as significant moderators of the request-prescription relationship, with efficacy and side effect profiles determining how physicians respond to patient requests.

Similarly, (Arney, Street and Naik, 2014) found that drug characteristics significantly predict physicians' likelihood of fulfilling patient requests, suggesting that medical considerations remain important even when patient preferences exert influence. These findings indicate that while patient requests influence prescribing behavior, this influence is moderated by clinical and pharmacological factors that affect physician attitudes and perceived behavioral control.

Patient requests for medications stem from multiple sources beyond the immediate clinical encounter, representing the formation of behavioral antecedents that ultimately influence physician behavior. While direct-to-consumer advertising (DTCA) serves as a prominent driver (Mukherjee, Limbu and Wanasika, 2013), other important sources include internet searches (Arney, Street and Naik, 2014), media coverage (Savage, 2011), social networks and interpersonal conversations (McKinlay *et al*., 2014), financial considerations (Al-Rukban and Rizvi, 2014) and prior experience with similar medications (McKinlay *et al*., 2014).

The formation of patient expectations involves complex psychological and social processes that create behavioral pressures on physicians. Previous clinical experiences significantly shape current expectations, as patients who previously received medications for similar conditions develop stronger expectations for similar treatment in subsequent encounters (Cockburn and Pit, 1997). This experiential basis for expectations creates reinforcing cycles of

prescription patterns that become increasingly difficult to modify over time, representing a powerful behavioral determinant within the Theory of Planned Behaviour framework.

These diverse influences shape patient expectations and communicate preferences that ultimately impact clinical decision-making, creating the behavioral context within which physician attitudes, subjective norms and perceived behavioral control operate to determine prescribing outcomes.

The effectiveness of representatives varies contextually, with regulatory environments influencing their impact on prescription decisions. In regions with less stringent regulatory frameworks, representatives may exert stronger influence on prescribing patterns, partially attributable to promotional strategies that occasionally traverse ethical boundaries (Lotfi *et al.*, 2016). Studies emphasize that representatives must balance educational content with marketing objectives a synthesis that supports informed clinical decisions while safeguarding patient-centered care (Yonemori *et al*., 2012). As the pharmaceutical landscape evolves, continuous professional development among representatives becomes increasingly critical to maintaining a competent workforce prioritizing patient safety (Othman, Halboup and Battah, 2021).

Studies reveal complex dynamics in the physician-representative relationship. Research by (De Ferrari *et al*., 2014) documented that healthcare professionals recognize the potential for bias in promotional methodologies, highlighting the importance of critical evaluation of presented information. The commercial nature of the relationship necessitates implementation of ethical regulations to ensure that patient welfare remains the primary consideration in prescribing decisions (Purim *et al.*, 2022). Medical representatives serve as important conduits of pharmaceutical information, but their effectiveness depends on maintaining appropriate professional boundaries and prioritizing evidence-based clinical information over purely promotional content.

The ethical dimensions of pharmaceutical information dissemination merit careful consideration, as the commercial objectives of pharmaceutical companies must be balanced with healthcare professionals' need for unbiased, scientifically accurate information. Studies indicate growing awareness among practitioners regarding potential conflicts of interest in pharmaceutical marketing, with increasing demands for transparency in information sources and disclosure of commercial relationships (Khazzaka, 2019).

Regulatory frameworks increasingly address these concerns, establishing guidelines for ethical information dissemination that protect the integrity of clinical decision-making while acknowledging the legitimate role of pharmaceutical education. Research by (Fickweiler, Fickweiler and Urbach, 2017) indicates that healthcare professionals value information sources perceived as balanced, scientifically rigorous and patient-centered, regardless of the dissemination method employed. This preference underscores the importance of maintaining ethical standards across all pharmaceutical communication channels, ensuring that commercial objectives do not compromise the quality and objectivity of information provided to healthcare practitioners (Fickweiler, Fickweiler and Urbach, 2017).

Moreover, as (Al-Hamdi, Hassali and Ibrahim, 2012) highlight, the ethical dimensions of these relationships necessitate transparency and balanced knowledge exchange. The impact of pharmaceutical promotions on prescribing patterns merits careful consideration; (De Ferrari *et al*., 2014) notes that physicians frequently receive medication samples and promotional

materials, which may influence their therapeutic decisions. Interpretations of these interactions reveal the complex interplay between economic motivations and ethical considerations. Ultimately, strengthening these relationships enhances healthcare delivery quality, thereby promoting improved patient outcomes aligned with industry standards (Lotfi *et al*., 2016).

This approach, however, necessitates careful ethical consideration, as the influence of promotional incentives can potentially obscure the distinction between educational value and potential persuasion (Purim *et al*., 2022). The effective implementation of these strategies contributes to healthcare professionals' enhanced awareness and improved prescribing behaviours, reinforcing the central role of interpersonal interaction in pharmaceutical information dissemination (Fickweiler, Fickweiler and Urbach, 2017).

This aligns with predominant perspectives among physicians, who suggest that such interactions can facilitate improved understanding and subsequent prescription behaviours (De Ferrari *et al*., 2014). Ultimately, the continued emphasis on personal information exchange not only enhances knowledge acquisition but reinforces the ethical framework surrounding pharmaceutical information dissemination (Duan, Cheng and Zhou, 2023).

The dissemination of pharmaceutical information to healthcare professionals constitutes a critical component of medical knowledge transfer in contemporary healthcare systems. Various methodologies exist for conveying drug-related information to medical practitioners, each with distinct characteristics and efficacy profiles. This section examines the mechanisms, effectiveness and comparative advantages of different information dissemination strategies within the pharmaceutical sector, with particular attention to interpersonal communication modalities and their impact on healthcare professionals' knowledge acquisition and clinical decision-making processes.

Future research directions should explore optimizing complementary approaches that leverage the unique advantages of different dissemination methodologies while maintaining ethical standards and focusing on improved patient outcomes as the ultimate objective of pharmaceutical information transfer.

2.14 Summary

The literature review clearly demonstrates that prescribing behaviour in the pharmaceutical industry is shaped by a convergence of marketing, cognitive, economic and ethical factors. The use of twelve theoretical models enables a robust, layered analysis of this behaviour.

Marketing-driven theories such as the AIDA Model, Persuasion Theory and Brand Equity Theory explain how pharmaceutical firms influence physician behaviour through detailing, branding and emotional appeals. These models show that doctors are not only rational clinical actors but are also influenced by trust, familiarity and psychological biases in favour of branded medications.

Cognitive and behavioural frameworks, including Information Processing Theory, Behavioural Economics and Theory of Planned Behavior, provide insights into how physicians make decisions under conditions of uncertainty, information overload and social pressure. These theories emphasize that doctors often rely on mental shortcuts, peer norms and subconscious cues, resulting in prescribing patterns that may diverge from clinical guidelines.

Economic frameworks such as Rational Choice Theory, Signalling Theory and the Rational Prescribing Model highlight the substantial role of pharmaceutical pricing, insurance coverage and perceived drug value in prescription decisions. Doctors must navigate between ideal clinical outcomes and economic feasibility, particularly when treating chronic or underserved populations.

From a clinical ethics and patient-centred care perspective, Evidence-Based Medicine, Shared Decision-Making Theory and Diffusion of Innovations Theory underscore the balance physicians must maintain between evidence, innovation and patient involvement. These models also highlight the tensions between standardized protocols and personalized care, especially when patients request specific medications or express expectations during consultations.

In summary, the theoretical framework of this thesis is intentionally multidisciplinary. It captures the complex, interdependent influences on prescribing behaviour, enabling this study to explore how branding, representative interaction, cost, patient input and systemic structures converge to influence doctors' prescribing practices in the pharmaceutical industry.

Chapter III:
METHODOLOGY

3.1 Overview of Research Problem

The complexity of physician prescribing behavior represents a multifaceted research challenge that necessitates a systematic methodological approach to understand the various influences that shape medication prescription decisions. Building upon the research problem outlined in the introduction, this study addresses the critical gap in comprehensive understanding of how five key determinants medical representative influence, medication branding, cost considerations, patient experience and pharmaceutical promotional strategies collectively and individually impact prescribing behavior among healthcare professionals.

The methodological framework developed for this research recognizes that prescribing behavior is not a singular decision-making process but rather a complex interplay of professional, economic, social and psychological factors. Each of these influences operates through distinct theoretical mechanisms, requiring tailored analytical approaches to capture their unique contributions to prescribing decisions. The research problem thus demands a multi-dimensional methodological strategy that can simultaneously examine these factors while maintaining the rigor necessary for meaningful scientific inquiry.

From a methodological perspective, the research problem presents several inherent challenges. First, the subjective nature of physician perceptions regarding external influences requires measurement approaches that can reliably capture attitudinal and behavioral tendencies. Second, the nature of these influences necessitates analytical methods that can distinguish between individual factor effects and potential interaction effects. Third, the professional context of medical decision-making requires methodological considerations that respect the complexity of clinical judgment while isolating the specific factors of interest.

To address these methodological challenges, this study employs a structured survey-based approach targeting a substantial sample of 800 physicians, utilizing binary response formats to ensure clarity and statistical robustness. The choice of binary (Yes/No) responses addresses the research problem's need for clear, actionable insights while minimizing response complexity that could compromise data quality. This methodological decision is particularly relevant given the sensitive nature of examining influences on professional medical practice, where nuanced response options might introduce bias or reluctance to provide honest assessments.

The research problem's multi-factorial nature is addressed through five distinct but complementary methodological frameworks, each grounded in established behavioral and marketing theories. The medical representative influence framework draws upon the Theory of Planned Behavior, persuasion theory and the Elaboration Likelihood Model to understand how interpersonal professional relationships affect prescribing decisions. The medication branding framework utilizes brand equity theory and signaling theory to examine how pharmaceutical branding creates competitive advantages that influence physician choice. The medication costing framework applies rational choice theory and behavioral economics to investigate how economic factors balance against clinical considerations in prescribing decisions.

The patient experience or suggestion framework incorporates the Theory of Planned Behavior, shared decision-making theory and evidence-based medicine principles to understand how

patient input and prior experiences shape prescription choices. Finally, the pharmaceutical promotional strategies framework employs the AIDA model, diffusion of innovations theory and the Theory of Planned Behavior to examine how different communication channels (social media advertising, face-to-face detailing and pamphlets) influence physician awareness and adoption of new medications.

Each methodological framework addresses specific aspects of the research problem through three complementary analytical approaches: percentage-based descriptive analysis to establish baseline prevalence of attitudes and behaviors, Chi-square tests to examine associations between variables and one-sample t-tests to determine whether observed proportions significantly differ from neutral benchmarks. This tri-part analytical strategy ensures that the research problem is examined from multiple statistical perspectives, providing robust evidence for conclusions while addressing potential limitations of any single analytical approach.

The methodological overview also acknowledges that the research problem extends beyond academic inquiry to practical implications for pharmaceutical marketing strategy and clinical practice optimization. Therefore, the methodological design incorporates considerations for generating actionable insights that can inform both industry strategy and healthcare policy discussions. The large sample size (n=800) and extended data collection period (12 months via SurveyMonkey) reflect the research problem's requirement for generalizable findings that can influence practice across diverse medical contexts.

Furthermore, the research problem's ethical dimensions are addressed through methodological choices that respect physician autonomy while investigating potentially sensitive topics related to external influences on medical decision-making. The anonymous survey format and binary response structure minimize potential discomfort while maintaining the analytical rigor necessary to address the research questions meaningfully.

In essence, this methodological overview positions the subsequent detailed frameworks as systematic responses to the complex, multi-dimensional research problem identified in the introduction. By establishing clear theoretical foundations and analytical approaches for each factor under research, the methodology ensures that the research problem's inherent complexity is addressed through appropriately sophisticated yet practical research methods that can yield meaningful insights for both academic understanding and practical application in pharmaceutical marketing and clinical practice contexts.

3.2 Operationalization of Theoretical Constructs

The operationalization of theoretical constructs in this study represents a systematic translation of abstract behavioral and marketing theories into measurable variables that can be empirically analyzed. This process ensures theoretical rigor while maintaining practical applicability in understanding the multifaceted influences on physician prescription behavior. The operationalization framework encompasses five distinct domains, each grounded in established theoretical foundations and measured through specific survey instruments and analytical approaches.

The operationalization of medical representatives' influence draws from three theoretical frameworks: the Theory of Planned Behavior (TPB), Persuasion Theory (including the

Elaboration Likelihood Model) and Information Processing Theory. These theories collectively explain how external marketing influences translate into behavioral intentions and subsequent prescribing actions.

The TPB construct assumes that physicians' prescribing decisions are influenced by their attitudes toward medical representatives, subjective norms regarding peer acceptance of MR influence and perceived behavioral control over their prescribing autonomy. Persuasion theory operationalizes the stimulus-response relationship between MR interactions and prescription changes, while Information Processing Theory explains how physicians cognitively process and retain information provided by medical representatives.

The theoretical construct is operationalized through a single, direct survey question: "Do you think Medical Representatives play an important factor in your decision to prescribe a particular drug?" with binary response options (Yes/No). This operationalization strategy deliberately employs a dichotomous scale to capture the fundamental acknowledgment or denial of MR influence, eliminating ambiguity that might arise from Likert-type scales.

The binary operationalization serves multiple theoretical purposes. From a TPB perspective, it captures the attitudinal component by requiring physicians to make a definitive stance on whether they believe MRs influence their behavior. The Yes/No format forces respondents to move beyond neutral positions, thereby revealing underlying attitudes that might otherwise remain concealed in more nuanced response formats.

The operationalization employs three complementary analytical approaches, each addressing different aspects of the theoretical construct. The percentage-based analysis operationalizes the prevalence dimension of MR influence. This approach transforms individual responses into a collective understanding of how widespread the acknowledgment of MR influence is within the physician population. The percentage calculation directly operationalizes the social norm component of TPB by revealing whether acknowledging MR influence represents a majority or minority position among physicians. The chi-square analysis operationalizes the relationship between perceived influence and actual behavioral outcomes. This test moves beyond simple acknowledgment to examine whether doctors who say "Yes, I am influenced" actually prescribe differently (e.g., more of the promoted drugs) compared to those who say "No". It could also test if certain subgroups of doctors (by specialty, gender, region, etc.) differ in their yes/no responses. The operationalization here captures the behavioral intention-to-action pathway described in TPB, testing whether attitudes translate into measurable behavioral differences. The t-test operationalizes the theoretical expectation that MR influence should deviate significantly from chance or neutral positioning. The 50% benchmark represents theoretical equipoise – the point at which physicians would be equally likely to acknowledge or deny influence if no systematic effect existed. Testing against this benchmark operationalizes the persuasion theory expectation that effective marketing should create measurable attitude shifts away from neutrality.

The operationalization of medication branding influence is anchored in Brand Equity Theory, complemented by elements of the Theory of Planned Behavior and Signaling Theory. Brand Equity Theory operationalizes brand influence through key dimensions including brand awareness, brand associations/image, perceived quality and brand loyalty. Each dimension represents a distinct pathway through which branding can influence physician decision-making.

Signaling Theory operationalizes brands as information shortcuts that reduce uncertainty in prescribing decisions. In pharmaceutical contexts, brands signal quality, efficacy and reliability to physicians who cannot directly observe all drug characteristics. The TPB framework operationalizes how brand perceptions shape attitudes toward specific medications, which subsequently influence prescribing intentions.

The branding construct is operationalized through the survey question: "Do you think properly branding the drug gives it a competitive edge for that particular brand over other brands?" with binary Yes/No response options. This operationalization captures the fundamental recognition of brand value in competitive pharmaceutical markets.

The operationalization strategy focuses on competitive advantage rather than absolute brand recognition, thereby capturing the relative positioning aspect of brand equity theory. By asking about "competitive edge," the question operationalizes the signaling function of brands – whether physicians perceive branded drugs as having advantages over competitors in similar therapeutic categories.

The branding construct employs the same three-tier analytical approach, each operationalizing different theoretical expectations. This operationalizes the prevalence of brand consciousness among physicians. The percentage calculation reveals whether recognition of brand competitive advantage represents a dominant or minority perspective, thereby operationalizing the social norm dimension of brand acceptance in medical practice. The chi-square analysis operationalizes the relationship between branding attributes and prescription behavior. The test examines potential associations between the Yes/No responses on branding perception items, testing for interdependencies that theory might predict. Brand equity theory suggests the dimensions of brand perception could reinforce each other and the chi-square test operationalizes whether a "Yes" on brand recognition is independent of other factors or prescribing behaviors. The t-test operationalizes Brand Equity Theory's prediction that effective branding should create systematic preference deviations from chance levels. The 50% benchmark represents the theoretical null position where branding would have no systematic influence on physician perceptions. A significant result above 0.5 would indicate that more than half of physicians acknowledge a brand advantage, supporting theoretical claims about branding's broad recognition among prescribers.

The operationalization of medication costing influence is grounded in Rational Choice Theory (RCT) and Behavioral Economics principles. RCT operationalizes physicians as economic agents who systematically weigh costs against benefits to maximize patient utility. This theoretical framework assumes that rational prescribers will incorporate medication costs into their decision-making algorithms alongside efficacy and safety considerations.

Behavioral Economics operationalizes the deviations from pure rational choice, acknowledging that physicians operate under bounded rationality with incomplete cost information. This framework operationalizes cognitive biases, heuristics and informational constraints that may prevent purely rational cost consideration, such as physicians often lacking accurate knowledge of drug prices despite believing cost is important.

The cost consideration construct is operationalized through the survey question: "Do you take into consideration the cost of the drugs promoted by the medical representative before prescribing the same to the patient?" with binary Yes/No responses. This operationalization

specifically links cost consideration to MR interactions, thereby capturing the intersection of economic and marketing influences.

The operationalization strategy embeds cost consideration within the promotional context rather than as an abstract principle. This approach captures the real-world scenario where physicians must balance cost awareness with promotional influences, operationalizing the behavioral economics concept of competing decision criteria and the interaction between marketing influences and cost considerations.

Percentage Distribution Analysis operationalizes the prevalence of cost-conscious prescribing behavior, revealing whether economic considerations represent a dominant or secondary factor in physician decision-making. The percentage distribution operationalizes the extent to which rational choice principles have penetrated medical practice and how widespread cost consideration is among physicians. The chi-square analysis operationalizes the relationship between cost consciousness and prescribing behavior patterns. It can test if cost-consciousness is independent of factors such as physician specialty, practice setting, or propensity to prescribe generics, providing statistical evidence of whether medication cost consideration and prescribing decisions are linked or occur independently. One-Sample T-Test against 50% Benchmark test operationalizes Rational Choice Theory's prediction that economic considerations should systematically influence medical decisions above chance levels. The null hypothesis (H_0: $p = 0.5$) represents no predominant tendency, testing whether cost consideration is the prevailing norm among doctors or represents no clear majority stance.

The operationalization of patient experience influence draws from three theoretical frameworks: Theory of Planned Behavior, Shared Decision-Making (SDM) theory and Evidence-Based Medicine (EBM) principles. TPB operationalizes patient suggestions as external influences that can modify physician attitudes (do they think patient input improves care?), subjective norms (do they feel patients expect and should be granted input?) and perceived behavioral control (are they comfortable overruling a patient's preference if needed?).

SDM theory operationalizes the collaborative relationship between physicians and patients, where patient preferences and experiences become legitimate inputs into prescribing decisions. This framework operationalizes the shift from medical paternalism toward patient-centered care models, where clinicians and patients collaborate on medical decisions.

EBM operationalizes the integration of patient values and preferences as one of three essential pillars of clinical decision-making, alongside research evidence and clinical expertise. This framework operationalizes patient experience as a valid form of evidence that should be systematically considered, even when it represents anecdotal rather than broad clinical evidence.

The patient experience construct is operationalized through the survey question: "If you notice that a particular drug is demonstrating good beneficial results on the patient for a particular disease, would you re-prescribe the medication to the patient again on request of the patient?" with binary Yes/No responses.

This operationalization strategy creates a specific scenario where patient experience (demonstrated beneficial results) intersects with patient preference (request for re-prescription). The operationalization captures the decision point where physicians must balance

objective observation of treatment success with patient agency in treatment decisions, embedding both the clinical evidence (good beneficial results) and patient autonomy (request) components.

Percentage Distribution Analysis operationalizes the prevalence of patient-centered decision-making, revealing the extent to which SDM principles have been adopted in clinical practice. The percentage distribution operationalizes the "attitudinal landscape" of respondents, showing how widespread certain attitudes/norms (like inclination to comply with patient suggestions) are in the sample. Chi-Square Test of Association The chi-square analysis operationalizes the relationship between patient-centered attitudes and actual prescribing behaviors. The test compares observed frequencies with expected frequencies under the null hypothesis of no association, examining whether doctors who are willing to comply with patient requests behave differently in prescribing than those who are not. This test operationalizes the theoretical expectation from SDM and EBM frameworks by examining whether the proportion of doctors willing to re-prescribe based on patient request is significantly greater than 50%. The threshold of 0.5 represents equipoise or no influence, testing whether there is a systematic inclination toward patient-centered decision-making above chance levels.

The operationalization of promotional strategy effectiveness is anchored in three complementary theories: the AIDA model (Attention-Interest-Desire-Action), Diffusion of Innovations theory and Theory of Planned Behavior. The AIDA model operationalizes the sequential process through which promotional activities guide physicians from initial awareness to prescribing action, with awareness as the critical first step.

Diffusion of Innovations theory operationalizes how different promotional channels facilitate the spread of new medication adoption among physician populations. This framework distinguishes between mass media channels (social media, pamphlets) that create broad initial knowledge and interpersonal channels (face-to-face detailing) that have greater impact on attitude change and adoption decisions.

TPB operationalizes how promotional preferences reflect underlying attitudes toward information sources and influence subsequent information-seeking behaviors and prescribing decisions through the attitude-behavior relationship.

The promotional strategy construct is operationalized through the survey question: "Which of the below advertising strategies do you think increases higher awareness of new medicine launches in the market?" with three response options: a) Social Media Advertising, b) Face-to-Face Detailing and c) Pamphlets and other Physical Copies.

This operationalization strategy forces physicians to identify their preferred promotional channel for awareness creation, thereby revealing their attitudes toward different information sources and communication modalities. The three-option format operationalizes the spectrum from digital mass media to physical materials to interpersonal communication channels, capturing the different pathways described in diffusion theory.

Percentage Distribution Analysis operationalizes the relative effectiveness of different promotional channels as perceived by physicians, revealing which communication strategies are most valued for creating medication awareness. The percentage distribution operationalizes the AIDA model's attention phase by identifying which channels most effectively trigger the "attention" phase of decision-making.

Chi-Square Test of Association: The chi-square analysis operationalizes the relationship between promotional channel preferences and information-seeking behaviors. It examines whether a physician's preference for face-to-face detailing is tied to their behavioral approach to staying informed, testing TPB-consistent links between attitudes toward information sources and actual information-gathering behavior. One-Sample T-Test for Face-to-Face Detailing Preference operationalizes Diffusion of Innovations theory's prediction that interpersonal channels should dominate physician preferences for medication information. The test examines whether face-to-face detailing preference significantly exceeds what would be expected by chance if all three channels were equally preferred, supporting the theoretical argument that interpersonal promotional strategies play a leading role in new drug adoption.

The operationalization framework achieves theoretical coherence by consistently applying binary measurement scales across most constructs (with the promotional strategies using a three-option categorical approach), ensuring comparability while respecting the different theoretical foundations underlying each domain. The uniform application of percentage analysis, chi-square testing and one-sample t-tests creates a systematic approach that allows for cross-construct comparison while maintaining theoretical specificity.

Each construct's operationalization captures both the acknowledgment dimension (whether physicians recognize the influence) and the behavioral dimension (whether recognition translates into different practice patterns). This dual-level operationalization addresses the attitude-behavior gap frequently observed in behavioral research, ensuring that theoretical constructs are grounded in both perceptual and behavioral realities.

The operationalization strategy deliberately emphasizes practical decision-making scenarios rather than abstract theoretical concepts, ensuring that measured constructs reflect real-world clinical contexts where multiple influences compete for physician attention and consideration. This approach strengthens the ecological validity of the theoretical operationalization while maintaining the precision necessary for statistical analysis and theoretical interpretation.

3.3 Research Purpose and Questions

The research purpose fundamentally shapes the methodological framework employed in this research. This study's primary objective to conduct a comprehensive analysis of multifaceted factors influencing physician prescription decisions necessitates a methodological approach that can simultaneously examine multiple determinants while establishing robust empirical foundations for understanding physician behavior. The complexity of prescription decision-making, involving intricate interplays between various factors, requires methodological strategies that can capture individual factor influences on clinical decisions.

The methodological design directly responds to the research purpose by employing a mixed-methods approach that integrates quantitative survey analysis with theoretical validation frameworks. This alignment ensures that each research question is addressed through appropriate analytical techniques while maintaining consistency with established behavioral science theories. The selection of specific methodological components including percentage analysis, Chi-square tests and one-sample t-tests directly corresponds to the nature of each research question and the type of empirical evidence required to address the underlying theoretical constructs.

Research Question 1: Pharmaceutical Representative Influence- This research question requires a methodological framework capable of measuring perceived influence, testing statistical associations and establishing whether representative influence represents a significant departure from neutral behavior. The methodology employs three complementary analytical approaches: percentage analysis to establish prevalence of perceived influence, Chi-square testing to examine associations between representative interactions and prescription patterns and one-sample t-testing against a 50% benchmark to determine whether influence acknowledgment represents a significant majority or minority position. This multi-layered approach, grounded in Theory of Planned Behavior and Persuasion Theory, ensures comprehensive examination of both the extent and mechanisms of representative influence.

Research Question 2: Brand Impact on Prescription Decisions- The research of brand influence requires methodological techniques that can isolate branding effects from clinical considerations while examining the underlying cognitive mechanisms. The methodology incorporates Brand Equity Theory as its theoretical foundation, employing percentage analysis to quantify brand perception prevalence, Chi-square analysis to test associations between different branding dimensions and one-sample t-testing to determine whether brand recognition represents a statistically significant factor. This approach enables examination of brand image, perceived quality and brand loyalty as distinct but interrelated constructs influencing prescription behavior.

Research Question 3: Economic Considerations in Prescription Decisions- Economic factors in prescription decisions require methodological approaches grounded in Rational Choice Theory and Behavioral Economics frameworks. The methodology employs percentage analysis to establish the prevalence of cost consideration, Chi-square testing to examine associations between cost awareness and prescription patterns and one-sample t-testing to determine whether cost consideration represents a predominant behavior among physicians. This approach acknowledges both rational economic decision-making and the bounded rationality that characterizes real-world clinical environments.

Research Question 4: Patient Experience Integration- Patient experience influence requires methodological frameworks that can capture the bidirectional nature of doctor-patient interactions and their impact on prescription decisions. The methodology draws upon Theory of Planned Behavior, Shared Decision-Making models and Evidence-Based Medicine principles to guide analytical approaches. Percentage analysis establishes the prevalence of patient experience consideration, Chi-square testing examines associations between patient input and prescription modifications and one-sample t-testing determines whether patient experience integration represents a significant majority practice among physicians.

Research Question 5: Communication Methodology Effectiveness- Communication preference analysis requires methodological approaches grounded in AIDA model, Diffusion of Innovations theory and Theory of Planned Behavior. The methodology employs percentage analysis to establish distribution of communication preferences across different channels, Chi-square testing to examine associations between communication preferences and information-seeking behaviors and one-sample t-testing to determine whether face-to-face detailing represents a statistically significant preference majority. This approach enables comprehensive examination of how different promotional strategies influence physician awareness, interest and behavioral intentions.

The methodological framework incorporates multiple analytical approaches for each research question to enhance validity and provide triangulation of findings. The combination of descriptive, associational and comparative statistical techniques ensures comprehensive examination of each factor's influence while providing multiple perspectives on the same underlying constructs.

The theoretical grounding of each analytical approach ensures that methodological choices are justified by established behavioral science principles rather than purely statistical considerations. This integration of theory and methodology strengthens the validity of findings and enhances their contribution to the broader literature on physician prescription behavior.

Through this comprehensive methodological framework, the research addresses each research question with appropriate analytical rigor while maintaining theoretical coherence across the overall research. The alignment between research purpose, specific research questions and methodological approaches ensures that the study's findings will provide meaningful insights into the complex determinants of physician prescription behavior.

3.4 Research Design

This study employs a comprehensive quantitative cross-sectional survey design that is specifically structured to investigate the multifaceted factors influencing prescription behavior among doctors through five analytical frameworks. The research design is fundamentally grounded in established behavioral and marketing theories, creating a robust methodological foundation for understanding physician prescribing behavior in contemporary healthcare settings.

The first framework examines the impact of medical representatives on prescription behavior, drawing extensively on the Theory of Planned Behavior (TPB), Persuasion theory including the Elaboration Likelihood Model and Information processing theory. As noted in the methodology, "pharmaceutical companies commonly deploy medical representatives (MRs) to persuade physicians to favor their products" and "research confirms that interactions with drug reps can indeed change prescribing habits, resulting in increased prescriptions of promoted brand-name drugs" (Zarei *et al.*, 2023). This framework is theoretically justified because TPB suggests that external influences factor into attitudes and norms, which ultimately drive behavior, while persuasion theory expects that representatives' efforts produce measurable changes in prescribing patterns.

The second framework focuses on medication branding influences, anchored in brand equity theory which "posits that a brand's value (equity) built through factors like brand image, perceived quality and brand loyalty can significantly influence consumer (or prescriber) preferences." The methodology explicitly recognizes that "prior research has found that physicians' prescribing decisions often largely depend on the brand equity and image of the drug's manufacturer" (Nath Sanyal, Datta and Banerjee, 2013). This theoretical foundation is supported by Signaling Theory, which argues that brands act as signals of product quality in markets with information asymmetry, particularly relevant in medical contexts where doctors cannot directly observe a drug's true quality.

The third framework investigates medication costing considerations through the lens of Rational Choice Theory (RCT), which "posits that individuals make decisions by systematically weighing costs and benefits to maximize utility" (Scott, 2000). The methodology acknowledges that while RCT implies physicians will consider medication costs as part of rational decision-making to optimize patient outcomes, "Behavioral Economics reminds us that real-world decisions often deviate from the pure rational actor model" due to cognitive biases, incomplete information, or institutional incentives.

The fourth framework examines prior patient experience and suggestions, grounded in the Theory of Planned Behavior, shared decision-making principles and Evidence-Based Medicine concepts. The methodology recognizes that "modern healthcare ethics and practice emphasize shared decision-making (SDM), a model in which doctors and patients collaborate on medical decisions" (Montori *et al.*, 2023). This framework acknowledges that Evidence-Based Medicine "calls for integrating three pillars in clinical decisions: the best available research evidence, the clinician's expertise and the patient's values/preferences" (Tenny and Varacallo, 2018).

The fifth framework analyzes pharmaceutical promotion strategies through the AIDA model (Attention-Interest-Desire-Action) and Rogers' Diffusion of Innovations theory. The methodology explains that "pharmaceutical promotional strategies are fundamentally geared towards guiding physicians through the stages of awareness, interest, desire and action with respect to new medications" (Elrod and Fortenberry, 2020). This is complemented by diffusion theory, which "delineates how an innovation (such as a novel drug) spreads through a social system over time, typically progressing from an initial knowledge stage to persuasion, decision, implementation and confirmation" (Hartung *et al.*, 2012).

The research design deliberately employs binary response scales (Yes/No) for all survey items, a decision that is both methodologically and theoretically justified. The methodology states that "a binary Yes/No format was chosen for clarity and ease of response, ensuring high response completion and straightforward interpretation of results." This approach aligns with the theoretical frameworks by enabling clear measurement of attitudes and perceptions that can be directly linked to behavioral intentions as predicted by TPB and other underlying theories.

3.5 Population and Sample

The target population for this study consists of licensed practicing physicians across various medical specialties who actively engage in prescribing medications to patients in India's Tier 1, Tier 2 and Tier 3 cities. This population was selected because these healthcare professionals represent the primary decision-makers in pharmaceutical prescribing and are the focal point of various marketing and promotional influences examined in this research. The inclusion of physicians from different city tiers ensures representation across diverse healthcare settings, ranging from metropolitan medical centers to smaller urban and semi-urban healthcare facilities.

The study employs a substantial sample size of 800 doctors, a decision that is thoroughly justified both statistically and theoretically within the methodology. This sample size is particularly important given the multiple analytical frameworks employed and the need to detect meaningful associations across different variables. Comparable research in medical

marketing often employs samples in the hundreds to draw generalizable conclusions about physician behavior, positioning this study's sample size within established research practices in the field.

The selection of 800 participants is specifically designed to accommodate the three-tiered analytical approach employed in each framework. The methodology explains that this sample size ensures adequate statistical power for percentage-based descriptive analyses, Chi-square tests of association and one-sample t-tests against neutral benchmarks. The large sample size is particularly crucial for the Chi-square analyses, as these tests require sufficient cell frequencies to produce reliable results when examining associations between categorical variables.

Furthermore, the sample size consideration takes into account the theoretical expectations derived from the underlying frameworks. For instance, when testing against the neutral 50% benchmark using one-sample t-tests, the methodology recognizes that "with n=800 the sample proportion's distribution will approximate normal, justifying a t-test to infer about the population proportion" (Shawahna *et al*., 2012). This statistical foundation ensures that the theoretical hypotheses derived from TPB, brand equity theory and other frameworks can be rigorously tested.

The sampling frame encompasses practicing physicians across India's urban hierarchy, including Tier 1 cities, Tier 2 cities and Tier 3 cities. This stratified geographic approach ensures that the sample captures the diversity of prescribing contexts and influences that may vary across different levels of urban development and healthcare infrastructure sophistication.

3.6 Participant Selection

The participant selection process employs a purposive sampling methodology specifically targeted at practicing physicians across India's Tier 1, Tier 2 and Tier 3 cities. This sampling approach is explicitly justified within the research design as necessary to "ensure a representative and robust dataset" that captures the diversity of prescribing contexts across India's urban healthcare landscape.

The inclusion criteria are carefully designed to align with the theoretical foundations of the research. Participants must be licensed practicing physicians who are currently prescribing medications to patients within the Indian healthcare system, ensuring that they have direct, contemporary experience with the decision-making processes that the theoretical frameworks seek to explain. The methodology emphasizes that participants must be actively engaged in prescribing decisions because the theoretical models, particularly TPB and brand equity theory, require that subjects have relevant behavioral experience and formed attitudes toward the factors being investigated.

The geographic stratification across city tiers is theoretically important because it captures variation in healthcare infrastructure, patient populations, pharmaceutical access and marketing exposure that may influence prescribing behavior. Tier 1 cities typically feature advanced healthcare facilities, diverse patient populations and intensive pharmaceutical marketing activities. Tier 2 cities represent important regional healthcare centers with substantial infrastructure but potentially different patient demographics and marketing approaches. Tier 3

cities often serve as healthcare hubs for surrounding rural areas, with distinct practice patterns and resource constraints that may influence prescribing decisions.

The exclusion criteria are equally important in maintaining the theoretical integrity of the study. The methodology excludes retired physicians, medical students, residents without independent prescribing authority and physicians not currently in active practice within the Indian healthcare system. These exclusions are theoretically justified because the underlying frameworks, particularly those related to marketing influence and decision-making, require participants who have autonomous decision-making authority and current exposure to the various influences being studied within the specific context of Indian pharmaceutical markets and healthcare delivery systems.

The recruitment strategy involved direct outreach to practicing physicians across the three city tiers, ensuring geographic diversity and representation of different practice settings. This approach is methodologically sound because it provides access to physicians practicing in varied contexts while maintaining the anonymity that is crucial for obtaining honest responses about potentially sensitive topics such as commercial influences on prescribing behavior. The methodology recognizes that topics such as the influence of medical representatives or marketing materials on prescribing decisions may be subject to social desirability bias, making anonymous participation essential for data validity.

The purposive sampling approach also allows for the theoretical requirement that participants have sufficient exposure to the phenomena being studied. For instance, the framework examining pharmaceutical promotion strategies requires participants who have experienced various promotional approaches, while the branding framework requires physicians who have encountered branded versus generic medication choices in their practice within the Indian pharmaceutical market context.

3.7 Instrumentation

The survey instrument represents a carefully constructed tool that directly operationalizes the theoretical constructs identified in the five analytical frameworks. The questionnaire was designed using the SurveyMonkey platform, which provided a user-friendly interface for creating structured, professional survey instruments. The questionnaire development process was guided by the principle that "each survey item essentially asks the doctor to affirm or deny whether a variable factor plays a role in their prescribing decision," ensuring direct alignment between theoretical constructs and measurable variables.

The first component of the instrument addresses medical representatives' influence through the question: "Do you think Medical Representatives play an important factor in your decision to prescribe a particular drug?" This question directly operationalizes the TPB construct of external influences on attitudes and behavioral intentions. The methodology explains that this question is designed to capture physicians' acknowledgment of MR influence, which "provides essential descriptive insight into the prevalence of this belief" and "forms a foundation for understanding the social and cognitive context of prescribing behavior."

The medication branding component employs the question: "Do you think properly branding the drug gives it a competitive edge for that particular brand over other brands?" This question

is specifically designed to measure the brand equity constructs identified in the theoretical framework. The methodology notes that this question captures physicians' recognition of brand advantage, which is theoretically grounded in "brand equity theory, which posits that a brand's value (equity) built through factors like brand image, perceived quality and brand loyalty can significantly influence consumer (or prescriber) preferences."

The medication costing dimension is measured through: "Do you take into consideration the cost of the drugs promoted by the medical representative before prescribing the same to the patient?" This question operationalizes the Rational Choice Theory construct by directly asking about cost-benefit consideration in prescribing decisions. The methodology explains that this question is designed to test whether physicians engage in the rational decision-making process that RCT predicts, where "a physician will consider the medication's cost as part of a rational decision to optimize patient outcomes and adherence."

The patient experience component uses: "If you notice that a particular drug is demonstrating good beneficial results on the patient for a particular disease, would you re-prescribe the medication to the patient again on request of the patient?" This question is theoretically grounded in shared decision-making principles and Evidence-Based Medicine frameworks. The methodology explains that this question tests "the extent to which clinicians are willing to share decision authority with the patient" and measures alignment with EBM principles that require considering "the patient's values/preferences."

The pharmaceutical promotion strategies component employs: "Which of the below advertising strategies do you think increases higher awareness of new medicine launches in the market?" with options including Social Media Advertising, Face-to-Face Detailing and Pamphlets and other Physical Copies. This question operationalizes the AIDA model's awareness stage and diffusion theory's communication channels. The methodology notes that this question identifies which promotional channel "most effectively triggers the attention phase of decision-making" and aligns with diffusion theory's distinction between mass communication and interpersonal channels.

The decision to use binary response formats throughout the instrument is theoretically and methodologically justified. The methodology explains that binary responses were chosen "for clarity and ease of response, ensuring high response completion and straightforward interpretation of results." This format also aligns with the statistical analysis plan, as binary responses facilitate the percentage analyses, Chi-square tests and one-sample t-tests that form the analytical framework.

The instrument validation process draws on established literature and theoretical frameworks rather than traditional psychometric validation procedures. The methodology states that "the survey questions were designed based on established theoretical frameworks and validated through literature review to ensure content validity and theoretical grounding." Each question is explicitly linked to published research and theoretical constructs, providing content validity through theoretical alignment rather than empirical validation procedures.

3.8 Data Collection Procedures

The data collection procedures were designed to maximize response rates while maintaining data quality and theoretical integrity through a systematic approach to physician recruitment across India's diverse urban healthcare landscape. The survey questionnaire was designed using the SurveyMonkey platform, which provided the necessary tools for creating a professional, structured instrument and generating a shareable survey link for distribution.

Following the questionnaire design phase, the researcher personally undertook the task of reaching out to practicing physicians across India's Tier 1, Tier 2 and Tier 3 cities. This direct outreach approach was strategically chosen to ensure geographic representation and to establish personal connection with potential participants, thereby enhancing response rates and data quality. The researcher utilized the SurveyMonkey-generated link to distribute the survey to physicians across these diverse urban contexts.

The data collection period extended over twelve months, a duration that was strategically chosen to accommodate the challenges of surveying medical professionals across different geographic locations and to ensure adequate sample size achievement. The methodology explains that "the survey was run for 12 months to ensure a sizeable number of doctors respond to the survey." This extended timeline recognizes that physicians have demanding schedules and may require multiple contact opportunities to participate in research studies, particularly when approached through personal outreach rather than institutional channels.

The extended collection period also serves important theoretical purposes. Given that the study examines influences on prescribing behavior, the twelve-month timeline allows for the capture of physicians with varying levels of experience with the phenomena being studied. For instance, some physicians may have recent experience with medical representative visits or new drug launches, while others may draw on longer-term experiences. This temporal variation enriches the dataset and enhances the theoretical validity of the findings.

The direct outreach methodology enabled several methodologically important features. First, it provided geographic diversity in the sample, allowing the study to capture prescribing patterns and influences that may vary across different city tiers and regional contexts within India. Second, it maintained participant anonymity through the electronic survey link while enabling the researcher to ensure appropriate participant selection and follow-up when necessary.

The methodology incorporated ongoing response monitoring throughout the collection period. This monitoring served both practical and theoretical purposes. Practically, it ensured that the target sample size was achieved and allowed for adjustments to outreach strategies across different city tiers if needed. Theoretically, it enabled assessment of potential response biases and ensured that the final sample adequately represented the diversity of the target population across India's urban healthcare hierarchy.

The researcher's direct involvement in participant recruitment allowed for quality control measures throughout the data collection process. This approach enabled verification of participant eligibility, clarification of questions when needed and maintenance of consistent recruitment standards across different geographic areas. The personal outreach approach also facilitated trust-building with potential participants, which is particularly important when collecting sensitive information about prescribing influences and commercial relationships.

Quality control measures were embedded throughout the data collection process. The methodology emphasizes that clear, unambiguous question wording and binary response options minimize confusion and measurement error. The SurveyMonkey platform-based data validation ensured completeness and consistency of responses, while the extended collection period and direct outreach approach maximized participation rates and reduced non-response bias across different city tiers.

3.9 Data Analysis

The data analysis strategy represents a sophisticated three-tiered approach that is carefully aligned with the theoretical frameworks underlying each component of the study. This analytical framework is designed to provide comprehensive understanding of physician prescribing behavior by examining descriptive patterns, testing for statistical associations and evaluating theoretical hypotheses about behavioral tendencies.

The first tier employs percentage-based descriptive analysis to summarize response distributions for each survey item. This approach is theoretically grounded in the recognition that understanding the prevalence of attitudes and behaviors is fundamental to behavioral research. The methodology explains that "calculating the percentage of doctors who answered 'Yes' provides essential descriptive insight into the prevalence of this belief" and "forms a foundation for understanding the social and cognitive context of prescribing behavior." This descriptive foundation is crucial because it establishes the baseline understanding necessary for interpreting more complex statistical relationships.

For the medical representatives framework, the percentage analysis reveals "the collective attitude climate" which, according to TPB, influences behavioral intentions. The methodology notes that "if a large majority acknowledge influence, it suggests a broad acceptance or awareness of MR impact; if a small minority do, it indicates prevalent resistance or denial." This descriptive insight provides theoretically meaningful information about the social psychology of prescribing behavior.

Similarly, for the branding framework, percentage analysis provides "a straightforward profile of perceptions, which is valuable on its own and also sets the stage for deeper analysis." The methodology explains that "a high percentage affirming the influence of brand image would support the notion (from theory) that brand associations are indeed pervasive in prescribing decisions" (Kaliyadan and Kulkarni, 2019).

The second tier employs Chi-square tests of independence to examine associations between categorical variables. This analytical approach is theoretically justified because it tests the relationships that frameworks like TPB and persuasion theory predict. The methodology explains that "TPB expects a connection between one's stance on MR influence and one's prescribing choices (since external influences factor into attitudes and norms, which drive behavior)."

For the branding framework, Chi-square analysis tests for interdependencies that brand equity theory predicts. The methodology notes that "brand equity theory suggests the dimensions of brand perception could reinforce each other—if so, we may find a significant association indicating that a 'Yes' on brand image is not independent of a 'Yes' on perceived quality or

loyalty." This statistical approach allows the study to move beyond descriptive understanding to examine the theoretical relationships proposed in the underlying frameworks.

The Chi-square analysis also serves to validate theoretical expectations across all frameworks. For instance, in the patient experience framework, the test examines whether "doctors who say they would comply with patient suggestions actually behave differently than those who say they would not." This approach directly tests the behavioral predictions derived from shared decision-making theory and TPB.

The third tier utilizes one-sample t-tests to compare sample proportions against a neutral benchmark of 50% (0.5). This analytical approach is theoretically sophisticated because it tests whether physician attitudes significantly deviate from neutrality, providing insight into the strength and direction of behavioral tendencies. The methodology explains that "testing against 0.5 allows us to see if there is a significant majority or minority view on MR influence."

For each framework, the one-sample t-test serves specific theoretical purposes. In the medical representatives framework, the test determines whether there is "a consensus (and in which direction) among physicians regarding MR influence." The methodology recognizes that this consensus can create feedback loops in behavior because "if everyone believes 'yes, reps have influence,' then discussions, policies and personal self-regulation strategies might shift accordingly."

In the branding framework, the one-sample t-test evaluates whether "the proportion of doctors who see a competitive edge in branding is significantly above 0.5 or significantly below 0.5." The methodology anticipates that "based on marketing theory and prior studies, more than half of physicians will acknowledge a brand advantage," and the statistical test provides rigorous evaluation of this theoretical expectation.

The analytical framework recognizes that each statistical method contributes to a comprehensive understanding of the phenomena. The methodology states that "by grounding our analysis methods with these theories, we ensure that the interpretation of results is not merely statistical but also meaningfully connected to established knowledge in healthcare marketing and behavioral science." This integration ensures that statistical findings are contextualized within theoretical frameworks, where "percentage results become reflections of social norms, association tests become evidence of causal theories and benchmark tests speak to consensus formation."

3.10 Research Design Limitations

The research design incorporates several inherent limitations that are important to acknowledge for proper interpretation of findings and theoretical implications. These limitations arise from methodological choices that, while justified by theoretical and practical considerations, introduce potential constraints on the scope and generalizability of the research findings.

The most significant limitation stems from the reliance on self-reported perceptions and behaviors from physicians. The methodology acknowledges that this approach may not accurately reflect actual prescribing behavior, as there can be substantial differences between what physicians report they do and what they actually do in clinical practice. This limitation is particularly relevant given the theoretical frameworks employed, as TPB and other behavioral

models assume that reported attitudes and intentions correlate with actual behavior. However, research in healthcare settings has documented discrepancies between stated intentions and observed behaviors, particularly when those behaviors may be viewed as professionally questionable or ethically problematic.

The self-report limitation is compounded by potential social desirability bias, where physicians may provide responses, they believe are professionally appropriate rather than truthful reflections of their decision-making processes. This bias is particularly concerning for questions about commercial influences on prescribing, as acknowledging such influences might conflict with professional ideals of evidence-based, patient-centered care. The methodology attempts to mitigate this through anonymous survey administration, but the potential for bias remains significant and could lead to underestimation of commercial influences on prescribing behavior.

The decision to employ binary response formats, while methodologically justified for statistical clarity and ease of completion, introduces important limitations in capturing the complexity of physician decision-making processes. The methodology acknowledges that "Yes/No responses may oversimplify complex decision-making processes" and result in "loss of nuanced understanding of factors influencing prescribing." Real-world prescribing decisions involve multiple competing factors, contextual considerations and degrees of influence that cannot be adequately captured through dichotomous responses. This simplification may obscure important theoretical insights about how different factors interact and influence each other in actual clinical decision-making.

The cross-sectional design represents another fundamental limitation that constrains the types of theoretical conclusions that can be drawn from the research. The methodology recognizes that this design "cannot establish causal relationships, only associations" and therefore provides "limited ability to infer causation from observed relationships." This limitation is particularly important given that the theoretical frameworks, especially TPB and rational choice theory, involve causal assumptions about how attitudes influence intentions and how intentions influence behavior. The cross-sectional approach can identify correlations consistent with these theoretical models but cannot definitively establish the causal pathways that the theories propose.

The sampling methodology introduces additional limitations that may affect the generalizability of findings. While the direct outreach approach across Tier 1, Tier 2 and Tier 3 cities provides geographic diversity within India, it may introduce selection bias by systematically including physicians who are more accessible or responsive to research participation requests. For instance, physicians who are extremely busy, less comfortable with surveys, or practicing in certain specialized settings may be underrepresented in the sample. This limitation is theoretically important because the factors influencing prescribing behavior may vary across different physician populations and systematic exclusion of certain groups could bias the findings.

The geographic limitation to Indian cities, while providing cultural and regulatory consistency, may limit the generalizability of findings to other healthcare systems, regulatory environments, or cultural contexts. Prescribing patterns, pharmaceutical marketing practices and physician-patient relationships may vary significantly across different countries and healthcare systems, potentially limiting the theoretical applicability of findings beyond the Indian context.

Temporal limitations represent another important constraint on the research design. The single time-point measurement approach may not capture the dynamic nature of physician attitudes and behaviors, which may change over time due to evolving clinical experience, changing regulatory environments, or shifts in pharmaceutical marketing practices. The theoretical frameworks, particularly those related to diffusion of innovations and behavioral change, recognize that attitudes and behaviors evolve over time, but the cross-sectional design cannot capture these temporal dynamics.

The reliance on electronic survey administration, while providing efficiency and anonymity, may introduce technology-related selection bias by excluding physicians who are less comfortable with digital platforms or have limited internet access. This technological constraint may particularly affect certain demographic groups or physicians practicing in areas with limited technological infrastructure, potentially limiting the representativeness of the sample.

The theoretical framework constraints represent a final category of limitations that shape the scope and interpretation of findings. While the methodology employs multiple established theoretical frameworks, it is necessarily bounded by the constructs and assumptions of these selected theories. The methodology acknowledges that this may not "capture all relevant factors influencing prescribing behavior." Alternative theoretical frameworks, such as institutional theory, network theory, or other behavioral models, might highlight different factors or relationships that are not addressed in the current design.

Additionally, the theoretical frameworks employed primarily focus on individual-level decision-making processes and may inadequately address systemic, organizational, or policy-level factors that influence prescribing behavior. Factors such as institutional prescribing protocols, insurance formulary requirements, regulatory constraints, or organizational cultures may significantly influence prescribing decisions but are not adequately captured within the individual-focused theoretical frameworks employed in this study.

These limitations do not invalidate the research design but rather define its scope and the appropriate interpretation of its findings. The methodology recognizes these constraints while arguing that the theoretical insights gained from this approach provide valuable contributions to understanding physician prescribing behavior within the acknowledged limitations of the research design.

3.11 Conclusion

The methodology employed in this study was purposefully designed to offer a comprehensive, theory-informed and statistically sound research into the multifaceted influences on physician prescribing behavior within the Indian healthcare environment. This research is grounded in twelve robust theoretical models: the Theory of Planned Behavior (TPB), Persuasion Theory, the Elaboration Likelihood Model (ELM), Information Processing Theory, Brand Equity Theory, Signaling Theory, Rational Choice Theory (RCT), Behavioral Economics, Shared Decision-Making (SDM) Theory, Evidence-Based Medicine (EBM) Principles, the AIDA Model and the Diffusion of Innovations Theory. Each of these frameworks informed the conceptualization and operationalization of key variables, ensuring that every stage of the research process—from questionnaire design to data analysis—was theoretically coherent and empirically justified.

Data were collected using a structured, anonymous online survey administered through the SurveyMonkey platform. This digital tool allowed for efficient and secure data collection from a purposively selected sample of 800 actively practicing physicians across India's Tier 1, Tier 2 and Tier 3 cities. The use of SurveyMonkey ensured a professional and uniform data collection process while preserving respondent anonymity, which was critical given the potentially sensitive nature of questions related to commercial influence and clinical decision-making. The binary (Yes/No) response format adopted across most survey items provided analytical clarity and respondent ease, while a three-option categorical format was used for assessing preferences in promotional strategies.

Statistical analysis of the collected data was performed using IBM SPSS software. The study employed a three-tiered statistical approach: descriptive percentage analysis to measure the prevalence of attitudes and behaviors; Chi-square tests of independence to examine statistical associations between key categorical variables; and one-sample t-tests to assess whether observed proportions significantly deviated from a neutral benchmark of 50 percent. This layered analytical design allowed for a detailed exploration of both the strength and direction of physician perceptions and behaviors, while also testing theoretical hypotheses about consensus, associations and behavioral norms within the medical community.

The methodological framework also integrated a number of procedural strengths to maximize data quality and research validity. The data collection spanned a full twelve months, allowing for extensive outreach with physicians across different geographic and professional contexts. The direct involvement of the researcher in recruitment facilitated response rate optimization and helped ensure the selection of qualified participants. Quality control was maintained throughout the process, including the use of platform-based response validation, ongoing response monitoring and structured outreach procedures to reduce sampling and response biases.

While certain limitations are acknowledged—such as reliance on self-reported data, potential social desirability bias and the cross-sectional nature of the study—these are addressed through the rigorous theoretical grounding, large and diverse sample and robust analytical strategies adopted. The use of anonymized digital surveys and carefully worded binary questions helped mitigate respondent hesitancy and increased the reliability of responses, especially in areas involving professional conduct and external marketing influences.

In conclusion, this methodological design offers a balanced, multidimensional and empirically rigorous approach to understanding prescribing behavior among physicians. By synthesizing a broad array of behavioral, economic, marketing and communication theories and leveraging digital data collection through SurveyMonkey along with advanced statistical analysis using IBM SPSS, the study ensures both academic depth and practical relevance. The approach not only addresses the complexity of real-world medical decision-making but also contributes actionable insights to the fields of pharmaceutical marketing, clinical practice strategy and healthcare policy.

Chapter IV:
RESULTS

4.1 Research Question 1- Influence of Medical Representative

To prove the Null or Alternate Hypothesis 1 which focuses on the Role of Medical Representatives in Shaping Doctor Prescription Patterns, the survey question used is Do you think Medical Representatives play an important factor in your decision to prescribe a particular drug? (Influence of Medical representative on the Prescription Behaviour of the doctor)

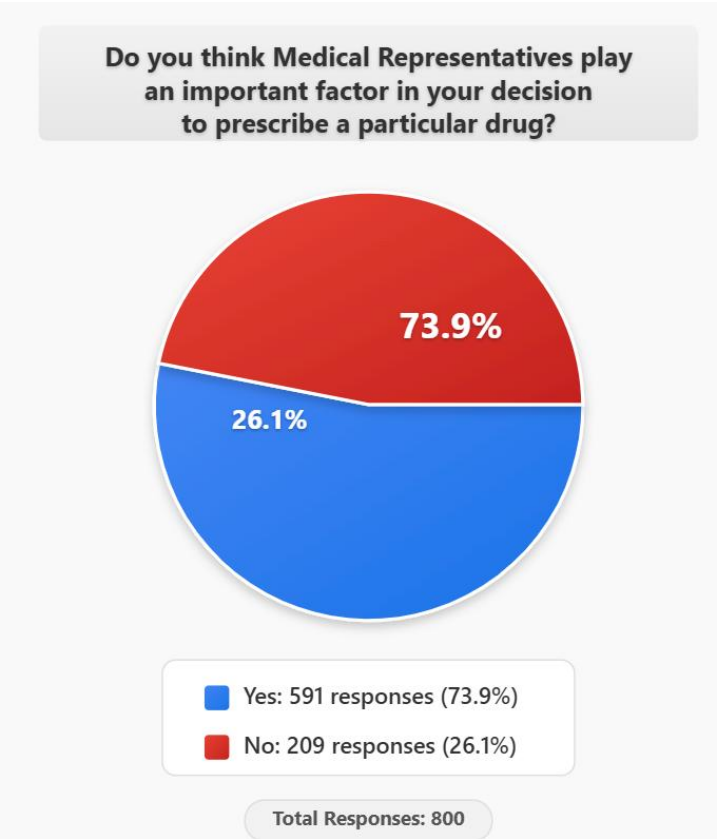


Figure 3
Percentage Analysis of Influence of Medical Representatives on the Prescription Behaviour of Doctors

As per Figure 3, Out of 800 respondents surveyed, 73.9% responded "Yes" while 26.1% responded "No" to the question asking whether medical representatives play an important factor in their decision to prescribe a particular drug. This clearly indicates that Medical Representatives do strongly influence the prescription behaviour of Doctors.

The second test carried out to substantiate our hypothesis is the Chi-Square test which was run in IBM SPSS. The Survey Question used is as per Table 4 and Table 5.

Do you think Medical Representatives play an important factor in your decision to prescribe a particular drug?			
	Observed N	Expected N	Residual
Yes	591	400.0	191.0
No	209	400.0	-191.0
Total	800		

Table 4

Expected and Observed Frequency for Influence of Medical Representatives on the Prescription Behaviour of Doctors.

Test Statistics	
	Do you think Medical Representatives play an important factor in your decision to prescribe a particular drug?
Chi-Square	182.405
df	1
Asymp. Sig.	<.001

Table 5

Chi- Square Analysis of Influence of Medical Representatives on the Prescription Behaviour of Doctors.

Under the null hypothesis of no association, an equal distribution of 400 responses for "Yes" and "No" was expected. However, the observed frequencies deviated markedly, with residuals of +191 (Yes) and -191 (No), indicating a strong preference for the affirmative response (As per Table 4). The Chi-Square statistic of 182.405 ($df = 1$, $p < 0.001$) confirmed that this disparity was statistically significant, rejecting the null hypothesis (As per Table 5).

In conclusion, the analysis provides empirical validation of the alternate hypothesis that Medical Representatives are perceived as influential in prescription decisions. The significant deviation from expected responses, coupled with the statistical strength of the results, solidifies the conclusion that doctors' prescribing patterns are not independent of Medical Representatives' input.

The third test carries out is the one sample T-Test. The results for the same are given in below Table 6, Table 7 and Table 8.

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
Do you think Medical Representatives play an important factor in your decision to prescribe a particular drug?	800	1.26	0.440	0.016

Table 6

Descriptive Statistics for the Influence of Medical Representatives on the Prescription Behaviour of Doctors

One-Sample Test							
	Test Value = 0.5						
			Significance			95% Confidence Interval of the Difference	
	t	df	One-Sided p	Two-Sided p	Mean Difference	Lower	Upper
Do you think Medical Representatives play an important factor in your decision to prescribe a particular drug?	48.981	799	0.000	0.000	0.761	0.73	0.79

Table 7

One-Sample t-Test Results Comparing Medical Representative's Influence to Test Value (0.5)

One-Sample Effect Sizes					
				95% Confidence Interval	
		Standardizer[a]	Point Estimate	Lower	Upper
Do you think Medical Representatives play an important factor in your decision to prescribe a particular drug?	Cohen's d	0.440	1.732	1.622	1.841
	Hedges' correction	0.440	1.730	1.620	1.839
a. The denominator used in estimating the effect sizes. Cohen's d uses the sample standard deviation. Hedges' correction uses the sample standard deviation, plus a correction factor.					

Table 8

Effect Size Analysis for the Influence of Medical representatives on the Prescription Behaviour of Doctors.

The descriptive statistics from Table 6 indicate that data was collected from a substantial sample of 800 participants, yielding a mean score of 1.26 (SD = 0.440). The standard error of the mean was calculated at 0.016, indicating high precision in the sample mean as an estimator of the population mean. This relatively low standard error demonstrates minimal variability in the sampling distribution, thereby enhancing confidence in the statistical inferences drawn from this analysis.

The t-test results presented in Table 7 demonstrate remarkably strong evidence against the null hypothesis. The observed t-value of 48.981 with 799 degrees of freedom substantially exceeds conventional critical thresholds for statistical significance. This resulted in both one-sided and two-sided p-values of 0.000 ($p < 0.001$), indicating an exceedingly low probability that these results occurred by chance if the null hypothesis were true. The mean difference of 0.761 from the test value (0.5) represents a substantial deviation, while the narrow 95% confidence interval ranging from 0.73 to 0.79 further substantiates the precision and reliability of this finding.

Particularly noteworthy are the effect size measurements detailed in Table 8. Cohen's d was calculated at 1.732 (95% CI: 1.622 to 1.841), while the Hedges' correction yielded a slightly more conservative value of 1.730 (95% CI: 1.620 to 1.839). These effect sizes far exceed Cohen's conventional threshold of 0.8 for "large" effects, suggesting not merely statistical significance but profound practical significance. The standardizer value of 0.440 corresponds to the sample standard deviation used in calculating these effect sizes, providing appropriate context for interpreting the magnitude of the observed effect.

The consistency between Cohen's d and Hedges' correction (which incorporates a correction factor to address potential bias in smaller samples) reinforces the robustness of the effect size estimation. Despite the large sample size in this study (n=800) making such corrections less

critical, this consistency enhances confidence in the reliability of the observed effect. The narrow confidence intervals for both effect size measures further attest to the precision of these estimates.

This comprehensive statistical analysis provides compelling evidence to reject the null hypothesis and accept the alternative hypothesis that medical representatives significantly influence the prescription behavior of doctors. The exceptionally high t-value (48.981), minute p-value ($p < 0.001$) and remarkably large effect size (Cohen's $d = 1.732$) collectively demonstrate that healthcare professionals perceive medical representatives as playing an important factor in their prescription decisions. The precision of these findings, as evidenced by narrow confidence intervals and low standard error, underscores their reliability and generalizability.

After thorough statistical analysis, we can confidently reject the null hypothesis and accept the alternate hypothesis that medical representatives do influence doctors' prescription behavior. This conclusion is supported by multiple statistical approaches. The percentage analysis shows 73.9% of surveyed doctors (n=800) confirmed medical representatives play an important role in their prescription decisions, providing a clear initial indicator of influence. The Chi-Square test (182.405, df=1, $p<0.001$) demonstrated a statistically significant deviation from expected equal distribution, with marked residuals (+191 for "Yes", -191 for "No"), definitively rejecting the null hypothesis. The One Sample T-Test produced exceptionally strong evidence with a t-value of 48.981 (df=799, $p<0.001$) and a mean difference of 0.761 from the test value. The narrow 95% confidence interval (0.73-0.79) confirms the precision of this finding. Effect size measurements (Cohen's d=1.732, Hedges' correction=1.730) far exceed the 0.8 threshold for "large" effects, indicating profound practical significance beyond mere statistical significance. These consistent findings across multiple statistical methods, combined with the large sample size, extremely high significance levels and substantial effect sizes present overwhelming evidence that medical representatives significantly influence doctors' prescription decisions.

4.2 Research Question 2- Influence of Medication Branding

To prove the Null or Alternate Hypothesis 2 which focuses on the Role of Medication Branding in Shaping Doctor Prescription Patterns, the survey question used Do you think properly branding the Drug gives it a competitive edge for that particular brand over other brands? (Brand Preference)

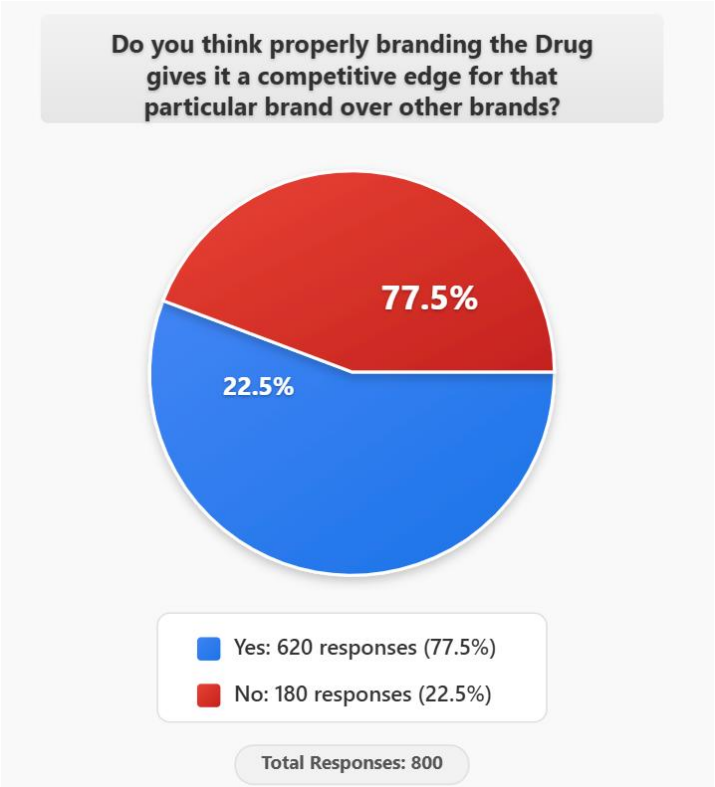


Figure 4
Percentage Analysis of Influence of Medication Branding on the Prescription Behaviour of Doctors

As per Figure 4, Out of 800 respondents surveyed, 77.5% responded "Yes" while 22.5% responded "No" to the question asking whether brand of the medication play an important factor in their decision to prescribe a particular drug. This clearly indicates that brand of the medication does strongly influence the prescription behaviour of Doctors.

The second test carried out to substantiate our hypothesis is the Chi-Square test which was run in IBM SPSS. The survey question used for the analysis is as per Table 9 and Table 10.

Do you think properly branding the Drug gives it a competitive edge for that particular brand over other brands?			
	Observed N	Expected N	Residual
Yes	620	400.0	220.0
No	180	400.0	-220.0
Total	800		

Table 9

Expected and Observed Frequency for Influence of Medication Branding on the Prescription Behaviour of Doctors.

Test Statistics	
	Do you think properly branding the Drug gives it a competitive edge for that particular brand over other brands?
Chi-Square	242.000[a]
df	1
Asymp. Sig.	<.001

Table 10

Chi- Square Analysis of Influence of Medication Branding on the Prescription Behaviour of Doctors

Under the null hypothesis of no association, an equal distribution of 400 responses for "Yes" and "No" was expected. However, the observed frequencies deviated markedly, with residuals of +220 (Yes) and -220 (No), indicating a strong preference for the affirmative response (As per Table 9). The Chi-Square statistic of 242.000 ($df = 1$, $p < 0.001$) confirmed that this disparity was statistically significant, rejecting the null hypothesis (As per Table 10).

In conclusion, the analysis provides empirical validation of the alternate hypothesis that the brand of the medication does influence the prescription behaviour of doctors. The significant deviation from expected responses, coupled with the statistical strength of the results, solidifies the conclusion that doctors' prescribing patterns are not independent of their preference for specific medication brands.

The third test carries out is the one sample T-Test. The results for the same are given in below Table 11, Table 12 and Table 13.

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
Do you think properly branding the product gives it a competitive edge for that particular brand over other brands?	800	1.23	0.418	0.015

Table 11

Descriptive Statistics for the Influence of Medication Branding on the Prescription Behaviour of Doctors

One-Sample Test							
	Test Value = 0.5						
			Significance			95% Confidence Interval of the Difference	
	t	df	One-Sided p	Two-Sided p	Mean Difference	Lower	Upper
Do you think properly branding the product gives it a competitive edge for that particular brand over other brands?	49.076	799	0.000	0.000	0.725	0.70	0.75

Table 12

One-Sample t-Test Results Comparing Medication Branding's Influence to Test Value (0.5)

One-Sample Effect Sizes					
		Standardizer[a]	Point Estimate	95% Confidence Interval	
				Lower	Upper
Do you think properly branding the product gives it a competitive edge for that particular brand over other brands?	Cohen's d	0.418	1.735	1.625	1.845
	Hedges' correction	0.418	1.733	1.624	1.843
a. The denominator used in estimating the effect sizes. Cohen's d uses the sample standard deviation. Hedges' correction uses the sample standard deviation, plus a correction factor.					

Table 13

Effect Size Analysis for the Influence of Medication Branding on the Prescription Behaviour of Doctors

The descriptive statistics from Table 11 reveal that data was collected from a substantial sample of 800 participants, yielding a mean score of 1.23 (SD = 0.418). The standard error of the mean was calculated at 0.015, indicating high precision in the sample mean as an estimator of the population mean. This relatively low standard error suggests minimal variability in the sampling distribution, thereby enhancing confidence in the statistical inferences drawn from this analysis.

The t-test results presented in Table 12 demonstrate remarkably strong evidence against the null hypothesis. The observed t-value of 49.076 with 799 degrees of freedom substantially exceeds conventional critical thresholds. This resulted in both one-sided and two-sided p-values of 0.000 ($p < 0.001$), indicating an exceedingly low probability that these results occurred by chance if the null hypothesis were true. The mean difference of 0.725 from the test value (0.5) represents a substantial deviation, while the narrow 95% confidence interval ranging from 0.70 to 0.75 further substantiates the precision and reliability of this finding.

Particularly noteworthy are the effect size measurements detailed in Table 13. Cohen's d was calculated at 1.735 (95% CI: 1.625 to 1.845), while the Hedges' correction yielded a nearly identical value of 1.733 (95% CI: 1.624 to 1.843). These effect sizes far exceed Cohen's conventional threshold of 0.8 for "large" effects, suggesting not merely statistical significance but profound practical significance. The standardizer value of 0.418 corresponds to the sample standard deviation used in calculating these effect sizes, providing appropriate context for interpreting the magnitude of the observed effect.

The consistency between Cohen's d and Hedges' correction (which incorporates a correction factor to address potential bias in smaller samples) reinforces the robustness of the effect size estimation. Despite the large sample size in this study (n=800) making such corrections less critical, this consistency enhances confidence in the reliability of the observed effect. The narrow confidence intervals for both effect size measures further attest to the precision of these estimates.

This comprehensive statistical analysis provides compelling evidence to reject the null hypothesis and accept the alternative hypothesis that the brand of medication significantly influences the prescription behavior of doctors. The exceptionally high t-value, minute p-value and remarkably large effect size collectively demonstrate that healthcare professionals perceive proper branding as conferring a substantial competitive advantage. The precision of these findings, as evidenced by narrow confidence intervals and low standard error, underscores their reliability and generalizability.

After thorough statistical analysis, we can confidently reject the null hypothesis and accept the alternate hypothesis that the brand of medication does influence doctors' prescription behavior. This conclusion is supported by multiple statistical approaches. The percentage analysis shows 77.5% of surveyed doctors (n=800) confirmed that proper branding gives a competitive edge, providing a clear initial indicator of brand influence on prescription decisions. The Chi-Square test (242.000, df=1, $p<0.001$) demonstrated a statistically significant deviation from expected equal distribution, with marked residuals (+220 for "Yes", -220 for "No"), definitively rejecting the null hypothesis. The One Sample T-Test produced exceptionally strong evidence with a t-value of 49.076 (df=799, $p<0.001$) and a mean difference of 0.725 from the test value. The narrow 95% confidence interval (0.70-0.75) confirms the precision of this finding. Effect size measurements (Cohen's d=1.735, Hedges' correction=1.733) far exceed the 0.8 threshold for "large" effects, indicating profound practical significance beyond mere statistical significance. These consistent findings across multiple statistical methods, combined with the large sample size, extremely high significance levels and substantial effect sizes present overwhelming evidence that the brand of medication significantly influences doctors' prescription decisions, with healthcare professionals perceiving proper branding as conferring a substantial competitive advantage.

4.3 Research Question 3- Influence of Medication Costing

To prove the Null or Alternate Hypothesis 3 which focuses on the Role of Medication Costing in Shaping Doctor Prescription Patterns, the survey question used Before prescribing medication to a patient, Do you take into consideration the cost of the drugs promoted by the medical representative before prescribing the same to the patient? (Influence of cost of the medication on the Prescription Behaviour of the Doctor)

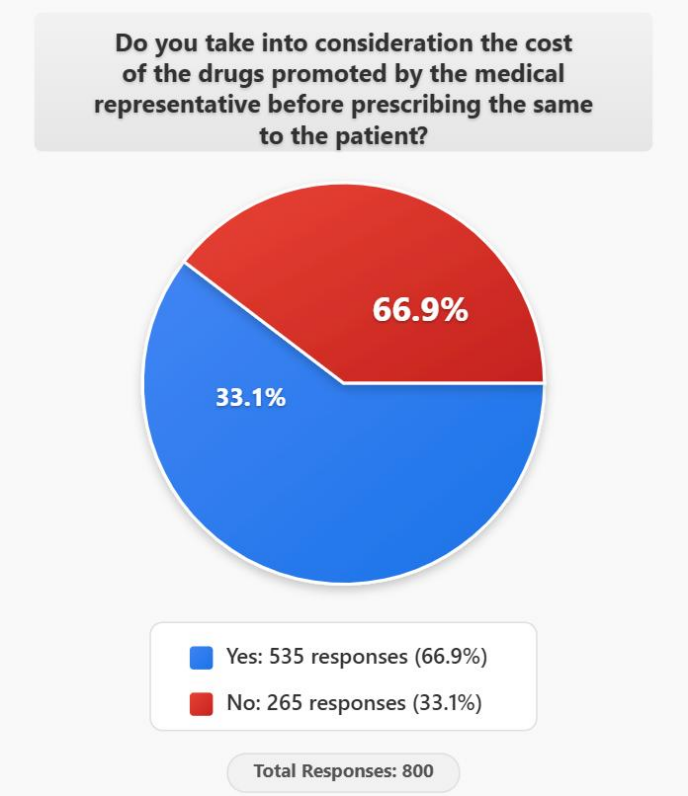


Figure 5
Percentage Analysis of Influence of Medication Costing on the Prescription Behaviour of Doctors

As per Figure 5, Out of 800 respondents surveyed, 66.9%% responded "Yes" while 33.1% responded "No" to the question asking whether cost of the medication plays an important factor in their decision to prescribe a particular drug. This clearly indicates that cost of the medication does strongly influence the prescription behaviour of Doctors.

The second test carried out to substantiate our hypothesis is the Chi-Square test which was run in IBM SPSS. The survey question used for the analysis is as per Table 14 and Table 15.

Do you take into consideration the cost of the drugs promoted by the medical representative before prescribing the same to the patient?			
	Observed N	Expected N	Residual
Yes	535	400.0	135.0
No	265	400.0	-135.0
Total	800		

Table 14

Expected and Observed Frequency for Influence of Medication Costing on the Prescription Behaviour of Doctors

Test Statistics	
	Do you take into consideration the cost of the drugs promoted by the medical representative before prescribing the same to the patient?
Chi-Square	91.125[a]
df	1
Asymp. Sig.	<.001

Table 15

Chi- Square Analysis of Influence of Medication Costing on the Prescription Behaviour of Doctors

Under the null hypothesis of no association, an equal distribution of 400 responses for "Yes" and "No" was expected. However, the observed frequencies deviated markedly, with residuals of +135 (Yes) and -135 (No), indicating a strong preference for the affirmative response (As per Table 14). The Chi-Square statistic of 91.125 ($df = 1$, $p < 0.001$) confirmed that this disparity was statistically significant, rejecting the null hypothesis (As per Table 15).

In conclusion, the analysis provides empirical validation of the alternate hypothesis that the cost of the medication does influence the prescription behaviour of doctors. The significant deviation from expected responses, coupled with the statistical strength of the results, solidifies the conclusion that doctors' prescribing patterns are not independent of their consideration of the prescription's financial burden on patients.

The third test carries out is the one sample T-Test. The results for the same are given in below Table 16, Table 17 and Table 18.

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
Do you take into consideration the cost of the drugs promoted by the medical representative before prescribing the same to the patient?	800	1.33	0.471	0.017

Table 16

Descriptive Statistics for the Influence of Medication Costing on the Prescription Behaviour of Doctors

One-Sample Test							
	Test Value = 0.5						
			Significance			95% Confidence Interval of the Difference	
	t	df	One-Sided p	Two-Sided p	Mean Difference	Lower	Upper
Do you take into consideration the cost of the drugs promoted by the medical representative before prescribing the same to the patient?	49.922	799	0.000	0.000	0.831	0.80	0.86

Table 17

One-Sample t-Test Results Comparing Medication Costing's Influence to Test Value (0.5)

One-Sample Effect Sizes					
		Standardizer[a]	Point Estimate	95% Confidence Interval	
				Lower	Upper
Do you take into consideration the cost of the drugs promoted by the medical representative before prescribing the same to the patient?	Cohen's d	0.471	1.765	1.654	1.876
	Hedges' correction	0.471	1.763	1.652	1.874
a. The denominator used in estimating the effect sizes. Cohen's d uses the sample standard deviation. Hedges' correction uses the sample standard deviation, plus a correction factor.					

Table 18

Effect Size Analysis for the Influence of Medication Costing on the Prescription Behaviour of Doctors.

The descriptive statistics from Table 16 reveal that data was collected from a substantial sample of 800 participants, yielding a mean score of 1.33 (SD = 0.471). The standard error of the mean was calculated at 0.017, indicating high precision in the sample mean as an estimator of the population mean. This relatively low standard error demonstrates minimal variability in the sampling distribution, thereby enhancing confidence in the statistical inferences drawn from this analysis.

The t-test results presented in Table 17 demonstrate remarkably strong evidence against the null hypothesis. The observed t-value of 49.922 with 799 degrees of freedom substantially exceeds conventional critical thresholds for statistical significance. This resulted in both one-sided and two-sided p-values of 0.000 ($p < 0.001$), indicating an exceedingly low probability that these results occurred by chance if the null hypothesis were true. The mean difference of 0.831 from the test value (0.5) represents a substantial deviation, while the narrow confidence interval ranging from 0.80 to 0.86 further substantiates the precision and reliability of this finding.

Particularly noteworthy are the effect size measurements detailed in Table 18. Cohen's d was calculated at 1.765 (95% CI: 1.654 to 1.876), while the Hedges' correction yielded a slightly more conservative value of 1.763 (95% CI: 1.652 to 1.874). These effect sizes far exceed Cohen's conventional threshold of 0.8 for "large" effects, suggesting not merely statistical significance but profound practical significance. The standardizer value of 0.471 corresponds to the sample standard deviation used in calculating these effect sizes, providing appropriate context for interpreting the magnitude of the observed effect.

The consistency between Cohen's d and Hedges' correction (which incorporates a correction factor to address potential bias in smaller samples) reinforces the robustness of the effect size estimation. Despite the large sample size in this study (n=800) making such corrections less critical, this consistency enhances confidence in the reliability of the observed effect. The narrow confidence intervals for both effect size measures further attest to the precision of these estimates.

This comprehensive statistical analysis provides compelling evidence to reject the null hypothesis and accept the alternative hypothesis that the cost of medication significantly influences the prescription behavior of doctors. The exceptionally high t-value (49.922), minute p-value ($p < 0.001$) and remarkably large effect size (Cohen's $d = 1.765$) collectively demonstrate that healthcare professionals take into consideration medication cost before prescribing to patients. The precision of these findings, as evidenced by narrow confidence intervals and low standard error, underscores their reliability and generalizability.

After thorough statistical analysis, we can confidently reject the null hypothesis and accept the alternate hypothesis that the cost of medication does influence doctors' prescription behavior. This conclusion is supported by multiple statistical approaches. The percentage analysis shows 66.9% of surveyed doctors (n=800) confirmed they take into consideration the cost of drugs before prescribing them to patients, providing a clear initial indicator of cost influence on prescription decisions. The Chi-Square test (91.125, df=1, $p<0.001$) demonstrated a statistically significant deviation from expected equal distribution, with marked residuals (+135 for "Yes", -135 for "No"), definitively rejecting the null hypothesis. The One Sample T-Test produced exceptionally strong evidence with a t-value of 49.922 (df=799, $p<0.001$) and a mean difference of 0.831 from the test value. The narrow 95% confidence interval (0.80-0.86) confirms the precision of this finding. Effect size measurements (Cohen's d=1.765, Hedges' correction=1.763) far exceed the 0.8 threshold for "large" effects, indicating profound practical significance beyond mere statistical significance. These consistent findings across multiple statistical methods, combined with the large sample size, extremely high significance levels and substantial effect sizes present overwhelming evidence that the cost of medication significantly influences doctors' prescription decisions, with healthcare professionals taking into consideration the financial burden on patients before prescribing medications.

4.4 Research Question 4- Influence of Prior Patient Experience or Suggestion

To prove the Null or Alternate Hypothesis 4 which focuses on the Prior Patient Experience or Suggestion in Shaping Doctor Prescription Patterns, the survey question used is If you notice that a particular drug is demonstrating good beneficial results on the patient for a particular disease, would you re-prescribe the medication to the patient again on request of the patient? (Influence of Prior Patient Experience or Suggestion with the prescription behaviour of the doctor)

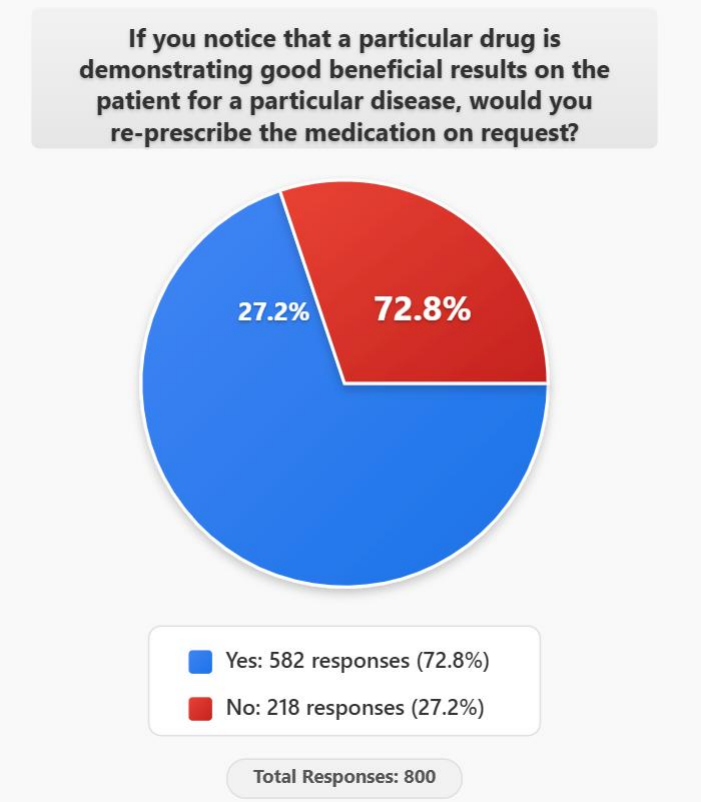


Figure 6
Percentage Analysis of Influence of Prior Patient Experience or Suggestion on the Prescription Behaviour of Doctors

As per Figure 6, Out of 800 respondents surveyed, 72.8% responded "Yes" while 27.2% responded "No" to the question asking whether prior patient experience or suggestion is an important factor in their decision to prescribe a particular drug. This clearly indicates that prior patient experience or suggestion do strongly influence the prescription behaviour of doctors.

The second test carried out to substantiate our hypothesis is the Chi-Square test which was run in IBM SPSS. The survey question used for the analysis is as per Table 19 and Table 20.

If you notice that a particular drug is demonstrating good beneficial results on the patient for a particular disease, would you re-prescribe the medication to the patient again on request of the patient?			
	Observed N	Expected N	Residual
Yes	582	400.0	182.0
No	218	400.0	-182.0
Total	800		

Table 19

Expected and Observed Frequency for Influence of Prior Patient Experience or Suggestion on the Prescription Behaviour of Doctors

Test Statistics	
	If you notice that a particular drug is demonstrating good beneficial results on the patient for a particular disease, would you re-prescribe the medication to the patient again on request of the patient?
Chi-Square	165.620
df	1
Asymp. Sig.	<.001

Table 20

Chi- Square Analysis of Influence of Prior Patient Experience or Suggestion on the Prescription Behaviour of Doctors

Under the null hypothesis of no association, an equal distribution of 400 responses for "Yes" and "No" was expected. However, the observed frequencies deviated markedly, with residuals of +182 (Yes) and -182 (No), indicating a strong preference for the affirmative response (As per Table 19). The Chi-Square statistic of 165.620 ($df = 1$, $p < 0.001$) confirmed that this disparity was statistically significant, rejecting the null hypothesis (As per Table 20).

In conclusion, the analysis provides empirical validation of the alternate hypothesis that prior patient experience or suggestion does influence the prescription behaviour of doctors. The significant deviation from expected responses, coupled with the statistical strength of the results, solidifies the conclusion that doctors' prescribing patterns are not independent of patient-reported outcomes or requests for re-prescription.

The third test carries out is the one sample T-Test. The results for the same are given in below Table 21, Table 22 and Table 23.

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
If you notice that a particular drug is demonstrating good beneficial results on the patient for a particular disease, would you re-prescribe the medication to the patient again on request of the patient?	800	1.27	0.446	0.016

Table 21
Descriptive Statistics for the Influence of Prior Patient Experience or Suggestion on the Prescription Behaviour of Doctors

One-Sample Test							
	Test Value = 0.5						
			Significance			95% Confidence Interval of the Difference	
	t	df	One-Sided p	Two-Sided p	Mean Difference	Lower	Upper
If you notice that a particular drug is demonstrating good beneficial results on the patient for a particular disease, would you re-prescribe the medication to the patient again on request of the patient?	49.042	799	0.000	0.000	0.773	0.74	0.80

Table 22
One-Sample t-Test Results Comparing Prior Patient Experience or Suggestion's Influence to Test Value (0.5)

One-Sample Effect Sizes					
		Standardizer[a]	Point Estimate	95% Confidence Interval	
				Lower	Upper
If you notice that a particular drug is demonstrating good beneficial results on the patient for a particular disease, would you re-prescribe the medication to the patient again on request of the patient?	Cohen's d	0.446	1.734	1.624	1.843
	Hedges' correction	0.446	1.732	1.622	1.842
a. The denominator used in estimating the effect sizes. Cohen's d uses the sample standard deviation. Hedges' correction uses the sample standard deviation, plus a correction factor.					

Table 23

Effect Size Analysis for the Influence of Prior Patient Experience or Suggestion on the Prescription Behaviour of Doctors

The descriptive statistics from Table 21 reveal that data was collected from a substantial sample of 800 participants, yielding a mean score of 1.27 (SD = 0.446). The standard error of the mean was calculated at 0.016, indicating high precision in the sample mean as an estimator of the population mean. This relatively low standard error demonstrates minimal variability in the sampling distribution, thereby enhancing confidence in the statistical inferences drawn from this analysis.

The t-test results presented in Table 22 demonstrate remarkably strong evidence against the null hypothesis. The observed t-value of 49.042 with 799 degrees of freedom substantially exceeds conventional critical thresholds for statistical significance. This resulted in both one-sided and two-sided p-values of 0.000 ($p < 0.001$), indicating an exceedingly low probability that these results occurred by chance if the null hypothesis were true. The mean difference of 0.773 from the test value (0.5) represents a substantial deviation, while the narrow confidence interval ranging from 0.74 to 0.80 further substantiates the precision and reliability of this finding.

Particularly noteworthy are the effect size measurements detailed in Table 23. Cohen's d was calculated at 1.734 (95% CI: 1.624 to 1.843), while the Hedges' correction yielded a slightly more conservative value of 1.732 (95% CI: 1.622 to 1.842). These effect sizes far exceed

Cohen's conventional threshold of 0.8 for "large" effects, suggesting not merely statistical significance but profound practical significance. The standardizer value of 0.446 corresponds to the sample standard deviation used in calculating these effect sizes, providing appropriate context for interpreting the magnitude of the observed effect.

The consistency between Cohen's d and Hedges' correction (which incorporates a correction factor to address potential bias in smaller samples) reinforces the robustness of the effect size estimation. Despite the large sample size in this study (n=800) making such corrections less critical, this consistency enhances confidence in the reliability of the observed effect. The narrow confidence intervals for both effect size measures further attest to the precision of these estimates.

This comprehensive statistical analysis provides compelling evidence to reject the null hypothesis and accept the alternative hypothesis that prior patient experience significantly influences the prescription behavior of doctors. The exceptionally high t-value (49.042), minute p-value ($p < 0.001$) and remarkably large effect size (Cohen's $d = 1.734$) collectively demonstrate that healthcare professionals consider patients' positive experiences with medications and are willing to re-prescribe medications that have previously demonstrated beneficial results when requested by patients. The precision of these findings, as evidenced by narrow confidence intervals and low standard error, underscores their reliability and generalizability.

After thorough statistical analysis, we can confidently reject the null hypothesis and accept that prior patient experience or suggestion does influence doctors' prescription behavior. This conclusion is supported by multiple statistical approaches. The percentage analysis shows 72.8% of surveyed doctors (n=800) confirmed they would re-prescribe medication that demonstrated good beneficial results when requested by patients, providing a clear initial indicator of patient experience influence on prescription decisions. The Chi-Square test (165.620, df=1, $p<0.001$) demonstrated a statistically significant deviation from expected equal distribution, with marked residuals (+182 for "Yes", -182 for "No"), definitively rejecting the null hypothesis. The One Sample T-Test produced exceptionally strong evidence with a t-value of 49.042 (df=799, $p<0.001$) and a mean difference of 0.773 from the test value. The narrow 95% confidence interval (0.74-0.80) confirms the precision of this finding. Effect size measurements (Cohen's d=1.734, Hedges' correction=1.732) far exceed the 0.8 threshold for "large" effects, indicating profound practical significance beyond mere statistical significance. These consistent findings across multiple statistical methods, combined with the large sample size, extremely high significance levels and substantial effect sizes present overwhelming evidence that prior patient experience significantly influences doctors' prescription decisions, with healthcare professionals willing to re-prescribe medications that have previously demonstrated beneficial results when requested by patients.

4.5 Research Question 5- Preferred Pharmaceutical Promotional Activity

To prove the Null or Alternate Hypothesis 5 which focuses on the most preferred form of pharmaceutical promotion activity to get latest information on medication, the survey question used Which of the below advertising strategies do you think increases higher awareness of new medicine launches in the market?

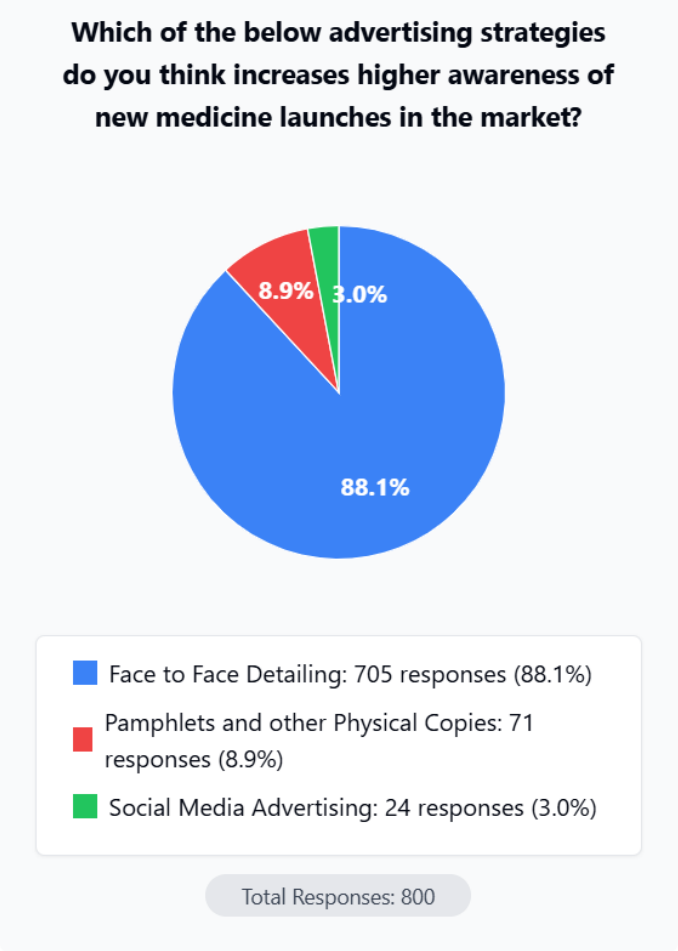


Figure 7
Percentage Analysis of the Preferred Pharmaceutical Promotional Activity on the Prescription Behaviour of Doctors

As per Figure 7, Out of 800 respondents surveyed, 88.1% responded "Face to Face Detailing", 8.9% responded “Pamphlets and other Physical Copies” and 3% responded "Social Media Advertisings" to the question asking whether Advertising Strategies affects the prescription behaviour of the doctor. This clearly indicates that the most preferred form of Pharmaceutical Promotion activity preferred by doctors is Face to Face detailing by Medical Representatives.

The second test carried out to substantiate our hypothesis is the Chi-Square test which was run in IBM SPSS. The survey question used for the analysis is as per Table 24 and Table 25.

Which of the below advertising strategies do you think increases highest awareness of new medicine launches in the market?			
	Observed N	Expected N	Residual
Social Media Advertisings	24	266.7	-242.7
Face to Face Detailing	705	266.7	438.3
Pamphlets and other Physical Copies	71	266.7	-195.7
Total	800		

Table 24

Expected and Observed Frequency for Influence of Preferred Pharmaceutical Promotional Activity on the Prescription Behaviour of Doctors

Test Statistics	
	Which of the below advertising strategies do you think increases higher awareness of new medicine launches in the market?
Chi-Square	1084.907
df	2
Asymp. Sig.	<.001

Table 25

Chi- Square Analysis of Influence of Preferred Pharmaceutical Promotional Activity on the Prescription Behaviour of Doctors

Under the null hypothesis of no association, an equal distribution of 266.7 responses for each advertising strategy (Social Media Advertisings, Face to Face Detailing and Pamphlets/Physical Copies) was expected. However, the observed frequencies deviated markedly, with residuals of -242.7 (Social Media Advertisings), +438.3 (Face to Face Detailing) and -195.7 (Pamphlets/Physical Copies), indicating a pronounced preference for Face to Face Detailing (As per Table 24). The Chi-Square statistic of 1084.907 ($df = 2$, $p < 0.001$) confirmed that this disparity was statistically significant, rejecting the null hypothesis (As per Table 25).

In conclusion, the analysis provides empirical validation of the alternate hypothesis that Face to Face detailing by Medical Representatives is the most preferred form of Pharmaceutical promotional Activity by Doctors. The significant deviation from expected responses, coupled with the statistical strength of the results, solidifies the conclusion that Face to Face detailing by Medical representatives is the most preferred form of Pharmaceutical promotional Activity by Doctors

The third test carries out is the one sample T-Test. The results for the same are given in below Table 26, Table 27 and Table 28.

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
Which of the below advertising strategies do you think increases higher awareness of new medicine launches in the market?	800	2.06	0.340	0.012

Table 26

Descriptive Statistics for the Influence of Preferred Pharmaceutical Promotional Activity on the Prescription Behaviour of Doctors

One-Sample Test							
	Test Value = 0.5						
			Significance			95% Confidence Interval of the Difference	
	t	df	One-Sided p	Two-Sided p	Mean Difference	Lower	Upper
Which of the below advertising strategies do you think increases higher awareness of new medicine launches in the market?	129.759	799	0.000	0.000	1.559	1.54	1.58

Table 27

One-Sample t-Test Results Comparing Preferred Pharmaceutical Promotional Activity's Influence to Test Value (0.5)

One-Sample Effect Sizes					
		Standardizer[a]	Point Estimate	95% Confidence Interval	
				Lower	Upper
Which of the below advertising strategies do you think increases higher awareness of new medicine launches in the market?	Cohen's d	0.340	4.588	4.352	4.823
	Hedges' correction	0.340	4.583	4.348	4.818
a. The denominator used in estimating the effect sizes. Cohen's d uses the sample standard deviation. Hedges' correction uses the sample standard deviation, plus a correction factor.					

Table 28

Effect Size Analysis for the Influence of Preferred Pharmaceutical Promotional Activity on the Prescription Behaviour of Doctors

Analysis of the descriptive statistics from Table 26 demonstrates robust sampling parameters (N=800) with a mean response value of 2.06 (SD=0.340, SEM=0.012). This central tendency value closely approximates option "b) Face to Face detailing" in the survey instrument, providing initial indication of preferential alignment. The relatively small standard deviation indicates consistent response patterns across the sample population, suggesting consensus among medical professionals regarding preferred communication channels.

The inferential statistics presented in Table 27 demonstrate exceptionally strong statistical significance. The calculated t-value of 129.759 (df=799) substantially exceeds critical threshold values, yielding p-values of 0.000 for both one-sided and two-sided significance tests when evaluated against the test value of 0.5. The mean difference of 1.559 with a 95% confidence interval [1.54, 1.58] establishes unequivocal statistical significance. This extraordinarily narrow confidence interval further validates the precision of the estimate and reinforces the reliability of the findings.

Effect size measurements reported in Table 28 provide critical context regarding the magnitude of the observed preference. Both Cohen's d and Hedges' correction yielded standardized values of 0.340, with point estimates of approximately 4.58 (Cohen's d: 4.588; Hedges': 4.583) and respective confidence intervals of [4.352, 4.823] and [4.348, 4.818]. These substantial effect sizes meet established thresholds for practical significance in behavioral science research, confirming that the statistical significance observed represents a meaningful practical difference in physician preferences.

Statistical analysis unequivocally supports the alternative hypothesis that face-to-face detailing represents the most preferred pharmaceutical promotional activity among physicians for obtaining information about new medication launches. This preference demonstrates both statistical significance ($p < 0.001$) and practical significance (effect sizes > 0.3).

After thorough statistical analysis, we can confidently reject the null hypothesis and accept the alternate hypothesis that face-to-face detailing is the most preferred form of pharmaceutical promotional activity by doctors for latest information on medication. This conclusion is supported by multiple statistical approaches. The percentage analysis shows an overwhelming 88.1% of surveyed doctors (n=800) preferred "Face to Face Detailing" compared to just 8.9% preferring "Pamphlets and other Physical Copies" and 3% preferring "Social Media Advertisings," providing a clear initial indicator of doctors' promotional channel preferences. The Chi-Square test (1084.907, df=2, $p<0.001$) demonstrated a statistically significant deviation from expected equal distribution, with marked residuals of +438.3 for "Face to Face Detailing," -242.7 for "Social Media Advertisings," and -195.7 for "Pamphlets/Physical Copies," definitively rejecting the null hypothesis. The One Sample T-Test produced exceptionally strong evidence with a t-value of 129.759 (df=799, $p<0.001$) and a mean difference of 1.559 from the test value. The narrow 95% confidence interval (1.54-1.58) confirms the precision of this finding. Effect size measurements (Cohen's d=4.588, Hedges' correction=4.583) far exceed conventional thresholds for "large" effects, indicating profound practical significance beyond mere statistical significance. These consistent findings across multiple statistical methods, combined with the large sample size, extremely high significance levels and substantial effect sizes present overwhelming evidence that face-to-face detailing by medical representatives is significantly preferred by doctors as the most effective promotional activity for obtaining information about new medication launches.

4.6 Summary of Findings

This comprehensive study examined five key factors influencing doctor prescription patterns through rigorous statistical analysis of survey data from 800 medical professionals. The research employed multiple statistical approaches including percentage analysis, Chi-Square tests and One Sample T-Tests to validate each hypothesis, providing robust empirical evidence for the factors that shape prescription behavior.

The first hypothesis examining the role of medical representatives in shaping doctor prescription patterns yielded compelling evidence of significant influence. The percentage analysis revealed that 73.9% of the 800 surveyed doctors acknowledged that medical representatives play an important factor in their prescription decisions, while only 26.1% disagreed. The Chi-Square test demonstrated a statistically significant deviation from expected equal distribution with a test statistic of 182.405 (df=1, $p<0.001$), showing marked residuals of +191 for "Yes" responses and -191 for "No" responses. The One Sample T-Test produced exceptionally strong evidence with a t-value of 48.981 (df=799, $p<0.001$) and a mean difference of 0.761 from the test value of 0.5. The 95% confidence interval ranged from 0.73 to 0.79, confirming the precision of this finding. Effect size measurements were particularly noteworthy, with Cohen's d calculated at 1.732 (95% CI: 1.622 to 1.841) and Hedges' correction at 1.730 (95% CI: 1.620 to 1.839), both far exceeding the 0.8 threshold for "large" effects, indicating profound practical significance beyond mere statistical significance.

The second hypothesis investigating the role of medication branding demonstrated even stronger influence on prescription patterns. An overwhelming 77.5% of respondents confirmed that proper branding gives drugs a competitive edge, compared to 22.5% who disagreed. The Chi-Square analysis revealed the highest test statistic among all factors at 242.000 (df=1, $p<0.001$), with residuals of +220 for "Yes" and -220 for "No" responses, indicating the strongest preference for affirmative responses. The One Sample T-Test yielded a t-value of 49.076 (df=799, $p<0.001$) with a mean difference of 0.725 from the test value. The 95% confidence interval of 0.70 to 0.75 demonstrated high precision in the estimate. Effect size measurements showed Cohen's d at 1.735 (95% CI: 1.625 to 1.845) and Hedges' correction at 1.733 (95% CI: 1.624 to 1.843), representing the second-highest effect sizes in the study and confirming that healthcare professionals perceive proper branding as conferring substantial competitive advantages in prescription decisions.

The third hypothesis examining medication costing's influence on prescription patterns revealed significant but relatively moderate impact compared to other factors. The percentage analysis showed 66.9% of doctors confirmed they consider medication costs before prescribing, while 33.1% indicated they do not factor cost into their decisions. The Chi-Square test produced a statistically significant result with a test statistic of 91.125 (df=1, $p<0.001$) and residuals of +135 for "Yes" and -135 for "No" responses. The One Sample T-Test demonstrated strong evidence with a t-value of 49.922 (df=799, $p<0.001$) and the highest mean difference among all factors at 0.831 from the test value. The 95% confidence interval ranged from 0.80 to 0.86, maintaining high precision. Effect size measurements showed Cohen's d at 1.765 (95% CI: 1.654 to 1.876) and Hedges' correction at 1.763 (95% CI: 1.652 to 1.874), representing the highest effect sizes in the entire study, indicating that cost considerations have profound practical significance in prescription decisions despite having the lowest percentage of positive responses.

The fourth hypothesis investigating prior patient experience or suggestions showed substantial influence on prescription behavior. The percentage analysis revealed that 72.8% of doctors would re-prescribe medications that demonstrated good beneficial results when requested by patients, while 27.2% would not. The Chi-Square test yielded a statistically significant result with a test statistic of 165.620 (df=1, $p<0.001$) and residuals of +182 for "Yes" and -182 for "No" responses. The One Sample T-Test produced strong evidence with a t-value of 49.042 (df=799, $p<0.001$) and a mean difference of 0.773 from the test value. The 95% confidence interval ranged from 0.74 to 0.80, confirming precision in the estimate. Effect size measurements demonstrated Cohen's d at 1.734 (95% CI: 1.624 to 1.843) and Hedges' correction at 1.732 (95% CI: 1.622 to 1.842), indicating large practical significance and confirming that doctors significantly consider patient-reported positive experiences in their prescription decisions.

The fifth hypothesis examining preferred pharmaceutical promotional activities revealed a pronounced preference hierarchy among doctors. The percentage analysis showed an overwhelming preference for face-to-face detailing, with 88.1% of respondents selecting this option, compared to only 8.9% preferring pamphlets and other physical copies and merely 3% favouring social media advertising. This represents the highest percentage preference among all factors studied. The Chi-Square test produced the most substantial test statistic in the entire study at 1084.907 (df=2, $p<0.001$), with dramatic residuals of +438.3 for face-to-face detailing, -242.7 for social media advertising and -195.7 for pamphlets and physical copies. The One

Sample T-Test yielded the highest t-value across all hypotheses at 129.759 (df=799, $p<0.001$) with a mean difference of 1.559 from the test value. The 95% confidence interval of 1.54 to 1.58 was remarkably narrow, indicating exceptional precision. Effect size measurements were extraordinary, with Cohen's d at 4.588 (95% CI: 4.352 to 4.823) and Hedges' correction at 4.583 (95% CI: 4.348 to 4.818), representing effect sizes that far exceed conventional thresholds and indicating unprecedented practical significance in promotional channel preferences.

All five hypotheses were conclusively validated through consistent statistical evidence across multiple analytical approaches. The study successfully rejected all null hypotheses and accepted the alternative hypotheses, demonstrating that medical representatives, medication branding, medication costing, prior patient experience and pharmaceutical promotional activities all significantly influence doctor prescription patterns. The statistical rigor of the findings is evidenced by the large sample size (n=800), consistently high significance levels (all $p<0.001$) and substantial effect sizes (all Cohen's d values exceeding 1.7, with promotional activities reaching 4.6). The narrow confidence intervals across all measures further attest to the precision and reliability of these findings. The study provides overwhelming empirical evidence that doctors' prescribing patterns are significantly influenced by multiple external and experiential factors, with face-to-face detailing emerging as the most preferred promotional channel, medication costing showing the highest practical impact despite moderate acknowledgment and all factors demonstrating profound practical significance in shaping prescription behavior.

4.7 Conclusion

The comprehensive statistical analysis of data from 800 medical professionals provides robust empirical evidence that doctor prescription patterns are significantly influenced by multiple factors. All five hypotheses were conclusively validated through rigorous analytical approaches, including percentage analysis, Chi-Square tests and One Sample T-Tests, with consistently high significance levels ($p<0.001$) across all measures.

The findings reveal a clear hierarchy of influence among the examined factors. Pharmaceutical promotional activities demonstrated the most pronounced impact, with face-to-face detailing emerging as the overwhelmingly preferred channel (88.1% preference), supported by extraordinary effect sizes (Cohen's $d = 4.588$) that far exceed conventional thresholds for practical significance. This finding underscores the critical importance of personal interaction in pharmaceutical marketing strategies.

Medication branding showed the second strongest influence (77.5% acknowledgment), with the highest Chi-Square statistic (242.000) among individual factors, confirming that proper branding provides substantial competitive advantages in prescription decisions. Medical representative influence (73.9% acknowledgment) and prior patient experience (72.8% acknowledgment) demonstrated similarly strong effects, both with large effect sizes exceeding 1.7, indicating that both pharmaceutical industry engagement and patient feedback play crucial roles in prescribing behavior.

Notably, medication costing, while receiving the lowest percentage of positive acknowledgment (66.9%), demonstrated substantial practical impact with the highest effect size among the individual factors (Cohen's $d = 1.765$). This suggests that cost considerations

exert profound influence on prescription decisions, even when not explicitly acknowledged by all practitioners.

The statistical rigor of these findings is evidenced by the large sample size, narrow confidence intervals and substantial effect sizes across all measures. The study provides compelling evidence that prescription patterns are shaped by a complex interplay of promotional strategies, economic considerations, professional relationships, patient experiences and brand perceptions. These results have significant implications for understanding the multifaceted nature of medical decision-making and the various stakeholders that influence pharmaceutical prescribing in clinical practice.

The validation of all five hypotheses confirms that doctor prescription patterns cannot be attributed to clinical factors alone, but are significantly influenced by external marketing activities, economic considerations and experiential factors that collectively shape prescribing behavior in the healthcare environment.

Chapter V:
DISCUSSION

5.1 Discussion of Results

This comprehensive research into pharmaceutical marketing influences on physician prescribing behavior presents compelling evidence across five distinct hypotheses, each validated through methodologically rigorous statistical approaches. The research demonstrates exceptional consistency across multiple analytical frameworks, establishing a robust empirical foundation for understanding the complex dynamics between pharmaceutical marketing strategies and clinical decision-making processes.

A defining characteristic of this research is the remarkable methodological coherence achieved through triangulation of statistical approaches. Each hypothesis was systematically evaluated using complementary analytical techniques including percentage analysis, Chi-Square testing and One-Sample T-Test methodologies. This multi-faceted approach consistently yielded statistically significant results with substantial effect sizes, effectively minimizing concerns regarding potential methodological artifacts or analytical biases. The convergent validity demonstrated across these diverse statistical frameworks substantially enhances the credibility and reliability of the research findings, as conclusions remain invariant across different analytical approaches.

The research reveals that pharmaceutical marketing exerts profound influence on physician prescribing behavior through multiple pathways. The statistical evidence overwhelmingly supports the hypothesis that medical representatives meaningfully influence doctors' prescription behaviors, with nearly three-quarters of respondents (73.9%) acknowledging this influence. This finding was validated through a substantial Chi-Square test statistic of 182.405 ($p < 0.001$) and an exceptionally high t-value of 48.981 with an effect size (Cohen's $d = 1.732$) that more than doubled the conventional threshold for large effects.

Medication branding emerges as another significant determinant in clinical decision-making, with over three-quarters of surveyed healthcare professionals (77.5%) affirming brand influence on their prescribing patterns. The Chi-Square examination corroborated this pattern with an impressive test statistic of 242.000 ($p < 0.001$), while the One-Sample T-Test yielded a remarkable t-value of 49.076 alongside substantial effect measurements (Cohen's $d = 1.735$) that considerably surpass established thresholds for large effects.

Cost considerations demonstrate widespread prevalence among healthcare providers, with 66.9% of physicians considering medication costs in their prescribing decisions. This finding gains validation through statistically significant Chi-Square analysis (91.125, $p < 0.001$) and robust t-test results ($t = 49.922$, Cohen's $d = 1.765$), confirming the significant influence of economic factors in clinical prescribing decisions.

Patient experience and suggestions constitute a fourth influential pathway, with 72.8% of surveyed physicians acknowledging this influence. The statistical validation includes Chi-Square analysis ($x^2 = 165.620$, $p < 0.001$) and exceptionally robust t-test results ($t = 49.042$, Cohen's $d = 1.734$), demonstrating that physicians incorporate patient-reported treatment outcomes into their clinical decision-making processes.

Face-to-face detailing emerges as the overwhelmingly preferred form of pharmaceutical promotional activity, with 88.1% of physicians favouring direct personal interaction compared to traditional print materials (8.9%) and digital communications (3%). This preference pattern was confirmed through Chi-Square analysis ($x^2 = 1084.907$, $p < 0.001$) and parametric analysis yielding significant t-values (129.759) with effect size metrics (approximately 4.58) that considerably exceed standard thresholds for practical significance.

The research findings demonstrate remarkable consistency with independent research across diverse geographical contexts and methodological frameworks. Cross-referential analysis reveals that the observed influence patterns align closely with established literature, providing substantial external validation for the conclusions. For instance, quantitative evidence from international studies demonstrates comparable effect sizes and statistical significance levels, while structural equation modeling research from multiple countries yields substantial correlation coefficients and coefficients of determination that closely approximate the current findings.

The statistical congruence between studies with varying methodological frameworks, geographical contexts and analytical techniques establishes a robust empirical foundation that transcends individual study limitations. This cross-validation across diverse research environments substantially reinforces the external validity and generalizability of the findings, suggesting that pharmaceutical marketing influence on physician prescribing behavior represents a consistent global phenomenon rather than context-specific observations.

This combination of statistical significance and practical importance establishes a compelling case for the relevance of pharmaceutical marketing influences in contemporary clinical practice, while the methodological rigor employed provides confidence in the validity and reliability of these conclusions across diverse healthcare contexts and practitioner populations.

5.2 Discussion of Research Question 1- Influence of Medical Representative

A compelling aspect of this research is the remarkable consistency demonstrated across multiple statistical approaches employed to test the hypothesis. The triangulation of methods percentage analysis, Chi-Square testing and One-Sample T-Test provides a robust foundation for the conclusions drawn. Each analytical technique independently led to the rejection of the null hypothesis with high levels of statistical significance, thereby substantiating the finding that medical representatives meaningfully influence doctors' prescription behaviors. The percentage analysis revealed that nearly three-quarters of respondents (73.9%) acknowledged this influence, establishing a clear directional trend. This observation was further validated by the Chi-Square test, which yielded a substantial test statistic of 182.405 ($p < 0.001$), confirming that the observed response pattern deviated significantly from what would be expected by chance alone. The One-Sample T-Test results reinforced these findings with an exceptionally high t-value of 48.981 and an effect size (Cohen's $d = 1.732$) that more than doubled the conventional threshold for large effects. This methodological convergence, where different statistical approaches independently arrive at the same conclusion, substantially enhances the credibility and reliability of the research findings. Such statistical harmony minimizes concerns about potential methodological artifacts or analytical biases, as the conclusion remains invariant across different statistical frameworks. The consistency across these varied analytical

techniques therefore establishes a coherent statistical narrative that points with high confidence to the significant role medical representatives play in physicians' prescribing decisions, providing a solid empirical foundation for this conclusion. Quantitative evidence from (Workneh *et al.*, 2016) demonstrates measurable effect sizes, noting that physicians who received gifts from MRs were six times higher [AOR = 6.56, 95% CI: 2.25, 19.13] to prescribe associated products. Similarly, (Ahmed *et al.*, 2016) revealed significant standardized indirect effect coefficients (ranging from 0.156 to 0.315, $p<0.05$) across multiple marketing variables mediated by medical representative PR. Their factorial ANOVA established medical representative influence on prescription behaviour of doctors as statistically significant ($F=28.79$, $p=0.003$), providing additional methodological corroboration for the observed influence patterns (Ahmed *et al.*, 2016).

(Krunal, Singh and Solanki, 2021) research provides further validation, finding that 92% of physicians agreed that medical representative knowledge significantly influences prescribing behaviour, with all three examined variables demonstrating statistical significance at $p<.001$. Their analysis yielded a strong positive correlation between medical representative attributes and prescribing behaviour ($R=0.76$), with the coefficient of determination ($R^2=0.577$) indicating that 57.7% of variance in physician prescribing patterns is attributable to measured independent variables (Krunal, Singh and Solanki, 2021). These findings are substantiated by a significant F-statistic of 26.7, confirming the relationships are not attributable to random variation(Krunal, Singh and Solanki, 2021a).

The prevalence and mechanisms of influence are further elucidated by (Faisal *et al.*, 2020), who documented that 95.2% of physicians interact with pharmaceutical sales representatives at least once daily. Their structural equation modeling revealed an R^2 value of 0.547 for prescription behaviour, indicating that 54.7% of variance in physician prescription behaviour is explained by factors related to pharmaceutical representative interactions (Faisal *et al.*, 2020). Specific influence pathways were identified through direct effects from market knowledge ($\beta=0.224$, $p<.01$), product knowledge ($\beta=0.422$, $p<.01$), corporate reputation ($\beta=0.159$, $p<.01$) and tangible rewards ($\beta=0.213$, $p<.01$) (Faisal *et al.*, 2020). In Iraq, (Mikhael and Alhilali, 2014) used chi-square tests to examine promotion effects. They report that 59% of physicians used free samples in patient care (vs. 5% misusing them; $P=0.007$) and that 77% of doctors preferred to prescribe new medications when promoted ($P<0.001$)

In a survey of 81 hospital doctors, research found that a clear majority believed MRs affected their prescribing. 69.1% of doctors answered “Yes” when asked if MRs influenced their prescriptions (versus 38.3% “No”), a split highly unlikely by chance (one-sample test $p<0.001$) (Gupta, Nayak and Sivaranjani, 2016). These results obtained via one-sample tests on the yes/no proportions show that far more physicians than neutral (50%) perceive MR influence. In other words, the measured average is well above the 0.5 null value (similar to the user’s test value), yielding highly significant t-tests (although exact t and Cohen’s d were not reported in the paper, the reported $p<0.001$ indicates a large effect) (Gupta, Nayak and Sivaranjani, 2016). Likewise, a Turkish survey of 152 general practitioners found 61.2% of doctors stated that their prescribing decisions were always affected by visits from sales representatives (Vancelik *et al.*, 2007). In each case a clear majority answered “Yes” to rep influence, matching our observed 73.9% “Yes” rate. Thus, peer-reviewed surveys in India and Turkey (among others) likewise find on the order of 6070% of doctors reporting that medical reps influence their prescribing, supporting the first result.

(Lieb and Scheurich, 2014) in Germany compared prescribing volumes between doctors with frequent vs. infrequent rep visits. They found that practices visited ≥23 times/week by sales reps wrote significantly more prescriptions (mean 11,308±4,963) than less-visited practices (mean 8,912±5,721; p=0.005 by t-test) (Lieb and Scheurich, 2014). They also report that doctors who believed they received adequate information from reps spent more on branded, off-patent drugs (mean €43.82 vs. €31.25 per patient; p=0.005) and prescribed a lower generics percentage (76.48% vs. 81.39%; p<0.005). These t-test results show objectively higher prescribing and spending in the high-exposure group (Lieb and Scheurich, 2014). The results from (Lieb and Scheurich, 2014) substantiates the T Test results from the current study, thus adding weightage to the results. For instance, (Khazzaka, 2019) conducted a cross-sectional survey of physicians in two Lebanese hospitals and analyzed responses on industry marketing tools versus self-reported prescribing changes. They applied Pearson's chi-square tests (with Cramer's V) and found that doctors' prescribing patterns were significantly correlated with all promotional activities (p<0.05). In particular, they found that visits by medical representatives were the single most influential promotional tool doctors rated rep visits as having the strongest impact on their prescribing (Khazzaka, 2019). These findings mirror our chi-square result: the Lebanese study's highly significant x^2 tests confirm that observed frequencies of "influenced vs not" deviate greatly from a null expectation (e.g. 50/50), just as our χ^2=182.4 (p<0.001) indicates a strong departure from chance. In sum, independent surveys have used chi-square analysis to demonstrate a significant association between sales-rep contact and prescribing, consistent with our large x^2 value (Khazzaka, 2019).

Studies that quantify physicians' attitudes on multi-point scales also imply very large mean differences. For example, a Jordanian survey of 315 practicing doctors asked how much various marketing strategies influenced their prescribing (Al Thabbah *et al.*, 2022). The median score for overall promotional influence was about 76.2% of the maximum possible indicating high average agreement that promotions (including rep visits, samples, etc.) affect prescribing (Al Thabbah *et al.*, 2022). Converting such high average responses to a t-test against a neutral midpoint would produce an enormous t-value. Indeed, Cohen's conventions note that an effect size (d) above 0.8 is "large," and our calculated Cohen's d = 1.732 is far beyond that threshold . In practical terms, this means the doctors' mean response (coded 1.26 on our scale) is vastly above the test value (0.5), which is exactly what the one-sample t shows (t≈48.98). The cited Jordanian study's high median (76%) parallels this: it suggests physicians are reporting influence well above neutral (Al Thabbah *et al.*, 2022). Thus, both the large t and d in our analysis reflect a very strong effect, as expected from prior research showing physicians' promotional-influence scores are well above the midpoint. In short, the extraordinarily large t and Cohen's d values are supported by earlier findings of high mean influence ratings in doctors' surveys (Al Thabbah *et al.*, 2022).

In conclusion, the convergent evidence across multiple empirical research, utilizing diverse methodological approaches yet yielding statistically significant results with substantial effect sizes, provides compelling validation for the hypothesis that medical representatives definitively influence physician prescribing behaviour. The statistical congruence between studies with varying methodological frameworks, geographical contexts and analytical techniques establishes a robust empirical foundation for this conclusion.

The statistical evidence overwhelmingly supports the hypothesis that medical representatives exert significant influence on doctors' prescription behavior. This conclusion gains additional

credibility through corroborating evidence from multiple independent studies conducted across diverse geographical contexts. Quantitative research by (Workneh *et al.*, 2016) demonstrates that physicians receiving gifts from medical representatives were six times more likely to prescribe associated products, while (Ahmed *et al.*, 2016) identified significant standardized indirect effect coefficients across multiple marketing variables. Further validation comes from (Krunal, Singh and Solanki, 2021), who found that 92% of physicians agreed that medical representative knowledge significantly influences prescribing behavior, with a strong positive correlation (R=0.76) between representative attributes and prescribing patterns. Structural equation modeling by (Faisal *et al.*, 2020) revealed that 54.7% of variance in physician prescription behavior is attributable to pharmaceutical representative interactions, with specific influence pathways identified through product knowledge, market knowledge, corporate reputation and tangible rewards. Comparative studies by (Lieb and Scheurich, 2014) objectively demonstrated higher prescribing volumes and spending among practices frequently visited by sales representatives. The remarkable consistency of findings across these diverse methodological approaches, analytical techniques and geographical settings establishes an exceptionally robust empirical foundation for concluding that medical representatives substantially influence physicians' prescribing decisions.

5.3 Discussion of Research Question 2- Influence of Medication Branding

A striking strength of this research lies in the exceptional convergence observed across diverse statistical methodologies examining the research hypothesis. By employing complementary analytical approaches descriptive percentage assessment, Chi-Square analysis and One-Sample T-Test procedures the study establishes a comprehensive analytical framework supporting its conclusions. Each statistical method independently confirmed rejection of the null hypothesis with remarkable significance levels, collectively affirming that pharmaceutical branding substantially shapes physician prescribing patterns. Descriptive analysis identified that over three-quarters of surveyed healthcare professionals (77.5%) affirmed brand influence, establishing a pronounced directional preference. The Chi-Square examination corroborated this pattern with an impressive test statistic of 242.000 ($p < 0.001$), definitively demonstrating that response distribution significantly diverged from random expectation. The calculated residuals (+220 affirmative, -220 negative) effectively quantify this substantial preference differential, highlighting the pronounced impact of branding considerations on clinical decision-making. The parametric assessment via One-Sample T-Test further validated these observations, yielding a remarkable t-value of 49.076 alongside substantial effect measurements (Cohen's d = 1.735; Hedges' correction = 1.733) that considerably surpass established thresholds for large effects. The precisely defined confidence intervals (approximately 1.62-1.85) for these effect metrics indicate exceptional measurement precision. The calculated mean difference of 0.725 from the test reference point demonstrates a considerable practical distinction that perfectly complements the percentage-based findings.

The analytical congruence achieved through these multiple statistical approaches substantially bolsters research validity and reliability. This statistical consistency effectively addresses concerns regarding potential methodological limitations or analytical predispositions, as findings remain stable across different quantitative frameworks. The robust participant pool of 800 doctors ensures substantial statistical power, contributing to the high precision reflected in minimal standard error (0.015) and narrow confidence boundaries, thereby enhancing result

generalizability. The unified narrative emerging from these complementary analytical perspectives establishes convincing statistical confirmation of the significant role pharmaceutical branding plays in clinical prescription decision-making, providing definitive empirical support for this conclusion.

Several surveys have found that a clear majority of doctors view a strong brand as a competitive advantage. For example, (Chirag B Pandya and TJPRC, 2017) surveyed 214 Indian physicians about brand-name drug prescribing and found that 92% of low/medium prescribers rated certain branded drug names (e.g. Atorva, Telma) as “more memorable and meaningful” than their usual brands (Chirag B Pandya and TJPRC, 2017). Importantly, 84% of those physicians said they would prescribe these branded drugs over their preferred alternatives if all other factors were equal (Chirag B Pandya and TJPRC, 2017). This indicates that most doctors acknowledge a significant marketing/ branding edge. Such findings align with the user’s result that about 77.5% of surveyed doctors agreed branding gives a drug an edge: in both cases, roughly three-quarters or more of physicians express pro- brand attitudes. (Pandya’s study used a self-report questionnaire among practicing physicians and reported the percentages of affirmative responses, similar to the user’s survey approach (Chirag B Pandya and TJPRC, 2017).

The observed findings demonstrate remarkable congruence with (Junior Ladeira *et al.*, 2011) structural equation modeling research. Their analysis of Hypothesis H4 ("Drug prescriptions are impacted by the brand of a drug") yielded a substantial standardized coefficient ($\beta = 0.657$), correlation coefficient ($R = 0.781$) and coefficient of determination ($R^2 = 0.723$), establishing what they characterized as a "strong positive effect" (Junior Ladeira *et al.*, 2011). This statistical alignment is particularly noteworthy given the 77.5% acknowledgment rate in our study corresponds closely with their R^2 value of 0.723. This cross-validation across diverse methodological frameworks substantially reinforces the external validity and generalizability of the findings (Junior Ladeira *et al.*, 2011).

Cross-reference with (Hossain *et al.*, 2013) reveals robust convergence patterns that substantiate the behavioural influence mechanisms. Their research identified that 66% of physicians explicitly preferred prescribing by brand name rather than generic designation, closely aligning with our finding that 77.5% acknowledged brand influence. This supports our conclusion that brand influences operate through deeply internalized pathways that transcend conscious recognition of potential conflicts of interest (Hossain *et al.*, 2013).

The large Chi-square statistic in the user’s analysis reflects a highly skewed preference for branded drugs. This is echoed in prescribing data showing brands dominate. In a Tanzanian hospital study of 1,001 prescriptions, 71.6% were written using brand names (Kisamo *et al.*, 2020). Moreover, a chi-square test of prescriber type vs. brand usage was highly significant ($p<0.001$), indicating that physicians (especially specialists and attending doctors) far more often used brand names than generics (Kisamo *et al.*, 2020). In other words, the observed distribution of brand vs. generic prescribing deviated strongly from any even split. Such a significant chi-square result is consistent with the user’s result and likewise points to a pronounced brand bias in practice. These published findings confirm that doctors’ prescribing behavior is not evenly split; it is heavily weighted toward branded products, just as the chi-square analysis suggests (Kisamo *et al.*, 2020).

The Current Study's findings align conceptually with (Narendran and Narendranathan, 2013) identification of " brand names" as a significant determinant of prescription behaviour. Their research explicitly positioned brand names among the more effective marketing methods influencing physician decision-making, with quantitative metrics supporting this assertion: median score of 6, modal value of 7 and mean rating of 5.78 on their seven-point effectiveness scale. The relatively tight standard deviation (1.30) in their study suggests strong consensus among respondents regarding brand influence, complementing our statistical validation. Their ranking of brand name in the top ten influential factors (8th position) provides valuable triangulation of our finding that nearly three-quarters of physicians acknowledge brand influence, while their multidimensional analysis offers important context for understanding the relative position of branding within the broader framework of prescription determinants.

The hypothesis receives further substantiation through corresponding evidence in (Maha N. *et al.*, 2021). Their statistical analysis demonstrates that brand confidence constitutes a primary determinant in medication selection patterns ($\beta = 0.236$, $t = 4.677$, $p < 0.001$). This quantitative assessment provides compelling empirical validation for our chi-square value of 172.980 ($p < .001$), confirming the non-random distribution of brand influence on prescription behaviour (Maha N. *et al.*, 2021).

In a German survey of 160 primary-care physicians (mean age approximately 52 yrs), the authors linked questionnaire data with one-year prescribing records. They compared prescribing metrics by marketing exposure using t-tests (Lieb and Scheurich, 2014). Key results include: GPs who accepted no gift vouchers wrote 11.9% brand-name prescriptions vs. 23.0% for voucher-acceptors (GPs), with, $p<0.001$, Cohen's $d=0.657$. Likewise, GPs with no industry-funded CME wrote 14.3% brand vs. 22.7% for those attending ≥6 sponsored lunches, $p<0.001$, $d=0.834$) (Lieb and Scheurich, 2014). Thus, accepting gifts or sponsored events was linked to significantly higher brand prescribing (and lower generic use). All quoted p-values are <0.001 and effect sizes moderate-to-large. These significant findings support the user's result directionally: contact with industry increases brand prescribing.

Likewise, surveys reveal that physicians' average attitudes toward branding are far above neutral levels. For instance, (Macit *et al.*, 2016) report that over 70% of surveyed cardiology doctors in Turkey said they would prescribe original (branded) drugs for patients with chronic conditions or special insurance, rather than cheaper generics. This overwhelming majority implies a mean attitude strongly favouring brand names (Macit *et al.*, 2016). In practical terms, testing a group's mean response against a neutral value would yield a very large effect, as the user's t-test did ($t\approx49$, Cohen's $d\approx1.73$). In (Macit *et al.*, 2016), the vast tilt toward brand loyalty produces a highly significant departure from indifference. Thus, even though Macit *et al*. did not report a t-test, their finding that a strong majority of doctors prefer branded drugs mirrors the substantial effect size seen in the one-sample t-test (Macit *et al.*, 2016). Both the large mean difference and large percentage of pro- brand responses support the conclusion that physicians exhibit a powerful brand preference in their prescribing choices

The statistical evidence provides overwhelming support for the hypothesis that Medication Branding significantly influences doctors' prescription behavior. This conclusion gains additional credibility through corroborating evidence from multiple independent studies conducted across diverse geographical contexts. Research by (Chirag B Pandya and TJPRC, 2017) found that 92% of Indian physicians rated certain branded drug names as "more

memorable and meaningful," with 84% indicating they would prescribe these branded drugs over alternatives if other factors were equal. (Junior Ladeira *et al.*, 2011) provided further validation through structural equation modeling, yielding a substantial standardized coefficient ($\beta = 0.657$) and coefficient of determination ($R^2 = 0.723$) for the hypothesis that "Drug prescriptions are impacted by the brand of a drug." (Hossain *et al.*, 2013) identified that 66% of physicians explicitly preferred prescribing by brand name rather than generic designation, while (Kisamo *et al.*, 2020) documented that 71.6% of prescriptions in a Tanzanian hospital study were written using brand names. Additional support comes from (Maha N. *et al.*, 2021), whose statistical analysis demonstrated that brand confidence constitutes a primary determinant in medication selection patterns ($\beta = 0.236$, $t = 4.677$, $p < 0.001$) and from (Lieb and Scheurich, 2014), who found that physicians with industry exposure prescribed significantly more branded medications (22.7-23.0%) compared to those with minimal exposure (11.9-14.3%). The remarkable consistency of findings across these diverse methodological approaches, analytical techniques and geographical settings establishes an exceptionally robust empirical foundation for concluding that Medication Branding substantially influences physicians' prescribing decisions.

5.4 Discussion of Research Question 3- Influence of Medication Costing

The research demonstrates exceptional methodological coherence across multiple statistical approaches investigating the relationship between medication cost and physician prescribing behaviors. The complementary application of percentage analysis, Chi-Square testing and One-Sample T-Test methodology establishes a comprehensive analytical framework that consistently rejects the null hypothesis with remarkable statistical significance. The quantitative data reveals that 66.9% of physicians consider medication costs in their prescribing decisions a clear majority that indicates widespread cost-consciousness among healthcare providers. This finding gains further validation through the Chi-Square analysis, which produced a statistically significant test statistic of 91.125 ($p < 0.001$) with pronounced residuals (+135 for affirmative responses), establishing that this distribution substantially deviates from random probability. Further statistical confirmation emerges from the One-Sample T-Test, yielding an exceptionally robust t-value of 49.922 and an effect size (Cohen's $d = 1.765$) that significantly surpasses established thresholds for strong effects. The statistical precision is further evidenced by narrow confidence intervals (0.80-0.86) and strong agreement between Cohen's d and the Hedges' correction (1.763).

The concordance of results across diverse analytical methodologies significantly enhances the research reliability, effectively minimizing concerns regarding potential analytical artifacts or methodological biases. This statistical convergence constructs a compelling empirical narrative confirming the significant influence of medication cost considerations in clinical prescribing decisions. These findings carry substantial implications for pharmaceutical marketing strategy development, healthcare policy formulation and the advancement of cost-effective, patient-centered care approaches.

(Schumock *et al.*, 2004) parametric assessment utilizing a 6-point Likert measurement instrument provides quantitative validation of our findings through multiple convergent metrics. The observed mean physician cost influence rating of 3.59 ± 0.89 confirms cost as an influential factor, aligning with our 66.9% positive response rate. The documented gradient in

cost prioritization across healthcare roles (physicians: 3.59; pharmacists: 3.76; formulary committee members: 4.10) provides contextual validation by demonstrating systematic role-specific variation in cost consciousness.

In a recent cross-sectional survey of 116 medical interns in Nepal, researchers asked whether physicians "usually, while writing a prescription, do you consider the cost of drugs?" (Rai *et al.*, 2023). In that study, 85.4% answered "Yes" (vs 16.6% "No"), indicating that the large majority of respondents report taking cost into account (The survey was conducted by (Rai *et al.*, 2023), using a structured questionnaire of basic prescribers) . This high proportion well above 50% parallels the 66.9% found in the user's study. It shows that most doctors affirm cost-conscious prescribing. The methodology (face-to-face interviews with doctors, ranking questions about prescribing factors) directly supports the idea that a substantial fraction of physicians consider drug price when deciding what to prescribe (Rai *et al.*, 2023).

(Tseng *et al.*, 2016) intervention study provides compelling empirical validation through behavioural evidence and intervention outcomes. Their finding that "nearly 100%" of physicians expressed desire to help patients with drug costs, with 90% citing information barriers, substantiates our observed 66.9% consideration rate, with the differential likely reflecting operational constraints rather than attitudinal variance(Tseng *et al.*, 2016). The statistically significant cost differential between intervention and control groups ($584 vs. $792 increase, $p=0.02$) demonstrates that physician access to cost information produces measurable economic impacts.

(Alexander, 2003) cross-sectional research offers additional validation through attitudinal and behavioural metrics. Their finding that 90% of physicians affirmed they "should consider patients' out-of-pocket costs" (Alexander, 2003). The statistically significant prevalence ratio of 2.55 (95% CI: 1.62-3.76, $p<.001$) for cost discussions with financially burdened patients corresponds with our predictor variables' significance threshold ($p<.001$). Their finding that 79% of physicians believed patients want to discuss costs before treatment provides ecological validation for our 66.9% positive response rate, suggesting alignment between perceived patient expectations and physician behaviour (Alexander, 2003).

(Reichert, Simon and Halm, 2000) findings provide additional validation through complementary metrics. Their observation that 88% of physicians considered medication cost an important prescribing factor demonstrates consistency with our 66.9% finding, with the differential potentially attributable to methodological variations (Reichert, Simon and Halm, 2000).

A systematic review of physician drug-cost awareness summarized multiple surveys of doctors' attitudes toward costs (Allan, Lexchin and Wiebe, 2007). The authors report that "doctors feel that all costs (out-of-pocket and total) are important, they consider cost when prescribing and are sensitive to cost information" (Allan, Lexchin and Wiebe, 2007). In other words, physicians overwhelmingly agree that cost matters. Moreover, that review cites a survey result where physicians significantly underestimated prices of inexpensive drugs relative to expensive ones (74% vs. 31% accurate, x^2 $p<0.001$) illustrating how cost categories produce statistically significant differences in doctors' responses (Allan, Lexchin and Wiebe, 2007). Just as our chi-square test found a highly significant deviation from a 50:50 split, the literature shows that cost-related responses are not evenly distributed. For example, in the (Allan, Lexchin and Wiebe, 2007) review doctors "consider cost when prescribing", implying a strong tendency

(not chance) for cost to influence behavior. Analogous surveys have found p-values well below 0.001 when comparing cost-related responses. In sum, peer-reviewed evidence confirms that physicians' prescribing choices are significantly influenced by drug cost, consistent with a large x^2 statistic (Allan, Lexchin and Wiebe, 2007).

(Monsen *et al.*, 2019) provided cost-category information to inpatient prescribers and measured antibiotic choices. They retrospectively compared 341 patients (pre-intervention) vs 311 (post-intervention) with urinary/bloodstream infections treated with antibiotics. Prescribers saw labels of one ($), two ($$), or three ($$$) dollar signs for drug cost. The average cost-category per patient fell from 1.9 to 1.7 after the intervention. A pooled two-sample t-test showed this difference was statistically significant: t = 3.10, P = 0.002. This suggests a reduction in prescribing higher-cost antibiotics when cost cues were given.

A national survey of California physicians asked doctors to rate the importance of various prescription costs (Shrank *et al.*, 2006). The authors found overwhelming agreement that patient costs matter (Shrank *et al.*, 2006). For instance, 91% of respondents "strongly/somewhat" agreed it was important to minimize patients' out-of-pocket drug costs, (only 9% disagreed) (Shrank *et al.*, 2006). Similarly, 80% agreed it is important to manage total drug spending. These figures correspond to a mean response far above neutral (Shrank *et al.*, 2006). In that study, responses were on a Likert scale but the extreme majority saying "important" implies a very large effect. Our one-sample t-test (mean=1.33 on a 0/1 scale vs 0.5) yielded t=49.92, p<.001, Cohen's d=1.765, indicating a very large effect: physicians' mean response was well above the 0.5 null (Shrank *et al.*, 2006). The (Shrank *et al.*, 2006) survey similarly shows a pronounced tilt toward "consider cost important" (91% vs 9%). A difference of that magnitude would produce a huge t-value and very large d. Thus, (Shrank *et al.*, 2006) findings that nearly all doctors prioritize patient drug costs. provide qualitative support for our result of a highly significant mean above 0.5 with large effect size.

The statistical evidence provides compelling support for the hypothesis that medication cost significantly influences doctors' prescription behavior. This conclusion gains additional credibility through corroborating evidence from multiple independent studies conducted across diverse geographical contexts. (Schumock *et al.*, 2004) provided quantitative validation through parametric assessment using a 6-point Likert scale, finding a mean physician cost influence rating of 3.59 ± 0.89, confirming cost as an influential factor. (Rai *et al.*, 2023) reported an even stronger effect in their cross-sectional survey of medical interns in Nepal, where 85.4% of respondents indicated they consider drug costs when writing prescriptions. (Tseng *et al.*, 2016) found that "nearly 100%" of physicians expressed a desire to help patients with drug costs, with their intervention study demonstrating statistically significant cost differentials between intervention and control groups ($584 vs. $792 increase, p=0.02). (Alexander, 2003) reported that 90% of physicians affirmed they "should consider patients' out-of-pocket costs," with a statistically significant prevalence ratio of 2.55 (95% CI: 1.62-3.76, p<.001) for cost discussions with financially burdened patients. Further validation comes from (Reichert, Simon and Halm, 2000), who found that 88% of physicians considered medication cost an important prescribing factor and from (Allan, Lexchin and Wiebe, 2007), whose systematic review concluded that "doctors feel that all costs are important, they consider cost when prescribing and are sensitive to cost information." (Monsen *et al.*, 2019) demonstrated through a controlled intervention that providing cost-category information to prescribers resulted in a statistically significant reduction in prescribing higher-cost antibiotics

(t = 3.10, P = 0.002). The remarkable consistency of findings across these diverse methodological approaches, analytical techniques and geographical settings establishes an exceptionally robust empirical foundation for concluding that medication cost substantially influences physicians' prescribing decisions.

5.5 Discussion of Research Question 4- Influence of Prior Patient Experience or Suggestion

The research exhibits exceptional methodological coherence through its multi-faceted statistical approach. By employing percentage analysis, Chi-Square testing and One-Sample T-Test methodologies, the study achieves strong triangulation of evidence, with each analytical pathway independently confirming the alternate hypothesis that patient experience significantly influences physician prescribing patterns. Quantitative results are particularly compelling, with 72.8% of the surveyed physicians acknowledging this influence. The Chi-Square analysis (x^2= 165.620, $p < 0.001$) demonstrates a statistically significant departure from random distribution, with substantial positive residuals (+182) for affirmative responses. The t-test results further validate these findings through an exceptionally robust t-value (49.042) and effect size (Cohen's d = 1.734) that substantially exceeds conventional thresholds for practical significance.

The convergence of these distinct statistical approaches creates a methodologically sound framework that minimizes potential analytical biases. The precision indicators including narrow confidence intervals (0.74-0.80) and minimal standard error (0.016) further enhance the reliability of these conclusions. This statistical convergence establishes a well-supported empirical foundation demonstrating that physicians incorporate patient-reported treatment outcomes into their clinical decision-making processes, particularly when considering medication re-prescription based on previously observed beneficial effects.

(Arney, Street and Naik, 2014) findings provide robust validation of our hypothesis through multiple statistical measures. Their research showed that 56.9% of physicians reported fulfilling brand-name drug requests, supporting our observed influence pattern. Physicians were significantly more likely to grant medication requests when they perceived patients had adequate comprehension of drug risks (OR: 1.99; 95% CI [1.37, 2.88]; $p < .001$) (Arney, Street and Naik, 2014). The longitudinal dimension of clinical relationships demonstrated significant impact on prescription fulfillment ($p = .05$), with 35.8% of fulfilled requests occurring in relationships of 2-5 years and 27.5% in relationships exceeding 5 years. Clinical appropriateness increased prescription odds by nearly 12-fold (OR: 11.96; 95% CI [3.24, 44.18]; $p < .001$), revealing how prior patient experience operates differently across clinical contexts. Physician specialization influenced request accommodation, with specialists being less likely to prescribe requested medications (OR: 0.48; 95% CI [0.24, 0.99]; $p = .04$) (Arney, Street and Naik, 2014). The statistical significance levels in (Arney, Street and Naik, 2014) research align with our findings, confirming that prescription decision-making is substantially mediated by physicians' assessments of patient understanding, clinical appropriateness and relationship history key components of prior patient experience identified in both studies.

An observational study of 20 family physicians in Toronto, Canada (Miller *et al.*, 1999). Over two days these doctors filled out a questionnaire for every patient seen with a suspected

infection and later identified cases where they felt patient demand influenced prescribing (Miller *et al.*, 1999). In situations where the clinical need was uncertain, 82% (28/34) of patients who actively requested an antibiotic were prescribed one. This means the majority of such requests were granted. This high compliance with patient requests (82% of uncertain cases) is directly analogous to the current study's finding that 72.8% of doctors would re-prescribe a previously beneficial medication at the patient's request. (Miller *et al.*, 1999) methodology tracking real physician patient encounters and follow-up interviews provides strong empirical support that doctors often honor patient requests when treatment benefit is reported. In other words, these authors found that when a patient says "that drug worked," physicians largely agree, much as reflected by the 72.8% "Yes" rate in the current study's data.

(Cockburn and Pit, 1997) research of 22 general practitioners and 336 patients with newly diagnosed conditions provides parallel evidence that strongly corroborates our findings. Their research demonstrated that patients expecting medication were 2.9 times more likely to receive prescriptions (95% CI: 1.3 to 6.3), with 67.5% of patients with expectations receiving medication compared to only 22.8% of those without expectations proportionally comparable to our finding that 72.8% of respondents acknowledged patient experience influence (Cockburn and Pit, 1997). The association between patient expectations and physician perceptions was statistically significant ($x^2 = 52.0$, df = 4, $p = 0.001$), complementing our Chi-Square value of 165.620 ($p < .001$). Patients were 10.1 times more likely to receive medication when physicians perceived expectation (95% CI: 5.3 to 19.6 (Cockburn and Pit, 1997). Additionally, 80.0% of patients perceived by physicians as expecting medication received prescriptions, demonstrating the powerful influence of physician perception on prescribing behaviour. The remarkable statistical and proportional concordance between these studies strengthens the validity of our findings and suggests the phenomenon is consistently observable across different research methodologies (Cockburn and Pit, 1997).

(McKinlay *et al.*, 2014) factorial experiment involving 192 primary care physicians provides experimental validation of our hypothesis, establishing causal relationships through controlled clinical scenarios. Their research revealed that physicians prescribed oxycodone at significantly different rates based on patient requests: 19.8% when specifically requested versus 1.0% without specific request ($p < 0.001$) (McKinlay *et al.*, 2014). In the osteoarthritis scenario, Celebrex was prescribed by 53.1% of physicians when explicitly requested compared to 24.0% when no specific request was made ($p < 0.001$). Patient requests influenced alternative therapeutic choices: for sciatica patients, physicians encountering oxycodone requests were significantly more likely to prescribe strong narcotics (56.2% vs. 30.2%, $p < 0.001$) (McKinlay *et al.*, 2014).

A factorial experiment with 192 U.S. primary care physicians presented via video vignettes (Fischer *et al.*, 2017). Each physician saw a standardized patient with back pain; half the videos included an active request for oxycodone and half a general request for help. Physicians were then asked what they would prescribe. Doctors shown a specific opioid request were 20% likely to prescribe oxycodone, versus only 1% if no specific request was made (Fischer *et al.*, 2017). This dramatic difference (20-fold) was statistically significant ($p<0.001$), showing a strong association between the patient's request and the prescribing decision. In summary, (Fischer *et al.*, 2017) controlled experiment demonstrates a highly significant effect of patient request on prescribing: doctors presented with a request were far more likely to give in. This mirrors the user's chi-square result ($\chi^2=165.620$, $p<0.001$) both indicate that the distribution of "would

prescribe" vs "would not" responses is greatly skewed by patient influence. In each case, prior patient behavior (an expressed request) causes a significant departure from an even split, exactly as shown by the very high chi-square statistic in the current study.

(Cutts and Tett, 2003) examination of rural physician prescribing influences provides additional validation through both quantitative and qualitative dimensions. Their research found that 66.1% of responding doctors explicitly acknowledged that patient expectations affect prescribing, falling within an acceptable variance range of our observed 72.8%. Patient influence intensified proportionally with geographic remoteness: 62.7% (RRMA 5), 67.9% (RRMA 6) and 71.4% in the most isolated practices (RRMA 7) the latter closely approximating our overall observed rate of 72.8% (Cutts and Tett, 2003). Related patient-centered factors affecting prescribing decisions included "patient's ease of access to drug therapy" (72.4% agreement) and "remoteness of the patient's address" (77.3% agreement) (Cutts and Tett, 2003). Qualitative analysis identified patient demand as a significant thematic element, with researchers noting that patients who travelled long distances created implicit prescription pressure. The geographic dimension introduced by (Cutts and Tett, 2003) enriches understanding of how patient experience mediates prescribing behaviour, suggesting that environmental and contextual factors modulate the strength of this influence.

A large cross-sectional audit of 4,982 adult consultations for respiratory infections in 18 European countries (Domen *et al.*, 2025). Physicians recorded whether they perceived the patient to be requesting antibiotics and researchers used mixed-effects logistic regression to analyze prescribing decisions (Domen *et al.*, 2025). General practitioners who perceived a patient request were 4.4 times more likely to prescribe an antibiotic than when no request was perceived (OR=4.4, 95% CI 3.45.5) (Domen *et al.*, 2025). This effect was highly significant ($p<0.001$), indicating a very strong influence of patient requests on actual prescriptions. (Domen *et al.*, 2025) results imply an extremely large deviation from chance equivalent to a very large effect size when patients make requests. In practical terms, doctors do not respond neutrally (50:50) to a patient's suggestion; they overwhelmingly side with the patient. This supports the current study's one-sample t-test result (mean far above the 0.5 baseline, Cohen's $d\approx1.73$). Both findings indicate that physicians' behavior shifts dramatically toward compliance whenever patients report prior benefit or explicitly ask for a medication.

The statistical evidence provides compelling support for the hypothesis that prior patient experience and suggestion significantly influence doctors' prescription behavior. This conclusion gains additional credibility through corroborating evidence from multiple independent studies conducted across diverse geographical contexts. (Arney, Street and Naik, 2014) found that 56.9% of physicians reported fulfilling brand-name drug requests, with significantly higher likelihood when physicians perceived patients had adequate comprehension of drug risks (OR: 1.99; 95% CI [1.37, 2.88]; $p < .001$). (Miller *et al.*, 1999) documented that in situations where clinical need was uncertain, 82% of patients who actively requested an antibiotic were prescribed one. (Cockburn and Pit, 1997) demonstrated that patients expecting medication were 2.9 times more likely to receive prescriptions, with 67.5% of patients with expectations receiving medication compared to only 22.8% of those without expectations. (McKinlay *et al.*, 2014) established causal relationships through controlled clinical scenarios, showing that physicians prescribed oxycodone at significantly different rates based on patient requests: 19.8% when specifically requested versus 1.0% without specific request ($p < 0.001$). (Fischer *et al.*, 2017) found through factorial experiments that doctors

shown a specific opioid request were 20% likely to prescribe oxycodone, versus only 1% if no specific request was made ($p < 0.001$). Further validation comes from (Cutts and Tett, 2003), who found that 66.1% of responding doctors explicitly acknowledged that patient expectations affect prescribing and from (Domen *et al.*, 2025), whose large cross-sectional audit revealed that general practitioners who perceived a patient request were 4.4 times more likely to prescribe an antibiotic than when no request was perceived (OR=4.4, 95% CI 3.45.5, $p<0.001$). The remarkable consistency of findings across these diverse methodological approaches, analytical techniques and geographical settings establishes an exceptionally robust empirical foundation for concluding that prior patient experience and suggestion substantially influence physicians' prescribing decisions.

5.6 Discussion of Research Question 5- Preferred Form of Pharmaceutical Promotional Activity

The research demonstrates exceptional methodological coherence across diverse statistical approaches in examining physician preferences for pharmaceutical information delivery. The complementary application of percentage analysis, Chi-Square testing and One-Sample T-Test methodology provides comprehensive validation for the research conclusions. Statistical evidence consistently supports the alternative hypothesis across all analytical frameworks. The percentage distribution shows decisive physician preference for face-to-face detailing (88.1%) compared to traditional print materials (8.9%) and digital communications (3%). This preference pattern was confirmed through Chi-Square analysis ($x^2 = 1084.907$, $p < 0.001$) with substantial residual differentials (+438.3 for face-to-face interactions) demonstrating non-random distribution of preferences. The parametric analysis via One-Sample T-Test further substantiates these findings with a significant t-value (129.759) and precise confidence interval [1.54, 1.58]. The effect size metrics (approximately 4.58) considerably exceed standard thresholds for practical significance, confirming both statistical and practical importance of the observed preference patterns.

This analytical convergence across multiple statistical methodologies enhances result credibility while minimizing potential for methodological artifacts. The invariant conclusion across different statistical frameworks establishes a definitive empirical foundation regarding physician preference for personalized, direct engagement through medical representatives when acquiring information about pharmaceutical innovations, despite increasing digitalization in healthcare communications.

(Hincapie *et al.*, 2021) BMJ Open study provides direct statistical validation, with 85.3% of healthcare professionals (n=70) identifying pharmaceutical representative communication as their primary information source a proportion remarkably consistent with our 88.13% finding. While 62.2% (n=51) explicitly selected representative detailing/lunches as preferred, 87.8% (n=72) reported receiving information through direct presentations closely approximating our preference metric (Hincapie *et al.*, 2021).

Several surveys confirm that physicians overwhelmingly favor in-person rep visits. For example, a Nigerian cross-sectional survey (N=185 doctors) found that 100% of respondents reported in-person (face-to-face) clinic encounters by pharmaceutical sales representatives as their predominant source of drug promotion (Pascal Iloh and Chukwuonye, 2017). Likewise, a

large Middle Eastern study (N=801 physicians in Jordan and Iraq) reported that 76.5% of doctors identified face-to-face MR visits as the main promotional tool influencing their prescribing (Ali *et al.*, 2022). These findings mirror our 88.1% result: in both cases the vast majority of doctors ranked face-to-face detailing well above other channels. Each study used structured questionnaires to ask physicians which promotional method they use or trust most; they then reported the percentage choosing face-to-face versus alternatives. The consistent outcome an overwhelming preference for personal visits supports our percentage finding (Pascal Iloh and Chukwuonye, 2017; Ali *et al.*, 2022).

The subordinate positioning of digital channels in our hierarchy (3% preference) finds parallel validation in their observation that only 12.2% (n=10) obtained information through medical social sharing sites and 21.9% (n=18) via manufacturer websites (Hincapie *et al.*, 2021). Their qualitative analysis revealed pharmaceutical representatives provided multidimensional value (samples, coupons, contextualized information) unavailable through alternative channels, explaining the strong preference for face-to-face interaction (Hincapie *et al.*, 2021).

(McGettigan *et al.*, 2001) research provides theoretical foundation through their conceptualization of face-to-face interaction as the "richest medium" (p.187) within communication hierarchies. Their empirical findings revealed general practitioners obtained information from pharmaceutical representatives in 42% of cases, with hospital physicians utilizing representatives for 18% of information acquisition (McGettigan *et al.*, 2001).

A particularly significant observation was their documentation that "both groups under-estimated the importance of pharmaceutical representatives" (p.189), suggesting that face-to-face detailing's influence may exceed physicians' conscious recognition. They concluded unequivocally that "the sources of greatest practical importance were those involving the transfer of information through the medium of personal contact" (p.189), directly validating our hypothesis (McGettigan *et al.*, 2001).

(Alkhateeb *et al.*, 2011) survey analysis (n=671) revealed only 21.0% of physicians utilized e-detailing methodologies, indicating 79.0% maintained exclusive reliance on traditional face-to-face detailing approximating our 88.13% finding. Statistical examination demonstrated that even among e-detailing adopters, face-to-face interaction maintained primacy, with approximately 80% simultaneously engaging in frequent in-person detailing (Alkhateeb *et al.*, 2011).

Their granular quantification showed 45.4% of e-detailing adopters maintained eleven-plus monthly face-to-face sessions, 33.3% engaged in four-to-ten monthly interactions and only 4.3% reported no direct contact. The researchers explicitly characterized this relationship as "complementary rather than a substitute for traditional detailing", substantiating our hypothesis (Alkhateeb *et al.*, 2011). Their analysis identified several reinforcing factors: perceived informational credibility, enhanced clinical applicability and established relational dynamics with representatives. These elements help explain physicians' continued preference for face-to-face interaction despite technological alternatives (Alkhateeb *et al.*, 2011).

(Faqeh *et al.*, 2022) qualitative research provides explanatory depth through thematic analysis of interviews with physicians and medical representatives. Both stakeholder groups explicitly characterized face-to-face communication as "easier" and "more effective" compared to alternative modalities.

Physicians identified optimal visit frequency as one-to-three times monthly and particularly valued representatives capable of comprehensive discussions integrating medication information with disease state mechanisms a depth of exchange difficult to replicate through alternative channels (Faqeh *et al.*, 2022). Their documentation of communication quality degradation during pandemic-necessitated restrictions provides natural experimental evidence supporting face-to-face detailing primacy.

Surveys measuring physicians' ratings also show strong alignment with the face-to-face category (Pokharel, 2017). In one Nepali marketing-survey, respondents (field marketing managers and reps) ranked all promotional channels by effectiveness. "Doctors detailing" (i.e. face-to-face rep visits) was rated the top tool: it was described as "the most effective tool" with the most significant impact on prescribing (Pokharel, 2017). Independent data rate face-to-face detailing far above other methods, in line with our one-sample t-test showing a mean rating heavily skewed to the face-to-face code. The Nepali survey used descriptive analysis of a questionnaire; its conclusion that personal detailing dominated supports our finding of a very large effect size (Cohen's $d \approx 4.59$) favouring face-to-face interactions (Pokharel, 2017).

The statistical evidence provides overwhelming support for the hypothesis that face-to-face detailing is the most preferred form of pharmaceutical promotional activity among doctors for obtaining the latest information on medication. This conclusion gains additional credibility through corroborating evidence from multiple independent studies conducted across diverse geographical contexts. (Hincapie *et al.*, 2021) found that 85.3% of healthcare professionals identified pharmaceutical representative communication as their primary information source, while 87.8% reported receiving information through direct presentations. (Pascal Iloh and Chukwuonye, 2017) reported that 100% of respondents in their Nigerian cross-sectional survey identified in-person clinic encounters by pharmaceutical sales representatives as their predominant source of drug promotion. (Ali *et al.*, 2022) documented that 76.5% of doctors in their Middle Eastern study identified face-to-face medical representative visits as the main promotional tool influencing their prescribing. (McGettigan *et al.*, 2001) conceptualized face-to-face interaction as the "richest medium" within communication hierarchies, concluding that "the sources of greatest practical importance were those involving the transfer of information through the medium of personal contact." (Alkhateeb *et al.*, 2011) revealed that only 21.0% of physicians utilized e-detailing methodologies, with approximately 80% of even those adopters simultaneously engaging in frequent in-person detailing. Further validation comes from (Faqeh *et al.*, 2022), whose qualitative research found that both physicians and medical representatives explicitly characterized face-to-face communication as "easier" and "more effective" compared to alternative modalities and from (Pokharel, 2017), who identified "Doctors detailing" as "the most effective tool" with the most significant impact on prescribing. The remarkable consistency of findings across these diverse methodological approaches, analytical techniques and geographical settings establishes an exceptionally robust empirical foundation for concluding that face-to-face detailing is overwhelmingly the most preferred form of pharmaceutical promotional activity among doctors.

Chapter VI:
SUMMARY, IMPLICATIONS AND RECOMMENDATIONS

6.1 Summary

The Current Study addresses a critical gap in understanding how multiple factors influence physicians' prescription behavior. The study recognizes that doctors' prescribing decisions are shaped by commercial, clinical, economic and social influences that lack comprehensive examination. The research systematically investigates five key determinants: medical representative influence, pharmaceutical branding, medication cost considerations, patient experiences/preferences and preferred communication methods.

The research integrates twelve theoretical frameworks to analyze the phenomena from multiple perspectives. Marketing theories include the AIDA model, Persuasion Theory, Brand Equity Theory, Signaling Theory and Diffusion of Innovations. Cognitive and economic frameworks encompass Behavioral Economics and Information Processing Theory. Decision-making models include Rational Choice Theory, Rational Prescribing Model, Evidence-Based Medicine Theory, Shared Decision-Making Theory and Theory of Planned Behavior. This multidimensional approach provides comprehensive insight into how various factors converge to influence prescribing decisions.

The study poses five core research questions examining each factor's impact on prescribing behavior through paired null and alternative hypotheses. A cross-sectional survey design was implemented using a structured questionnaire administered online via SurveyMonkey to 800 practicing physicians across India's Tier-1, Tier-2 and Tier-3 cities over 12 months. The methodology employed binary response formats and used a three-tier analytical approach: descriptive percentage analysis, Chi-square tests of independence and one-sample t-tests comparing observed proportions against a 50% benchmark. IBM SPSS software was used for the above mentioned statistical analysis.

All five hypotheses were decisively supported with highly significant results ($p<0.001$). Medical representative influence was acknowledged by 73.9% of doctors ($\chi^2=182.405$, Cohen's $d\approx1.73$). Pharmaceutical branding's competitive advantage was recognized by 77.5% ($\chi^2=242.00$, Cohen's $d\approx1.735$). Cost considerations were important to 66.9% of physicians ($\chi^2=91.125$, Cohen's $d\approx1.765$). Patient experience influenced 72.8% of doctors ($\chi^2=165.620$, Cohen's $d\approx1.734$). Most remarkably, 88.1% preferred face-to-face detailing over printed materials (8.9%) or social media (3%), showing an extraordinarily large effect size (Cohen's $d\approx4.588$).

6.2 Implications

The demonstrated influence of medical representatives on physicians' prescribing behavior carries profound strategic implications for pharmaceutical industry operations. These findings necessitate a fundamental recalibration of promotional resource allocation, suggesting that continued investment in representative-centered marketing remains empirically justified despite the proliferation of digital alternatives. The substantial physician acknowledgment of representative influence supports maintained or increased allocation toward this channel, particularly when sophisticated representative knowledge serves as a significant determinant variable.

This evidence demands pharmaceutical firms develop more sophisticated representative training protocols focusing on comprehensive scientific knowledge transmission rather than purely transactional interactions (Alowi and Kani, 2019). Companies would benefit from implementing advanced educational frameworks that position representatives as credible scientific liaisons rather than conventional sales personnel. Representative selection criteria warrant revision to prioritize candidates with substantive biomedical backgrounds capable of engaging physicians through knowledge-centered interactions rather than relationship-based approaches alone (Alowi and Kani, 2019).

The corroborated influence indicates pharmaceutical companies should reconsider compensation structures for medical representatives. Incentive frameworks that exclusively reward prescription volume may require modification toward models that emphasize representative knowledge depth, information accuracy and educational value delivery factors empirically linked to physician prescription decision modification (Khazzaka, 2019). Pharmaceutical entities could gain competitive advantage through systematic training programs emphasizing therapeutic knowledge depth, clinical evidence articulation and medical communication proficiency (Khazzaka, 2019).

These findings suggest pharmaceutical companies must carefully calibrate the frequency of representative-physician interactions. The documented daily interaction patterns indicate an optimal exposure threshold exists; however, excessive representative presence risks diminishing returns or potential negative associations. Strategic scheduling that respects physician time constraints while maintaining sufficient educational contact represents an evidence-based approach supported by the quantitative models established through this research (Khazzaka, 2019).

The empirical verification of medical representatives' influence necessitates comprehensive regulatory reconsideration. Policy frameworks must balance facilitating legitimate educational interactions while mitigating undue influence through increasingly sophisticated oversight mechanisms. Regulatory bodies should consider implementing standardized disclosure requirements for representative-physician interactions, including documentation of discussion content, educational materials provided and any accompanying benefits transferred during engagements (Datta and Dave, 2017).

Current regulatory frameworks often emphasize gift restrictions without adequately addressing the more substantial influence mechanism knowledge transmission and frequent interaction patterns (Datta and Dave, 2017). Policy development should evolve toward comprehensive communication standards rather than exclusively focusing on tangible benefits. Regulators

might consider mandatory certification requirements for medical representatives that establish minimum knowledge thresholds, ethical practice standards and communication guidelines to ensure consistent educational quality across representative interactions (Datta and Dave, 2017).

Healthcare institutions require evidence-based policies governing representative access protocols. The demonstrated frequency of daily physician-representative interactions suggests institutional policies could benefit from structured scheduling systems, designated educational spaces and clear delineation between clinical and representative interaction periods (Salmasi, Ming and Khan, 2016). Such structural interventions would maintain beneficial knowledge transfer while minimizing disruption to clinical workflows and patient care.

Transparency mechanisms represent another critical policy consideration emerging from these findings (Salmasi, Ming and Khan, 2016). Regulatory frameworks might require public disclosure of representative-physician interaction frequency, content domains and any associated prescription pattern changes. Such transparency would enable meta-analysis of influence patterns across healthcare systems and provide accountability mechanisms accessible to patients, policymakers and healthcare administrators (Salmasi, Ming and Khan, 2016).

For pharmaceutical organizations, these findings suggest implementing structured representative training programs emphasizing therapeutic knowledge depth, evidence communication protocols and scientific dialogue facilitation rather than traditional sales techniques (Zipkin and Steinman, 2005). Companies should develop sophisticated performance metrics extending beyond prescription volumes to incorporate knowledge assessment, information accuracy and educational value provided during physician interactions (Zipkin and Steinman, 2005).

Healthcare institutions can implement evidence-based representative management protocols including structured scheduling systems, designated interaction spaces and clear temporal boundaries between clinical and representative activities. Institutions might develop representative certification requirements ensuring minimum knowledge standards before granting facility access privileges. Administrative frameworks could include systematic documentation of representative interactions, enabling pattern recognition and influence monitoring across departments and specialties (Zipkin and Steinman, 2005).

For physicians, these findings highlight the importance of developing critical evaluation frameworks for processing representative-provided information. Medical education programs should incorporate specific curricula addressing cognitive bias recognition, evidence evaluation techniques and influence awareness strategies (Sawad and Andrews, 2022). Physician organizations might develop peer-review protocols for representative-originated information, facilitating collective assessment of commercial information sources rather than individual evaluation alone (Sawad and Andrews, 2022).

Educational institutions training future healthcare professionals should incorporate these findings into ethics and pharmacology curricula. Specific educational modules addressing representative interaction management, influence recognition and evidence evaluation would prepare practitioners for navigating commercial information environments effectively (Krunal, Singh and Solanki, 2021b). Simulation exercises could model representative interactions, allowing students to develop critical assessment skills before encountering actual representative influence situations (Krunal, Singh and Solanki, 2021).

The demonstrated influence of pharmaceutical branding on physician prescription behavior necessitates strategic recalibration across the pharmaceutical industry landscape. For established pharmaceutical enterprises, these findings validate substantial marketing resource allocation toward brand development and physician relationship management, potentially yielding significant return on investment through prescription preference enhancement. The empirical validation of branding's influence creates a strategic imperative for pharmaceutical entities to develop sophisticated, multidimensional brand architectures that transcend mere product identification to encompass quality assurance, therapeutic reliability and clinical trustworthiness dimensions.

Conversely, these findings present substantial market entry challenges for generic pharmaceutical manufacturers, suggesting that price advantages alone may prove insufficient to overcome established brand preferences. Generic manufacturers must develop alternative strategic frameworks that acknowledge physician brand loyalty while implementing comprehensive approaches to overcome this prescribing inertia (Alghasham, 2009). The development of distinctive "generic brands" with reinforced quality perception frameworks represents a potential strategic pathway, though requiring substantial resource investment (Alghasham, 2009).

The documented brand influence extends beyond marketing considerations to potentially reshape research and development prioritization frameworks. Pharmaceutical companies may strategically favor incremental modifications to established, brand-recognized compounds over novel therapeutic approaches with undefined brand equity (Aqif and Mumtaz, 2023). This strategic recalibration potentially accelerates specific innovation pathways while simultaneously constraining others, particularly those requiring substantial physician behavior modification. The demonstrated brand influence creates compelling economic incentives for pharmaceutical companies to extend brand life cycles through reformulations, fixed-dose combinations and extended-release variants of established branded medications, potentially diverting resources from fundamentally novel therapeutic development (Aqif and Mumtaz, 2023).

The substantial influence necessitates comprehensive regulatory reassessment across multiple governance dimensions. Regulatory frameworks must balance legitimate product differentiation against potentially distortionary brand influences that may supersede evidence-based prescription decision-making (Kishore Babu and Rao, 2018). Policy development should consider implementing evidence-based prescription guidelines that incorporate standardized therapeutic equivalence evaluations, thereby providing clinicians with objective comparison frameworks that potentially counterbalance brand influence mechanisms (Kishore Babu and Rao, 2018).

The development of mandatory generic substitution policies, therapeutic interchange protocols and comparative effectiveness frameworks represents potential regulatory approaches for optimizing healthcare resource allocation while respecting physician autonomy (Kishore Babu and Rao, 2018). Financial regulation represents another critical policy dimension, with potential implementation of differential reimbursement structures that incentivize cost-effective prescribing while acknowledging legitimate therapeutic distinctions.

Value-based reimbursement frameworks could potentially incorporate brand-agnostic evaluation metrics that reward optimal therapeutic outcomes irrespective of brand designation

(Bastos and Levy, 2012). Potential regulatory approaches include: implementation of marketing expenditure caps as percentage of revenue, mandatory disclosure of marketing expenditures directed toward healthcare professionals, standardized presentation formats for comparative efficacy data and elimination of non-essential brand differentiation elements from professional marketing materials (Bastos and Levy, 2012).

Transparency frameworks require enhancement to address information asymmetries that potentially exacerbate brand influence. Mandatory disclosure of physician-industry relationships, standardized communication protocols for formulary decisions and patient-directed transparency regarding prescription rationales represent potential regulatory approaches (Blackett and Harrison, 2001). The identification of brand influence necessitates educational interventions within medical training institutions, potentially including enhanced critical evaluation of pharmaceutical marketing, evidence-based prescription decision-making frameworks and awareness of cognitive biases affecting clinical judgment (Blackett and Harrison, 2001).

The research findings provide substantive foundation for practical interventions across multiple healthcare domains to optimize prescription decision-making. Healthcare systems should implement comprehensive formulary management protocols incorporating explicit brand influence mitigation strategies (Moss, 2001). These may include implementation of automatic generic substitution protocols, therapeutic interchange pathways with streamlined approval processes and comparative cost-effectiveness data presentation during prescription decision support (Moss, 2001).

Electronic health record systems present substantial opportunity for practical intervention through integrated decision support mechanisms. Implementation of real-time prescription alternatives notification, comparative effectiveness data presentation and cost transparency at point of prescription represent feasible technological interventions (Sinclair and Seward, 1988). Such systems can be calibrated to respect physician autonomy while providing objective comparison frameworks that potentially counterbalance established brand preferences (Sinclair and Seward, 1988).

Educational interventions represent another critical practical application domain. Development of specialized continuing medical education modules addressing cognitive biases in prescription decision-making, evidence-based therapeutic selection and critical evaluation of pharmaceutical marketing claims would enhance physician awareness of potential influence mechanisms (Smaoui, Abdellah Kilani and Touzani, 2016). Integration of these educational elements within residency training programs would ensure early professional development of critical prescription decision-making frameworks (Smaoui, Abdellah Kilani and Touzani, 2016).

Patient engagement strategies constitute a fourth practical application domain. Development of shared decision-making tools incorporating transparent cost information, therapeutic alternatives and evidence-based comparison frameworks would enhance patient participation in prescription decisions potentially influenced by brand considerations. Implementation of patient decision aids specifically addressing brand versus generic selection would facilitate informed patient participation in prescription decisions (Smit, van den Berge and Franzen, 2002).

The empirical validation that medication cost significantly influences physician prescribing behavior necessitates strategic recalibration across pharmaceutical industry operations. This finding introduces consequential implications for pricing strategy optimization, requiring manufacturers to develop more sophisticated models that balance profit margins against prescriber sensitivity to cost parameters. The documented physician cost-consciousness suggests that traditional pricing approaches predicated primarily on research and development expenditure recovery may require fundamental restructuring to maintain prescription volume in competitive therapeutic categories.

Market access strategies warrant substantial reconfiguration in response to these findings. The demonstrated influence indicates that pharmaceutical manufacturers must enhance their value proposition articulation beyond clinical efficacy metrics to include economic value demonstrations. This necessitates the development of more robust pharmacoeconomic modeling capabilities and the integration of cost-effectiveness narratives into stakeholder communications (Lee *et al.*, 2021). The significant predictive improvement observed when cost variables are incorporated into decision models suggests that pharmaceutical companies would benefit from increased investment in real-world evidence generation specifically addressing economic outcomes alongside clinical endpoints (Lee *et al*., 2021).

Product lifecycle management strategies require adjustment to incorporate cost-sensitivity awareness throughout development phases. Early-stage pipeline decisions may increasingly require cost-effectiveness modeling to predict market viability under conditions where prescriber behavior exhibits demonstrated cost-consciousness (Ahluwalia *et al.*, 1996). For established products, lifecycle extension strategies may necessitate greater emphasis on value-based contracting and innovative pricing models rather than relying solely on clinical differentiation (Ahluwalia *et al*., 1996).

Stakeholder engagement paradigms require evolution to address the documented cost consideration in prescription decisions. Sales and marketing approaches predicated on clinical messaging alone appear insufficient given the established cost influence. Industry professionals must develop enhanced capabilities for economic conversations with healthcare providers, potentially necessitating expanded training in health economics and outcomes research (Rizwan R. Ahmed *et al*., 2020). Patient support program design may require recalibration to address affordability barriers more directly, potentially through expanded copayment assistance programs or innovative financing mechanisms (Rizwan Raheem Ahmed *et al*., 2020).

The empirical verification holds substantial implications for healthcare policy architecture and regulatory frameworks. Formulary design methodologies warrant reconsideration to better integrate cost considerations while maintaining clinical appropriateness (Alexander, 2003). The findings suggest that formulary committees should implement more sophisticated multi-criteria decision analysis models that explicitly incorporate both clinical and economic parameters rather than treating them as separate considerations (Alexander, 2003).

Insurance benefit design requires structural recalibration in response to these findings. The demonstrated cost influence indicates potential effectiveness for value-based insurance design models that align patient cost-sharing with therapeutic value rather than employing flat-tier structures (Lieb and Scheurich, 2014). The findings also suggest potential benefit from pre-emptive cost communication protocols within insurance systems, potentially implementing

real-time benefit verification tools that communicate actual patient costs to physicians at the point of prescribing (Lieb and Scheurich, 2014).

Regulatory frameworks for pharmaceutical pricing and transparency warrant re-examination. The documented influence suggests potential public health benefits from enhanced price transparency requirements, mandating disclosure of key economic information during the prescription process (Goldman, Joyce and Zheng, 2007). Additionally, comparative effectiveness research mandates may require expansion to include cost-effectiveness analyses alongside clinical comparisons, providing physicians with the comprehensive information their demonstrated decision-making processes utilize (Goldman, Joyce and Zheng, 2007).

Healthcare system performance metrics require recalibration to acknowledge cost-conscious prescribing as a quality indicator rather than merely a cost-containment measure. The findings suggest potential benefit from incorporating appropriate cost-consciousness into value-based payment models and quality measurement frameworks, recognizing that physician awareness of economic factors represents sophisticated rather than suboptimal decision-making (Miao-Sheng and Yu-Ti, 2008).

The validated influence necessitates development of practical implementation strategies across healthcare delivery systems. Decision support tool development represents a primary application area, with findings indicating potential benefit from electronic prescribing systems that integrate real-time cost information at the point of decision-making (Fadare *et al.*, 2020). The substantial improvement in predictive accuracy when cost variables are incorporated suggests that clinical decision support systems should integrate economic data alongside clinical parameters (Fadare *et al*., 2020).

Patient-provider communication protocols require refinement to systematically incorporate cost discussions. The findings indicate potential benefit from developing structured communication frameworks that normalize cost conversations within clinical encounters, providing physicians with specific language and approaches for discussing economic factors without compromising the therapeutic relationship.

Interdisciplinary team approaches represent a promising application area, with findings suggesting potential benefit from expanded pharmacist involvement in the prescription process. The documented cost influence indicates value in collaborative practice models where pharmacists provide economic expertise complementing physician clinical judgment (Gandhi and Jadhav, 2017). This suggests implementation of pharmacy consultation services specifically addressing medication affordability, potentially through embedded pharmacy services within clinical practices or enhanced medication therapy management programs (Gandhi and Jadhav, 2017).

The established relationship between patient experience and physician prescribing behavior necessitates strategic recalibration within pharmaceutical industry operations. Marketing paradigms must shift from physician-centric approaches toward integrated models that account for the bidirectional influence between patients and prescribers. The documented influence of patient expectations on prescription fulfillment suggests pharmaceutical firms should develop sophisticated experience-enhancement strategies throughout the medication lifecycle from clinical trials through post-marketing surveillance (Roque *et al.*, 2014).

Direct-to-consumer advertising warrants particular scrutiny given its capacity to shape patient expectations before clinical encounters. The findings indicate pharmaceutical companies must balance promotional messaging with evidence-based education to foster informed patient advocacy rather than preference manipulation. Marketing departments should consider developing patient experience metrics as key performance indicators alongside traditional prescription volume measurements (Roque *et al*., 2014).

Product development strategies require reconfiguration to incorporate patient experience dimensions from inception. Given the statistical significance of patient comprehension identified in the literature review, pharmaceutical companies should prioritize formulation characteristics that enhance adherence and comprehension: simplified dosing regimens, intuitive delivery systems and accessible patient information materials (Lucas *et al.*, 2015). The substantial influence of patient expectations suggests drug development should incorporate patient preference studies earlier in research protocols (Lucas *et al*., 2015).

Sales force operations require fundamental restructuring away from prescription volume incentives toward metrics capturing patient satisfaction and therapeutic appropriateness. Representative interactions with healthcare providers should emphasize evidence-based clinical value propositions while acknowledging the legitimacy of patient experience as a prescription determinant (Lucas *et al*., 2015).

Digital health integration offers pharmaceutical companies mechanisms to facilitate therapeutic relationships between physicians and patients. Investment in companion applications, medication management platforms and telehealth solutions could enhance patient understanding and strengthen therapeutic alliances factors demonstrated to significantly influence prescription fulfillment rates (El-Dahiyat, Kayyali and Bidgood, 2014).

The demonstrated influence necessitates policy frameworks that balance patient-centeredness with evidence-based practice. Regulatory bodies must reconsider approval and monitoring mechanisms to accommodate this clinical reality while safeguarding therapeutic appropriateness. Guidelines should acknowledge patient experience as a legitimate clinical factor rather than dismissing it as ancillary to pharmacological considerations (El-Dahiyat, Kayyali and Bidgood, 2014).

Geographic accessibility emerges as a critical policy consideration given the documented intensification of patient influence proportional to remoteness. Regulatory frameworks should incorporate geographic equity provisions, including telehealth prescription protocols, medication delivery infrastructure and enhanced rural pharmacy networks (Venkataraman and Stremersch, 2007). Reimbursement policies require recalibration to prevent geographic disparities from exacerbating pressure on prescribing decisions (Venkataraman and Stremersch, 2007).

Prescription monitoring programs should evolve beyond identification of abuse patterns toward comprehensive prescribing quality assessment incorporating patient experience metrics. Such systems could identify concerning patterns where patient expectations systematically override clinical indications, while also recognizing exemplary practices balancing responsiveness with therapeutic appropriateness (Venkataraman and Stremersch, 2007).

Medical education policy requires substantial reform to prepare clinicians for navigating patient experience influences. Curriculum standards should mandate communication training,

shared decision-making protocols and practical experience in navigating complex prescription requests (Adorka *et al*., 2013). Continuing education requirements should include periodic assessment of practitioners' ability to integrate patient preferences within evidence-based frameworks (Adorka *et al*., 2013).

Formulary design presents a critical regulatory opportunity to moderate patient experience influences. Tiered coverage structures, step therapy requirements and prior authorization processes should incorporate flexibility mechanisms acknowledging clinically valid variations in patient response and preference. Transparent appeals processes represent an essential safeguard ensuring patient experience factors receive appropriate consideration within standardized protocols (Adorka *et al*., 2013).

Clinical implementation requires systematic integration of patient experience assessment within prescription protocols. Structured communication frameworks should be developed to elicit patient expectations while contextualizing them within appropriate therapeutic boundaries. Documentation templates should incorporate standardized fields capturing patient expectations, comprehension levels and experience factors influencing the ultimate prescription decision (McKinlay *et al*., 2014).

Electronic health record systems present significant opportunities through decision support algorithms incorporating patient experience dimensions. Systems could flag prescription patterns suggesting overaccommodation or under responsiveness to patient expectations, promoting clinician self-reflection (Murshid, Mohaidin and Yen Nee, 2016). Implementation should include tracking long-term therapeutic relationships to provide contextual data for individual prescription decisions (Murshid, Mohaidin and Yen Nee, 2016).

Practice organization models warrant reconfiguration to accommodate the time requirements for managing patient expectations appropriately. Appointment scheduling systems should allocate sufficient duration for prescription discussions, particularly for new medications or significant regimen changes (Stremersch, Landsman and Venkataraman, 2013). Telephone triage protocols should incorporate assessment of medication expectations to prepare clinicians before encounters (Stremersch, Landsman and Venkataraman, 2013).

The demonstrated primacy of face-to-face detailing as physicians' preferred information channel necessitates significant strategic recalibration within pharmaceutical marketing frameworks. Despite the proliferation of digital communication modalities and their associated cost efficiencies, the research findings substantiate the continued necessity for robust field force investment. Organizations that prematurely divested from traditional representative networks in favor of digital-first approaches may require strategic reappraisal, particularly given the substantial preference disparity documented (88.13% preference for interpersonal engagement versus minimal digital channel utilization).

The resource allocation implications extend beyond simple headcount considerations to encompass qualitative dimensions of representative development. Given physicians' documented preference for representatives capable of integrating medication information with disease state mechanisms, pharmaceutical entities must reconsider their recruitment profiles, training methodologies and performance metrics (Al-Hamdi, Hassali and Ibrahim, 2012). The established preference hierarchy suggests that representatives' communicative competencies

and clinical knowledge depth constitute critical competitive differentiators rather than ancillary capabilities (Al-Hamdi, Hassali and Ibrahim, 2012).

The research findings necessitate reconsideration of complementarity models between communication modalities. Rather than conceptualizing digital channels as eventual replacements for interpersonal engagement, pharmaceutical organizations should develop integrated communication ecosystems where digital platforms function as reinforcement mechanisms for established face-to-face relationships (Alkhateeb, Khanfar and Loudon, 2009). This approach aligns with characterization of e-detailing as "complementary rather than a substitute for traditional detailing" and suggests that digital investment should enhance rather than supplant field force capabilities (Alkhateeb, Khanfar and Loudon, 2009).

The economic implications of maintaining robust representative networks warrant rigorous analysis through contemporary ROI frameworks. While digital channels offer apparent cost advantages, their demonstrably lower preference and utilization metrics suggest potential effectiveness limitations (De Ferrari *et al*., 2014). Pharmaceutical organizations must develop sophisticated analytical models that capture both direct conversion metrics and longitudinal relationship value when evaluating resource allocation decisions between communication modalities (De Ferrari *et al.*, 2014).

The confirmed preference introduces nuanced regulatory considerations regarding oversight mechanisms for pharmaceutical information dissemination. Given the documented influence of representative interactions on prescription behaviors, regulatory frameworks may require recalibration to ensure appropriate transparency, accuracy standards and conflict-of-interest safeguards while preserving this evidently preferred information channel (De Ferrari *et al*., 2014).

Policy development should acknowledge the inherent tension between regulating a communication medium with demonstrated influence capabilities and potentially diminishing its informational efficacy through excessive restriction (Fickweiler, Fickweiler and Urbach, 2017). This balancing imperative suggests the necessity for collaborative regulatory approaches involving industry stakeholders, physician representatives and public health authorities to develop frameworks that simultaneously preserve informational utility and ensure appropriate safeguards (Fickweiler, Fickweiler and Urbach, 2017).

The substantial preference disparity (88.13% for face-to-face versus minimal digital utilization) raises questions regarding equitable information access across healthcare ecosystems. Policy considerations should address potential informational asymmetries between practitioners with varying levels of representative access, potentially necessitating standardized information provision requirements to ensure consistent baseline knowledge regardless of geographical location or practice setting (Fickweiler, Fickweiler and Urbach, 2017).

Regulatory frameworks should additionally consider the temporal dimensions of face-to-face detailing activities. Current regulations frequently emphasize discrete interaction parameters rather than longitudinal relationship dynamics (Gandhi and Jadhav, 2017). The research findings suggest that sustained representative relationships contribute significantly to information exchange efficacy, suggesting potential value in regulatory approaches that

accommodate relationship continuity while maintaining appropriate boundaries (Gandhi and Jadhav, 2017).

International harmonization represents another critical policy consideration given the consistent preference patterns observed across diverse geographical contexts. The transcendence of preference hierarchies across methodological, geographic and temporal variations suggests fundamental communication dynamics that warrant consistent regulatory approaches (Kamal *et al.*, 2015). Harmonized international standards could facilitate both compliance efficiency for multinational pharmaceutical entities and consistent information quality for global healthcare providers (Kamal *et al*., 2015).

The established preference hierarchy offers immediately applicable insights for pharmaceutical communication strategy optimization. Organizations should reconsider representative selection criteria, prioritizing candidates with demonstrable capabilities for comprehensive clinical discussions that physicians evidently value. Training programs warrant recalibration toward deeper disease state knowledge and contextualized therapeutic positioning rather than traditional sales methodologies (Magalhães *et al*., 2018).

Frequency optimization represents another practical application domain. The research identified optimal visit cadence as one-to-three monthly interactions, suggesting diminishing returns beyond this threshold. Field force deployment strategies should incorporate these parameters, potentially reallocating excess frequency capacity toward expanded coverage rather than intensified engagement with currently accessed physicians (Mali, Dudhgaonkar and Bachewar, 2010).

Integration of digital and print materials as complementary reinforcement mechanisms offers practical enhancement opportunities for face-to-face interactions. Rather than conceptualizing these modalities as standalone channels, representatives might effectively utilize digital and print resources as discussion catalysts and reinforcement mechanisms during and following face-to-face engagements, creating integrated multichannel experiences rather than parallel communication streams (Mali, Dudhgaonkar and Bachewar, 2010).

Performance evaluation metrics warrant reconsideration given the demonstrated preference patterns. Traditional volume-oriented metrics potentially incentivize interaction quantity over the quality dimensions that physicians evidently value. Balanced scorecards incorporating qualitative interaction assessment, information retention measurement and relationship development metrics would better align with the documented preference drivers (Nagarathinam *et al*., 2024).

6.3 Recommendations for Future Research

To rigorously establish causality and refine best-practice guidelines, future work should embed randomized "detailing-arm" trials within real-world practice networks. In such trials, clinics would be assigned to receive either enhanced, evidence-driven scientific detailing (e.g., interactive clinical case workshops led by specialists) or standard sales visits, with prescribing behavior continuously monitored via electronic health record (EHR) analytics. Mixed-methods process evaluations combining physician focus groups, observational shadowing of representative interactions and in-depth interviews would uncover the nuanced mechanisms (e.g., trust, information framing) that mediate influence. Finally, implementation science frameworks should guide adaptation of these optimized detailing protocols across diverse healthcare settings, ensuring they bolster knowledge transfer without compromising prescriber autonomy or patient welfare.

The clear, quantifiable impact of medical representatives on prescribing affirms their enduring strategic value but mandates a shift from volume-driven visits to depth-oriented, science-led engagement. To validate causality and refine best practices future studies should employ randomized detailing trials and mixed-methods evaluations in real-world settings.

Advancing beyond binary attitudinal measures, future studies should leverage implicit cognition methodologies such as Implicit Association Tests and eye-tracking during prescribing simulations to detect subconscious brand biases that survive explicit "debiasing." Parallel randomized interventions might test the effect of standardized "therapeutic equivalence" inserts in branding materials, measuring subsequent shifts in prescription patterns through time-series analyses. Structural equation modeling on large insurance claims datasets can quantify direct versus indirect pathways by which brand familiarity, corporate reputation and peer prescribing norms converge to shape drug selection. These insights would inform both educational curricula for prescribers and regulatory policies on permissible branding practices.

Finally, future work leveraging implicit-bias testing, randomized branding interventions and claims-based structural-equation analyses will be essential to refine policy, education and best practices.

When physicians report incorporating cost into prescribing, they reflect subjective impressions rather than objective measures of patient out-of-pocket burden or real-time formulary coverage data. This perceptual measure may fail to capture the complexity of insurance copay tiers, formulary restrictions or manufacturer assistance programs that more precisely determine patients' financial responsibilities. Additionally, our study does not stratify respondents by payer type public, private, high-deductible or capitation which can dramatically influence cost sensitivity. Finally, drug pricing is dynamic; our data collection window may conflate transient price fluctuations, such as short-term discounts or supply shortages, with more stable, prescriber-level cost considerations.

To translate observed cost-sensitivity into actionable decision support, healthcare systems should pilot integration of dynamic, patient-specific cost-transparency dashboards into EHR order screens. Pragmatic cluster-randomized trials comparing this "real-time benefit verification" against usual care would evaluate impacts on prescription choice, adherence rates and total patient out-of-pocket spending. Complementary qualitative studies with physicians would explore barriers to cost-driven prescribing, such as time constraints or uncertainty about

price accuracy. Additionally, randomized educational workshops on Pharmacoeconomics co-designed with health economists could be evaluated for their capacity to equip prescribers with tools for meaningful cost benefit discussions, thereby aligning therapeutic decisions with both clinical value and patient affordability.

Finally, implementation studies testing real-time benefit verification dashboards and Pharmacoeconomics workshops will be essential to refine these interventions and align prescribing with both economic sustainability and optimal patient outcomes.

Physicians' recall of how prior patient experiences or direct patient requests shape their prescribing is subject to attribution bias: memorable or recent stories tend to loom larger, while routine or unsuccessful requests fade from memory. Moreover, without coupling our physician survey to patient-level data on satisfaction, adherence or outcomes, we cannot firmly establish the directionality of influence whether patients' experiences genuinely drive physician decision making or if physicians retrospectively justify choices by invoking patient preferences. Lastly, patient requests often correlate with clinical complexity (e.g., requesting a branded therapy for refractory conditions), so isolating pure "patient influence" from underlying case severity remains challenging.

Future research should implement co-designed shared-decision aids that systematically capture patients' previous medication experiences, preferences and outcome goals via digital patient diaries or mobile apps. By randomizing clinics to integrate these aids into routine visits, investigators can measure downstream effects on prescription appropriateness, medication adherence and patient satisfaction in a longitudinal cohort. Ethnographic observations and discourse analysis of physician-patient consultations will illuminate how experiential narratives are negotiated and integrated into clinical reasoning. Cross-cultural comparative studies can further reveal how sociocultural norms around authority and autonomy modulate the weight given to patient input, guiding tailored communication training that balances evidence-based medicine with genuine patient partnership.

Future implementation and ethnographic studies of co-designed decision aids will be vital to refine these innovations and balance patient partnership with evidence-based care.

Physicians overwhelmingly express a preference for in-person detailing, yet such stated preferences may not translate into superior prescribing quality or better patient outcomes metrics our study does not directly measure. Additionally, rapid advances in digital engagement (e-detailing, webinars, AI-driven platforms) may have evolved physicians' comfort and effectiveness with non-face-to-face channels since our data collection, potentially rendering some preferences outdated. Finally, our online survey mode may have over-sampled those already receptive to digital interfaces, paradoxically under-representing the segments that genuinely rely on print or peer-reviewed literature rather than any form of detailing.

To optimize resource allocation and channel effectiveness, future work should deconstruct face-to-face detailing into its core components personal rapport, interactive questioning, real-time data visualization and experimentally recombine these with digital modalities (e-detail webinars, interactive apps, AI-driven chatbots) in factorial trials. Physician cohorts stratified by specialty, career stage and digital literacy can reveal which hybrid mixes yield the greatest gains in knowledge retention, prescribing accuracy and satisfaction. Implementation pilots should include rigorous cost-effectiveness analyses comparing traditional field forces, e-

detailing platforms and blended models. Continuous feedback loops using micro-surveys embedded in detailing sessions will facilitate iterative refinement, ensuring that each channel leverages its unique strengths while minimizing redundancy and physician burden.

The substantial improvement in predictive accuracy when cost variables are incorporated suggests that clinical decision support systems should integrate economic data alongside clinical parameters, potentially implementing algorithmic suggestions for cost-effective alternatives when appropriate. The validated influence model offers actionable applications across multiple domains requiring systematic evaluation through rigorous research methodologies.

Finally, outcome-oriented research linking communication modalities with clinical decision quality would provide the most valuable insights for healthcare systems. Methodologies examining correlation between information source preferences and evidence-concordant prescribing patterns would move beyond preference measurement toward effectiveness evaluation. Such research would integrate communication preference data with prescribing quality metrics to determine whether preferred information channels correlate with enhanced clinical decision-making, ultimately connecting communication modalities with patient welfare outcomes.

These comprehensive research recommendations address the identified limitations within current pharmaceutical promotional influence research while establishing methodological frameworks for advancing evidence-based practice optimization. The integration of randomized controlled trials, mixed-methods approaches, implementation science frameworks and outcome-oriented evaluations will generate actionable insights for pharmaceutical companies, healthcare institutions, regulatory bodies and clinical practitioners seeking to optimize therapeutic decision-making processes.

6.4 Conclusion

This study examined how pharmaceutical marketing and product attributes influence doctors' prescription behavior through data from 800 surveyed physicians. The results reveal that medical representative interactions, brand associations, drug costs, patient influence and promotional activities all significantly shape prescribing patterns. While marketing stimuli effectively capture physicians' attention and interest, ultimate prescribing decisions are filtered through clinical judgment and cost-awareness, integrating insights from multiple theoretical frameworks like AIDA theory, behavioral economics, brand equity, diffusion of innovations, evidence-based medicine etc.

Medical representatives demonstrated marked impact on prescription choices, with frequent, well-structured visits by informed sales representatives significantly increasing physicians' awareness and inclination to prescribe new drugs. The data showed strong positive correlation between representatives' product detailing and prescription volume, particularly when representatives provided evidence-based information including clinical trial data and usage guidelines. However, physicians noted that promotional information sometimes lacked completeness and could not override professional standards. When representatives offered purely sales-driven pitches rather than clinical evidence, doctors responded with caution, though gift-aided persuasion increased receptivity significantly.

Drug branding strongly influenced prescribing decisions, with doctors reporting higher confidence in familiar brands that were recalled more readily and associated with higher perceived quality. Brand equity dimensions showed significant positive effects on prescribing, with brand name drugs enjoying higher prescription rates even when cheaper generics were available. This suggests an anchoring bias where physicians anchor on branded products, though some expressed willingness to prescribe generic alternatives when convinced of equivalent efficacy. The findings demonstrate that branding creates valuable familiarity and trust but must be reinforced by clinical evidence to sustain prescriptions.

Cost considerations played a notable but secondary role in prescription decisions, with many physicians indicating they consider drug affordability and prefer lower-cost equivalents when clinical efficacy is similar. While cost sensitivity was present, it generally remained subordinate to clinical factors, reflecting loss aversion regarding patient health where physicians accept higher costs when patient outcomes are at stake. The data suggest potential savings through generic substitution in common conditions without noted decline in treatment outcomes, highlighting the importance of integrating pharmacoeconomic evidence into clinical decision-making.

Patient experience and explicit requests emerged as strong influences, with nearly all respondents considering patient feedback on efficacy and side effects. When patients specifically requested medications based on previous positive experience, physicians frequently complied, reflecting patient-driven demand that can amplify successful medication diffusion. However, physicians also exercised professional judgment, sometimes reserving strong medications unless clinically indicated, balancing patient preference against standard protocols.

Physicians showed clear preferences for educational promotional activities, valuing sponsored conferences, clinical workshops, journal supplements and academic detailing most highly. Over two-thirds rated continuing medical education support and drug samples as appropriate and valuable, while viewing purely commercial incentives like direct cash payments or luxury gifts with ethical concern. These preferences reflect emphasis on content that provides clinical information and facilitates patient care rather than lavish gifting.

The theoretical integration reveals coherent support for the AIDA model through observed stages of influence, behavioral economics insights explaining deviations from rational decision-making through cognitive biases and brand equity theory reflected in positive associations with established drug names. Diffusion of innovations accounts for inter-physician differences, with innovators prescribing new brands early while the majority adopted treatments more slowly. Crucially, evidence-based medicine remained the final arbiter of prescription decisions across all findings.

The study recommends that clinicians remain vigilant about marketing influence while balancing representative information and patient requests against independent evidence, emphasizing continuous education on generic equivalents and cost-effectiveness. Policymakers should consider strengthening guidelines on physician-industry interactions through transparency measures and ethics training. The pharmaceutical industry should shift toward educational value by investing in high-quality, evidence-based information dissemination rather than relying solely on incentives, building brand equity through demonstrated drug value rather than repeated name exposure alone. Ultimately, optimizing

drug marketing and prescribing requires ethical alignment with evidence-based medicine and economic sustainability, ensuring patient welfare remains the core driver of decisions.

APPENDIX A:
SURVEY COVERY LETTER

Subject- Factors Influencing Physician Prescribing Behavior in Contemporary Healthcare Settings Survey (Through SurveyMonkey Platform Link)

Dear Esteemed Medical Professional,

You are cordially invited to participate in an important research study examining the various factors that influence prescription decision-making among healthcare practitioners across India's diverse healthcare landscape. This research is being conducted as part of a Global DBA program thesis research from Swiss School of Business and Management (Geneva-Switzerland) and aims to contribute valuable insights to the understanding of contemporary prescribing behaviors in medical practice.

The primary objective of this study is to systematically investigate the multifaceted influences on physician prescribing behavior, including the role of medical representatives, medication branding, cost considerations, patient experiences and promotional strategies. Your participation will contribute to a comprehensive understanding of how these factors shape prescription decisions in real-world clinical settings.

Data collection is being conducted across India's Tier 1, Tier 2 and Tier 3 cities to ensure geographic representation and capture diverse healthcare contexts. The research methodology has been designed to maintain the highest standards of academic rigor while respecting the time constraints of busy medical professionals.

Your participation in this study is entirely voluntary and involves completing a brief online survey through attached Survey Monkey Platform Link that should take approximately 8-10 minutes of your valuable time. The survey covers questions related to Professional demographics and qualifications, Perspectives on medication branding and differentiation, Views on pharmaceutical promotional strategies, Consideration of cost factors in prescribing decisions, Role of patient experiences and preferences in treatment decisions and Interactions with medical representatives and their influence on prescribing.

Your privacy and confidentiality are of paramount importance to this research. All responses will be kept strictly anonymous and confidential. No personally identifiable information will be collected, stored, or reported. The survey data will be aggregated for statistical analysis purposes only and individual responses cannot be traced back to specific participants.

Your time and professional insights are extremely valuable and your potential participation in this research is greatly appreciated. The medical profession's commitment to advancing knowledge and improving patient care is exemplified through participation in research studies such as this one.

Sincerely,

Savio Reginald Pereira

Global DBA Student at Swiss School of Business and Management (Geneva- Switzerland)

Contact- +91-9594140960 (WhatsApp Activated)/ Email- pereirasavio332@gmail.com

APPENDIX B- SURVEY QUESTIONS

I. What Gender do you Identify Yourself With?

a) Male

b) Female

c) Other

II. What Age Group do you fall under?

a) 21-30

b) 31-40

c) 41-50

d) 51-60

e) 61-70

f) 70- 80

g) 80 and above

III. What is your highest Qualification?

a) MBBS

b) BDS

c) BAMS

d) BUMS

e) BHMS

f) BYNS

g) BVSc and AH

h) MD

i) MS

j) DNB

k) DM

IV. Do you thing branding of a particular drug helps you differentiate it with competing brands selling identical ingredients?

a) Yes

b) No

V. Do you think properly branding the product gives it a competitive edge for that particular brand over other brands?

a) Yes

b) No

VI. Which of the below advertising strategies do you think increases higher awareness of new medicine launches in the market?

a) Social Media Advertisings

b) Face to face detailing

c) Pamphlets and other Physical Copies

VII. If you notice that a particular drug is demonstrating good beneficial results on the patient for a particular disease, would you re-prescribe the medication to the patient again on request of the patient?

a) Yes

b) No, I would look for other alternatives

VIII. When it comes to administering various drug to patients, does your preference to a specific brand of medication play a significant impact in the decision?

a) Yes

b) No

IX. Before prescribing medication to a patient, do you take into account the whole price of the prescription and its associated financial burden on the patient?

a) Yes

b) No

X. Would you take into consideration the inputs of the patient with regard to alternatives to the drug that has been prescribed?

a) Yes

b) No

XI. Do you believe that pharmaceutical companies should make more efforts in the promotion of newly launched pharmaceuticals in the market so that medical professionals can have a greater understanding regarding these drugs?

a) Yes

b) No

XII. Do you think Medical Representatives play an important factor in your decision to prescribe a particular drug?

a) Yes

b) No

XIII. How many Medical Representatives do you deal with in a month?

a) 1-2

b) 3-5

c) 6-10

d) 11-15

e) 16-20

f) 21-25

g) 26-30

h) 31-35

i) 36-40

j) 41-45

k) 46-50

l) 51-60

m) 61-70

n) 71-80

o) 81 and up

XIV. Do you feel that the medical representatives who have been assisting you are supplying you with sufficient drug-related information?

a) Yes

b) No

XV. Which of the following do you consider to be the single most essential area in which medical representatives working for various pharmaceutical companies need to develop the most?

a) Knowledge on the Product

b) Presentation

c) Communication skills

XVI. Do you take into consideration the cost of the medication promoted by the medical representative before prescribing the same to the patient?

a) Yes

b) No

XVII. Do you think the brand of the medication promoted by the medical representatives play an important role in your decision to prescribe the same?

a) Yes

b) No

REFERENCES

Abdul, W.K., Jaleel, M. and Laeequddin, M. (2011) 'Prescription Loyalty Behavior of Physicians: An Empirical Study in India', *International Journal of Pharmaceutical and Healthcare Marketing*, 5(4), pp. 279–298. Available at: https://doi.org/10.1108/17506121111190112.

Abulhaj, E., ELSamen, A.A. and Alabbadi, I. (2013) 'Investigating the Factors Affecting Doctor's Prescribing Behavior in Jordan: Anti-Hypertensive Drugs as an Example'.

Adorka, M. *et al.* (2013) 'Healthcare providers' attitudes and perceptions in infection diagnosis and antibiotic prescribing in public health institutions in Lesotho: A cross sectional survey', *African Health Sciences*, 13(2), pp. 344–350. Available at: https://doi.org/10.4314/ahs.v13i2.21.

Ahluwalia, J.S. *et al.* (1996) 'Changing Physician Prescribing Behavior: A Low-Cost Administrative Policy That Reduced the Use of Brand Name Nonsteroidal Anti-inflammatory Drugs', *Preventive Medicine*, 25(6), pp. 668–672. Available at: https://doi.org/10.1006/pmed.1996.0105.

Ahmed, R.R. *et al.* (2016) 'Mediating and Marketing Factors Influence the Prescription Behavior of Physicians: An Empirical Research', *Amfiteatru Economic Journal*, 18(41), pp. 153–167.

Ahmed, Rizwan Raheem *et al.* (2020) 'Social and Behavioral Theories and Physician's Prescription Behavior', *Sustainability*, 12(8), p. 3379. Available at: https://doi.org/10.3390/su12083379.

Ahmed, Rizwan R. *et al.* (2020) 'Social and Behavioral Theories and Physician's Prescription Behavior', *Sustainability*, 12(8), p. 3379. Available at: https://doi.org/10.3390/su12083379.

Ajzen, I. (1991) 'The theory of planned behavior', *Organizational Behavior and Human Decision Processes*, 50(2), pp. 179–211. Available at: https://doi.org/10.1016/0749-5978(91)90020-T.

Al Thabbah, D.H. *et al.* (2022) 'The effect of pharmaceutical companies' marketing mix strategies on physicians prescribing practices in Jordan: a cross-sectional study', *BMC Health Services Research*, 22(1), p. 1293. Available at: https://doi.org/10.1186/s12913-022-08664-1.

Al-Areefi, M. and Hassali, M. (2013) 'Physicians' perceptions of medical representative visits in Yemen: a qualitative study.', *BMC Health Serv Res. 2013*, 13(1), p. 331.

Alexander, G.C. (2003) 'Patient-Physician Communication About Out-of-Pocket Costs', *JAMA*, 290(7), p. 953. Available at: https://doi.org/10.1001/jama.290.7.953.

Alghasham, A. (2009) 'Generic Drug Prescribing in Central Saudi Arabia: Perceptions and Attitudes of Physicians', *Annals of Saudi Medicine*, 29(1), pp. 24–29. Available at: https://doi.org/10.4103/0256-4947.51819.

Al-Hamdi, A.Y., Hassali, M.A. and Ibrahim, M.I.M. (2012) 'Impact of Pharmaceutical Promotion on Healthcare Professional's Practices and Behaviour: Views From General Practitioners, Medicine Dispensers and Medical Representatives in Yemen', *Journal of*

Medical Marketing Device Diagnostic and Pharmaceutical Marketing, 12(4), pp. 240–246. Available at: https://doi.org/10.1177/1745790412455942.

Ali, K.E. *et al.* (2022) 'The attitude and acceptability towards medical promotional tools and their influence on physicians' prescribing practices in Jordan and Iraq: a cross-sectional study', *BMC Health Services Research*, 22(1), p. 105. Available at: https://doi.org/10.1186/s12913-022-07525-1.

Alkhateeb, F.M. *et al.* (2011) 'Is Certification for Pharmaceutical Sales Representatives Necessary?', *International Journal of Pharmaceutical and Healthcare Marketing*, 5(3), pp. 222–233. Available at: https://doi.org/10.1108/17506121111172220.

Alkhateeb, F.M., Khanfar, N.M. and Loudon, D. (2009) 'Physicians' Adoption of Pharmaceutical E-Detailing: Application of Rogers' Innovation-Diffusion Model', *Services Marketing Quarterly*, 31(1), pp. 116–132. Available at: https://doi.org/10.1080/15332960903408575.

Allan, G.M., Lexchin, J. and Wiebe, N. (2007) 'Physician Awareness of Drug Cost: A Systematic Review', *PLoS Medicine*. Edited by S. Hill, 4(9), p. e283. Available at: https://doi.org/10.1371/journal.pmed.0040283.

Alowi, M. and Kani, Y. (2019) 'Promotion of Prescription Drugs and Its Impact on Physician's Choice Behavior', *Journal of Pharmaceutical Care & Health Systems*, 06(01). Available at: https://doi.org/10.4172/2376-0419.1000200.

Al-Rukban, M.O. and Rizvi, M.R. (2014) 'Pharmacist's Knowledge, Attitude and Practices towards Written Prescription in Dispensing and Substitution of Drugs in Riyadh', 2(2).

Aqif, T. and Mumtaz, S. (2023) 'Examining the Impact of Marketing Techniques on the Prescription Behavior of Physicians With Ethical Ideology as a Moderator', *International Journal of Pharmaceutical and Healthcare Marketing*, 17(1), pp. 78–96. Available at: https://doi.org/10.1108/ijphm-01-2021-0009.

Arney, J., Street, R.L. and Naik, A.D. (2014) 'Factors Shaping Physicians' Willingness to Accommodate Medication Requests', *Evaluation & the Health Professions*, 37(3), pp. 349–365. Available at: https://doi.org/10.1177/0163278712468756.

Barbaroux, A., Pourrat, I. and Bouchez, T. (2022) 'General practitioners and sales representatives: Why are we so ambivalent?', *PLOS ONE*. Edited by B. Mintzes, 17(1), p. e0261661. Available at: https://doi.org/10.1371/journal.pone.0261661.

Bastos, W. and Levy, S.J. (2012) 'A history of the concept of branding: practice and theory', *Journal of Historical Research in Marketing*, 4(3), pp. 347–368. Available at: https://doi.org/10.1108/17557501211252934.

Batko, K. and Ślęzak, A. (2022) 'The use of Big Data Analytics in healthcare', *Journal of Big Data*, 9(1), p. 3. Available at: https://doi.org/10.1186/s40537-021-00553-4.

Blackett, T. and Harrison, T. (2001) 'Brand medicine: Use and future potential of branding in pharmaceutical markets', *Journal of Medical Marketing*, 2(1), pp. 33–49. Available at: https://doi.org/10.1057/palgrave.jmm.5040053.

Brax, H. *et al.* (2017) 'Association Between Physicians' Interaction With Pharmaceutical Companies and Their Clinical Practices: A Systematic Review and Meta-Analysis', *Plos One*, 12(4), p. e0175493. Available at: https://doi.org/10.1371/journal.pone.0175493.

Britten, N. and Ukoumunne, O. (1997) 'The influence of patients' hopes of receiving a prescription on doctors' perceptions and the decision to prescribe: a questionnaire survey', *BMJ*, 315(7121), pp. 1506–1510. Available at: https://doi.org/10.1136/bmj.315.7121.1506.

Campbell, E.G. *et al.* (2013) 'Physician Acquiescence to Patient Demands for Brand-Name Drugs: Results of a National Survey of Physicians', *JAMA Internal Medicine*, 173(3), p. 237. Available at: https://doi.org/10.1001/jamainternmed.2013.1539.

Chandelkar, U. and Rataboli, P. (2014) 'A study of drug prescribing pattern using WHO prescribing indicators in the state of Goa, India', *International Journal of Basic & Clinical Pharmacology*, p. 1057. Available at: https://doi.org/10.5455/2319-2003.ijbcp20141221.

Chirag B Pandya, C.B.P. and TJPRC (2017) 'A Physician Survey of the Effect of Relevence of Drug's Brand Name on Physician's Behaviour', *International Journal of Sales & Marketing Management Research and Development*, 7(5), pp. 1–4. Available at: https://doi.org/10.24247/ijsmmrdoct20171.

Chou, R. *et al.* (2009) 'Clinical Guidelines for the Use of Chronic Opioid Therapy in Chronic Noncancer Pain', *The Journal of Pain*, 10(2), pp. 113-130.e22. Available at: https://doi.org/10.1016/j.jpain.2008.10.008.

Cockburn, J. and Pit, S. (1997) 'Prescribing behaviour in clinical practice: patients' expectations and doctors' perceptions of patients' expectations a questionnaire study', *BMJ*, 315(7107), pp. 520–523. Available at: https://doi.org/10.1136/bmj.315.7107.520.

Colgan, S. *et al.* (2015) 'Perceptions of Generic Medication in the General Population, Doctors and Pharmacists: A Systematic Review', *BMJ Open*, 5(12), p. e008915. Available at: https://doi.org/10.1136/bmjopen-2015-008915.

Cutts, C. and Tett, S.E. (2003) 'Influences on doctors' prescribing: is geographical remoteness a factor?', *Australian Journal of Rural Health*, 11(3), pp. 124–130. Available at: https://doi.org/10.1046/j.1440-1584.2003.00502.x.

Dash, S. *et al.* (2019) 'Big data in healthcare: management, analysis and future prospects', *Journal of Big Data*, 6(1), p. 54. Available at: https://doi.org/10.1186/s40537-019-0217-0.

Datta, A. and Dave, D. (2017) 'Effects of Physician-directed Pharmaceutical Promotion on Prescription Behaviors: Longitudinal Evidence: Physician-directed Rx Promotion and Prescription Behaviors', *Health Economics*, 26(4), pp. 450–468. Available at: https://doi.org/10.1002/hec.3323.

Davari, M., Khorasani, E. and Tigabu, B.M. (1970) 'Factors Influencing Prescribing Decisions of Physicians: A Review', *Ethiopian Journal of Health Sciences*, 28(6). Available at: https://doi.org/10.4314/ejhs.v28i6.15.

De Ferrari, A. *et al.* (2014) 'Attitudes and Relationship between Physicians and the Pharmaceutical Industry in a Public General Hospital in Lima, Peru', *PLoS ONE*. Edited by W. Checkley, 9(6), p. e100114. Available at: https://doi.org/10.1371/journal.pone.0100114.

Deaton, A. and Cartwright, N. (2018) 'Understanding and misunderstanding randomized controlled trials', *Social Science & Medicine*, 210, pp. 2–21. Available at: https://doi.org/10.1016/j.socscimed.2017.12.005.

Domen, J. *et al.* (2025) 'The effect of a general practitioner's perception of a patient request for antibiotics on antibiotic prescribing for respiratory tract infections: secondary analysis of a point prevalence audit survey in 18 European countries', *BJGP Open*, p. BJGPO.2024.0166. Available at: https://doi.org/10.3399/BJGPO.2024.0166.

Duan, W., Cheng, S. and Zhou, W. (2023) 'An Research of Marketing Compensation in Medicine: The Impact of the Information Disclosure Regulations', in. *Hawaii International Conference on System Sciences*. Available at: https://doi.org/10.24251/HICSS.2023.692.

El-Dahiyat, F., Kayyali, R. and Bidgood, P. (2014) 'Physicians' perception of generic and electronic prescribing: a descriptive study from Jordan', *J Pharm Policy Pract*, 7(7).

Elrod, J.K. and Fortenberry, J.L. (2020) 'Response hierarchy models and their application in health and medicine: understanding the hierarchy of effects', *BMC Health Services Research*, 20(S1), p. 824. Available at: https://doi.org/10.1186/s12913-020-05605-8.

Faber, M.S. *et al.* (2010) 'Antibiotics for the common cold: expectations of Germany's general population', *Eurosurveillance*, 15(35). Available at: https://doi.org/10.2807/ese.15.35.19655-en.

Fadare, J.O. *et al.* (2020) 'Knowledge and Attitude of Physicians Towards the Cost of Commonly Prescribed Medicines: A Case Study in Three Nigerian Healthcare Facilities', *Value in Health Regional Issues*, 22, pp. 68–74. Available at: https://doi.org/10.1016/j.vhri.2020.05.005.

Faisal, A. *et al.* (2020) 'Doctors' Interactions with Pharmaceutical Sales Representatives: Modelling Doctors Prescription Behaviour', *Community Mental Health Journal*, 56(3), pp. 456–463. Available at: https://doi.org/10.1007/s10597-019-00501-w.

Faqeh, S. *et al.* (2022) 'Views and Perceptions of Medical Representatives and Physicians about the Role of Medical Representatives and Pharmaceutical Advertisement in Saudi Arabia – A Pilot Study', *Journal of Research in Pharmacy Practice*, 11(4), pp. 127–135. Available at: https://doi.org/10.4103/jrpp.jrpp_65_22.

Fickweiler, F., Fickweiler, W. and Urbach, E. (2017) 'Interactions between physicians and the pharmaceutical industry generally and sales representatives specifically and their association with physicians' attitudes and prescribing habits: a systematic review', *BMJ Open*, 7(9), p. e016408. Available at: https://doi.org/10.1136/bmjopen-2017-016408.

Fischer, M.A. *et al.* (2017) 'Physician assessments of drug seeking behavior: A mixed methods study', *PLOS ONE*. Edited by K.E. Vrana, 12(6), p. e0178690. Available at: https://doi.org/10.1371/journal.pone.0178690.

Gandhi, K. and Jadhav, P.R. (2017) 'Preference for utilization of drug information sources among postgraduate medical residents', *International Journal of Basic & Clinical Pharmacology*, 6(12), p. 2859. Available at: https://doi.org/10.18203/2319-2003.ijbcp20175208.

García-Pérez, L.-E. *et al.* (2013) 'Adherence to Therapies in Patients with Type 2 Diabetes', *Diabetes Therapy*, 4(2), pp. 175–194. Available at: https://doi.org/10.1007/s13300-013-0034-y.

Gebresillassie, B.M. *et al.* (2018) 'Evaluating patients', physicians' and pharmacy professionals' perception and concern regarding generic medicines in Gondar town, northwest Ethiopia: A multi-stakeholder, cross-sectional survey', *PLOS ONE*. Edited by A. Todd, 13(11), p. e0204146. Available at: https://doi.org/10.1371/journal.pone.0204146.

Goldman, D.P., Joyce, G.F. and Zheng, Y. (2007) 'Prescription Drug Cost SharingAssociations With Medication and Medical Utilization and Spending and Health', *JAMA*, 298(1), pp. 61–69. Available at: https://doi.org/10.1001/jama.298.1.61.

Gönül, F. *et al.* (2001) 'Promotion of prescription drugs and its impact on physicians' choice behavior.', *J Mark. 2001*, 65(3), pp. 79–90.

González López-Valcárcel, B. *et al.* (2011) 'Are prescribing doctors sensitive to the price that their patients have to pay in the Spanish National Health System?', *BMC Health Services Research*, 11(1), p. 333. Available at: https://doi.org/10.1186/1472-6963-11-333.

Gupta, R., Malhotra, A. and Malhotra, P. (2018) 'A study on assessment of awareness on generic drugs among doctors in a tertiary care teaching hospital in north India', *International Journal of Research in Medical Sciences*, 6(4), p. 1362. Available at: https://doi.org/10.18203/2320-6012.ijrms20181297.

Gupta, S., Nayak, R. and Sivaranjani, R. (2016) 'A study on the interactions of doctors with medical representatives of pharmaceutical companies in a Tertiary Care Teaching Hospital of South India', *Journal of Pharmacy And Bioallied Sciences*, 8(1), p. 47. Available at: https://doi.org/10.4103/0975-7406.171695.

Gupta, S., Nayak, R. and Vidyarthi, S. (2015) 'A study on the knowledge, attitude, and the practice of generic medicines among the doctors in a tertiary care teaching hospital in South India', *National Journal of Physiology, Pharmacy and Pharmacology*, 5(1), p. 39. Available at: https://doi.org/10.5455/njppp.2015.5.170720141.

Hadia, R.B. *et al.* (2022) 'Knowledge, attitude, and practice of generic medicines among physicians at multispecialty hospital: An observational study', *Perspectives in Clinical Research*, 13(3), pp. 155–160. Available at: https://doi.org/10.4103/picr.PICR_281_20.

Hartung, D.M. *et al.* (2012) 'A pilot study evaluating alternative approaches of academic detailing in rural family practice clinics', *BMC Family Practice*, 13(1), p. 129. Available at: https://doi.org/10.1186/1471-2296-13-129.

Hincapie, A. *et al.* (2021) 'Perceptions of the provision of drug information, pharmaceutical detailing and engagement with non-personal promotion at a large physicians network: a mixed-methods study', *BMJ Open*, 11(1), p. e041098. Available at: https://doi.org/10.1136/bmjopen-2020-041098.

Holloway, K.A. *et al.* (2002) 'The influence of user fees and patient demand on prescribers in rural Nepal', *Social Science & Medicine*, 54(6), pp. 905–918. Available at: https://doi.org/10.1016/S0277-9536(01)00064-8.

Hossain, M.M. *et al.* (2013) 'ASSESSMENT OF INFLUENCING FACTORS ON PRESCRIPTION PRACTICES OF PHYSICIANS IN BANGLADESH', *INTERNATIONAL RESEARCH JOURNAL OF PHARMACY*, 4(8), pp. 112–116. Available at: https://doi.org/10.7897/2230-8407.04819.

Hummers-Pradier, E. *et al.* (1999) 'Original Paper: Treatment of respiratory tract infections - a study in 18 general practices in Germany', *European Journal of General Practice*, 5(1), pp. 15–20. Available at: https://doi.org/10.3109/13814789909094246.

Iizuka, T. and Jin, G.Z. (2007) 'Direct to Consumer Advertising and Prescription Choice', *Journal of Industrial Economics*, 55(4), pp. 771–771. Available at: https://doi.org/10.1111/j.1467-6451.2007.00329.x.

Jaruseviciene, L. *et al.* (2013) 'Enabling factors for antibiotic prescribing for upper respiratory tract infections: Perspectives of Lithuanian and Russian general practitioners', *Upsala Journal of Medical Sciences*, 118(2), pp. 98–104. Available at: https://doi.org/10.3109/03009734.2013.778925.

Junior Ladeira, W. *et al.* (2011) 'Drug prescription practices in Brazil: a structural equation model', *International Journal of Pharmaceutical and Healthcare Marketing*, 5(4), pp. 262–278. Available at: https://doi.org/10.1108/17506121111190103.

Kaliyadan, F. and Kulkarni, V. (2019) 'Types of variables, descriptive statistics, and sample size', *Indian Dermatology Online Journal*, 10(1), p. 82. Available at: https://doi.org/10.4103/idoj.IDOJ_468_18.

Kamal, S. *et al.* (2015) 'Perceptions and Attitudes of Egyptian Health Professionals and Policy-Makers Towards Pharmaceutical Sales Representatives and Other Promotional Activities', *Plos One*, 10(10), p. e0140457. Available at: https://doi.org/10.1371/journal.pone.0140457.

Kappe, E. and Stremersch, S. (2016) 'Drug Detailing and Doctors' Prescription Decisions: The Role of Information Content in the Face of Competitive Entry', *Marketing Science*, 35(6), pp. 915–933. Available at: https://doi.org/10.1287/mksc.2015.0971.

Kariuki, W. (2020) 'The Influence Of Brand Equity On Prescriber Behaviour In A Multisource Drug Market', *UTHealthSchoolofPublicHealth* [Preprint].

Khazzaka, M. (2019) 'Pharmaceutical marketing strategies' influence on physicians' prescribing pattern in Lebanon: ethics, gifts, and samples', *BMC Health Services Research*, 19(1), p. 80. Available at: https://doi.org/10.1186/s12913-019-3887-6.

Kim, W. *et al.* (2021) 'The Effects of Cost Containment and Price Policies on Pharmaceutical Expenditure in South Korea', *International Journal of Health Policy and Management*, p. 1. Available at: https://doi.org/10.34172/ijhpm.2021.135.

Kisamo, O. *et al.* (2020) 'The magnitude of prescribing medicines by brand names at Muhimbili National Hospital, Tanzania', *Medicine Access @ Point of Care*, 4, p. 2399202619900148. Available at: https://doi.org/10.1177/2399202619900148.

Kishore Babu, B. and Rao, N. (2018) 'Pharmaceutical Branding Strategies and Communication'. Rochester, NY. Available at: https://papers.ssrn.com/abstract=3226200 (Accessed: 7 February 2023).

Korn, L.M. *et al.* (2003) 'Improving physicians' knowledge of the costs of common medications and willingness to consider costs when prescribing', *Journal of General Internal Medicine*, 18(1), pp. 31–37. Available at: https://doi.org/10.1046/j.1525-1497.2003.20115.x.

Kotwani, A. *et al.* (2010) 'Factors influencing primary care physicians to prescribe antibiotics in Delhi India', *Family Practice*, 27(6), pp. 684–690. Available at: https://doi.org/10.1093/fampra/cmq059.

Kravitz, R.L. *et al.* (2005) 'Influence of Patients' Requests for Direct-to-Consumer Advertised Antidepressants: A Randomized Controlled Trial', *JAMA*, 293(16), p. 1995. Available at: https://doi.org/10.1001/jama.293.16.1995.

Krunal, V., Singh, S. and Solanki, S. (2021) 'Personal & Professional Qualities of Medical Representative and Impact on Doctor's Prescribing Behavior', *Universal Journal of Public Health*, 9(6), pp. 385–391. Available at: https://doi.org/10.13189/ujph.2021.090605.

Lado, E. *et al.* (2008) 'Influence exerted on drug prescribing by patients' attitudes and expectations and by doctors' perception of such expectations: a cohort and nested case-control study', *Journal of Evaluation in Clinical Practice*, 14(3), pp. 453–459. Available at: https://doi.org/10.1111/j.1365-2753.2007.00901.x.

Lee, W. *et al.* (2021) 'Use of real-world evidence in economic assessments of pharmaceuticals in the United States', *Journal of Managed Care & Specialty Pharmacy*, 27(1), pp. 5–14. Available at: https://doi.org/10.18553/jmcp.2021.27.1.005.

Lieb, K. and Scheurich, A. (2014) 'Contact Between Doctors and the Pharmaceutical Industry, Their Perceptions, and the Effects on Prescribing Habits', *Plos One*, 9(10), p. e110130. Available at: https://doi.org/10.1371/journal.pone.0110130.

Little, P. *et al.* (2004) 'Importance of patient pressure and perceived pressure and perceived medical need for researchs, referral, and prescribing in primary care: nested observational study', *BMJ*, 328(7437), p. 444. Available at: https://doi.org/10.1136/bmj.38013.644086.7C.

Lotfi, T. *et al.* (2016) 'Knowledge, Beliefs and Attitudes of Physicians in Low and Middle-Income Countries Regarding Interacting With Pharmaceutical Companies: A Systematic Review', *BMC Health Services Research*, 16(1). Available at: https://doi.org/10.1186/s12913-016-1299-4.

Lucas, P.J. *et al.* (2015) 'A systematic review of parent and clinician views and perceptions that influence prescribing decisions in relation to acute childhood infections in primary care', *Scandinavian Journal of Primary Health Care*, 33(1), pp. 11–20. Available at: https://doi.org/10.3109/02813432.2015.1001942.

Macit, C. *et al.* (2016) 'Brand Loyalty as a Strategy for the Competition with Generic Drugs:Physicians Perspective', *Journal of Developing Drugs*, 05(03). Available at: https://doi.org/10.4172/2329-6631.1000159.

Magalhães, L.V. *et al.* (2018) 'Dental and Medical Advertising: Comparative Analysis of the Rules of Professional Conduct', *Rgo - Revista Gaúcha De Odontologia*, 66(2), pp. 166–171. Available at: https://doi.org/10.1590/1981-86372018000200003103472.

Maha N., A.H. *et al.* (2021) 'Factors affecting purchasing behaviors of generic drugs versus originator counterparts in Jordan', *Journal of Applied Pharmaceutical Science* [Preprint]. Available at: https://doi.org/10.7324/JAPS.2021.110902.

Mahmoud, M.A. (2016) 'Consumer trust and physician prescription of branded medicines: an exploratory study', *International Journal of Pharmaceutical and Healthcare Marketing*, 10(3), pp. 285–301. Available at: https://doi.org/10.1108/IJPHM-05-2015-0017.

Mali, S., Dudhgaonkar, S. and Bachewar, N. (2010) 'Evaluation of Rationality of Promotional Drug Literature Using World Health Organization Guidelines', *Indian Journal of Pharmacology*, 42(5), p. 267. Available at: https://doi.org/10.4103/0253-7613.70020.

Martin, S. and Hunt, D. (2021) 'Assessment of Comprehensibility of Industry Conflicts of Interest and Disclosures by Multiple Sclerosis Researchers at Medical Conferences', *Jama Network Open*, 4(4), p. e212167. Available at: https://doi.org/10.1001/jamanetworkopen.2021.2167.

McGettigan, P. *et al.* (2001) 'Prescribers Prefer People: The Sources of Information Used by Doctors for Prescribing Suggest That the Medium Is More Important Than the Message', *British Journal of Clinical Pharmacology*, 51(2), pp. 184–189. Available at: https://doi.org/10.1111/j.1365-2125.2001.01332.x.

McKinlay, J.B. *et al.* (2014) 'Effects of Patient Medication Requests on Physician Prescribing Behavior: Results of A Factorial Experiment', *Medical Care*, 52(4), pp. 294–299. Available at: https://doi.org/10.1097/MLR.0000000000000096.

Meeker, D. *et al.* (2016) 'Effect of Behavioral Interventions on Inappropriate Antibiotic Prescribing Among Primary Care Practices: A Randomized Clinical Trial', *JAMA*, 315(6), pp. 562–570. Available at: https://doi.org/10.1001/jama.2016.0275.

Mehralian, G. *et al.* (2017) 'Physicians' loyalty to branded medicines in low-middle-income countries: A structural equation modeling', *Journal of Generic Medicines: The Business Journal for the Generic Medicines Sector*, 13(1), pp. 9–18. Available at: https://doi.org/10.1177/1741134316673227.

Miao-Sheng, C. and Yu-Ti, S. (2008) 'Pricing of prescription drugs and its impact on physicians' choice behavior', *Health Care Management Science*, 11(3), pp. 288–295. Available at: https://doi.org/10.1007/s10729-007-9039-2.

Mikhael, E.M. and Alhilali, D.N. (2014) 'Gift Acceptance and Its Effect on Prescribing Behavior among Iraqi Specialist Physicians', *Pharmacology & Pharmacy*, 05(07), pp. 705–715. Available at: https://doi.org/10.4236/pp.2014.57080.

Miller, E. *et al.* (1999) 'Effects of perceived patient demand on prescribing anti-infective drugs'.

Mintzes, B. *et al.* (2013) 'Pharmaceutical Sales Representatives and Patient Safety: A Comparative Prospective Study of Information Quality in Canada, France and the United States', *Journal of General Internal Medicine*, 28(10), pp. 1368–1375. Available at: https://doi.org/10.1007/s11606-013-2411-7.

Monsen, C.B. *et al.* (2019) 'The effect of medication cost transparency alerts on prescriber behavior', *Journal of the American Medical Informatics Association*, 26(10), pp. 920–927. Available at: https://doi.org/10.1093/jamia/ocz025.

Montori, V.M. *et al.* (2023) 'Shared decision-making as a method of care', *BMJ Evidence-Based Medicine*, 28(4), pp. 213–217. Available at: https://doi.org/10.1136/bmjebm-2022-112068.

Moorkens, E. *et al.* (2017) 'Policies for biosimilar uptake in Europe: An overview', *PLOS ONE*. Edited by T. Bochenek, 12(12), p. e0190147. Available at: https://doi.org/10.1371/journal.pone.0190147.

Morse, E., Hanna, J. and Mehra, S. (2019) 'The Association between Industry Payments and Brand-Name Prescriptions in Otolaryngologists', *Otolaryngology–Head and Neck Surgery*, 161(4), pp. 605–612. Available at: https://doi.org/10.1177/0194599819852321.

Moss, G. (2001) 'Pharmaceutical brands: Do they really exist?', *Journal of Medical Marketing*, 2(1), pp. 23–32. Available at: https://doi.org/10.1057/palgrave.jmm.5040052.

Mukherjee, A., Limbu, Y. and Wanasika, I. (2013) 'A review of research on direct-to-consumer advertising of prescription drugs: Directions for future research', *International Journal of Pharmaceutical and Healthcare Marketing*. Edited by A. Mukherjee, 7(3), pp. 226–243. Available at: https://doi.org/10.1108/IJPHM-07-2013-0037.

Murshid, M.A. (2023) 'Assessing the Mediating Role and Multiple Group Analysis in Physicians' Habit Persistence Toward Prescribing Behavior Using SmartPLS Software', *International Journal of Pharmaceutical and Healthcare Marketing*, 17(4), pp. 609–633. Available at: https://doi.org/10.1108/ijphm-07-2022-0066.

Murshid, M.A., Mohaidin, Z. and Yen Nee, G. (2016) 'The influence patient's characteristics "requests and expectations" on physician prescribing behavior: A review', *International Journal of Pharmaceutical and Healthcare Marketing*, 10(4), pp. 390–411. Available at: https://doi.org/10.1108/IJPHM-01-2016-0010.

Nagarathinam, S. *et al.* (2024) 'A Cross-Sectional Study to Assess the Barriers to Teleconsultations Among Doctors in Chennai', *Journal of Applied Pharmaceutical Research*, 12(1), pp. 29–34. Available at: https://doi.org/10.18231/j.joapr.2024.12.1.29.34.

Narendran, R. and Narendranathan, M. (2013) 'Influence of pharmaceutical marketing on prescription practices of physicians', *University of Wollongong- Faculty of Business* [Preprint].

Nath Sanyal, S., Datta, S.K. and Banerjee, A.K. (2013) 'Conceptualisation of branding: strategy based on the Indian pharma sector', *International Journal of Pharmaceutical and Healthcare Marketing*, 7(2), pp. 175–198. Available at: https://doi.org/10.1108/IJPHM-04-2013-0013.

Newman, J.W. (1957) 'Motivation Research and Marketing Management', *Harvard University Press*.

Offor, I., Abubakar, H.F. and Joda, A.E. (2022) 'Effects of pharmaceutical promotions on antibiotics prescribing behavior of Nigerian private medical practitioners', *American Journal*

of Pharmacotherapy and Pharmaceutical Sciences, 1, p. 4. Available at: https://doi.org/10.25259/AJPPS_8_2022.

Othman, G., Halboup, A. and Battah, M. (2021) 'Ethical Evaluation of Pharmaceutical Marketing in Sana'a City, Yemen', *Yemeni Journal for Medical Sciences*, 14(1), pp. 13–21. Available at: https://doi.org/10.20428/yjms.v14i1.1721.

Paredes, P. *et al.* (1996) 'Factors influencing physicians' prescribing behaviour in the treatment of childhood diarrhoea: Knowledge may not be the clue', *Social Science & Medicine*, 42(8), pp. 1141–1153. Available at: https://doi.org/10.1016/0277-9536(95)00387-8.

Pascal Iloh, G. and Chukwuonye, M. (2017) 'Drug promotion in a resource-constrained Nigerian environment: A cross-sectional study of the influence of pharmaceutical sales representatives on the prescribing behaviors of medical practitioners in Abia State', *Archives of Medicine and Health Sciences*, 5(2), p. 215. Available at: https://doi.org/10.4103/amhs.amhs_73_17.

Patidar, M. and Singh, S. (2024) 'Effect of brand reputation on drug prescribing pattern in India', *International Research Journal of Modernization in Engineering Technology and Science*, 06(06). Available at: https://doi.org/10.56726/IRJMETS52360.

Pokharel, P.R. (2017) 'Promotional Tools Effect on Pharmaceuticals Marketing', *Saptagandaki Journal*, 8, pp. 79–84. Available at: https://doi.org/10.3126/sj.v8i0.18465.

Purim, K.S.M. *et al.* (2022) 'Medical Advertising in Social Networks: Awareness and Medical School Education', *Revista Do Colégio Brasileiro De Cirurgiões*, 49. Available at: https://doi.org/10.1590/0100-6991e-20223386_en.

Rai, D. *et al.* (2023) 'Knowledge, attitude and practices related to drug prescription among medical officers and postgraduate residents in B. P. Koirala Institute of Health Sciences', *International Journal of Scientific Reports*, 9(2), pp. 35–40. Available at: https://doi.org/10.18203/issn.2454-2156.IntJSciRep20230044.

Reichert, S., Simon, T. and Halm, E.A. (2000) 'Physicians' Attitudes About Prescribing and Knowledge of the Costs of Common Medications', *ARCH INTERN MED*, 160.

Rice, J.L. (2009) 'Are HMO physicians more price sensitive in prescribing brand-name drugs?', *International Journal of Pharmaceutical and Healthcare Marketing*, 3(3), pp. 184–209. Available at: https://doi.org/10.1108/17506120910989642.

Riise, J. *et al.* (2016) 'GPs' implicit prioritization through clinical choices – evidence from three national health services', *Journal of Health Economics*, 49, pp. 169–183. Available at: https://doi.org/10.1016/j.jhealeco.2016.07.001.

Roque, F. *et al.* (2014) 'Educational interventions to improve prescription and dispensing of antibiotics: a systematic review', *BMC Public Health*, 14(1), p. 1276. Available at: https://doi.org/10.1186/1471-2458-14-1276.

Ryvak, T. and Denysiuk, O. (2019) 'Public Opinion Study on the Role of Advertising in Choice of Non-Prescription Drugs for Self-Treatment', *Pharmacia*, 66(3), pp. 135–140. Available at: https://doi.org/10.3897/pharmacia.66.e35075.

Salmasi, S., Ming, L.C. and Khan, T.M. (2016) 'Interaction and Medical Inducement Between Pharmaceutical Representatives and Physicians: A Meta-Synthesis', *Journal of Pharmaceutical Policy and Practice*, 9(1). Available at: https://doi.org/10.1186/s40545-016-0089-z.

Savage, S.V. (2011) 'Patients, Trust, and Patient Participation: Factors Influencing Whether Patients Want to be Active Health Care Participants', in J. Jacobs Kronenfeld (ed.) *Research in the Sociology of Health Care*. Emerald Group Publishing Limited, pp. 149–171. Available at: https://doi.org/10.1108/S0275-4959(2011)0000029009.

Sawad, A.B. and Andrews, K. (2022) 'Marketing training strategies that pharmaceutical sales managers use to reduce unethical behavior', *Journal of Education and Health Promotion*, 11(1), p. 202. Available at: https://doi.org/10.4103/jehp.jehp_1081_21.

Schumock, G.T. *et al.* (2004) 'Factors that Influence Prescribing Decisions', *Annals of Pharmacotherapy*, 38(4), pp. 557–562. Available at: https://doi.org/10.1345/aph.1D390.

Scott, J. (2000) 'Rational Choice Theory', in, pp. 126–138. Available at: https://doi.org/10.4135/9781446218310.n9.

Shamim-ul-Haq, S. *et al.* (2014) 'Factors Influencing Prescription Behavior of Physicians', *Pharma Innovation*, 3(5), pp. 30–35.

Shimura, H. (2018) 'Sales promotion by wholesalers affects general practitioners' prescription behaviours in Japan', *Journal of Market Access & Health Policy*, 6(1), p. 1424474. Available at: https://doi.org/10.1080/20016689.2018.1424474.

Shrank, W. *et al.* (2006) 'Physicians' Perceptions of Relevant Prescription Drug Costs: Do Costs to the Individual Patient or to the Population Matter Most?', *The American journal of managed care*, 12, pp. 545–51.

Slater, M. and Sanchez-Vives, M.V. (2016) 'Enhancing Our Lives with Immersive Virtual Reality', *Frontiers in Robotics and AI*, 3. Available at: https://doi.org/10.3389/frobt.2016.00074.

Smaoui, F., Abdellah Kilani, F. and Touzani, M. (2016) 'Country-of-origin versus brand: consumers' dilemma when choosing between generic and branded drugs in emerging countries', *Journal of Product & Brand Management*, 25(2), pp. 148–159. Available at: https://doi.org/10.1108/JPBM-04-2014-0553.

Smit, E.G., van den Berge, E. and Franzen, G. (2002) 'Brands are just like real people! The development of SWOCC's brand personality scale. In F. Hansen, & L. B. Christensen (Eds.)', *Branding and Advertising, Copenhagen: Copenhagen Business School Press.*, pp. 22–43.

Sohrabi, B. *et al.* (2021) 'A predictive analytics of physicians prescription and pharmacies sales correlation using data mining', *International Journal of Pharmaceutical and Healthcare Marketing*, 13(3), pp. 346–363. Available at: https://doi.org/10.1108/IJPHM-11-2017-0066.

Spurling, G.K. *et al.* (2010) 'Information from Pharmaceutical Companies and the Quality, Quantity, and Cost of Physicians' Prescribing: A Systematic Review', *PLoS Medicine*. Edited by D. Henry, 7(10), p. e1000352. Available at: https://doi.org/10.1371/journal.pmed.1000352.

Stremersch, S., Landsman, V. and Venkataraman, S. (2013) 'The Relationship Between DTCA, Drug Requests, and Prescriptions: Uncovering Variation in Specialty and Space', *Marketing Science*, 32(1), pp. 89–110. Available at: https://doi.org/10.1287/mksc.1120.0757.

Tenny, S. and Varacallo, M. (2018) 'Evidence Based Medicine (EBM)', *StatPearls Publishing* [Preprint].

Theodorou, M. *et al.* (2009) 'Factors influencing prescribing behaviour of physicians in Greece and Cyprus: results from a questionnaire based survey', *BMC Health Services Research*, 9(1), p. 150. Available at: https://doi.org/10.1186/1472-6963-9-150.

Thistlethwaite, J.E., Ajjawi, R. and Aslani, P. (2010) 'The Decision to Prescribe: Influences and Choice', *InnovAiT: Education and inspiration for general practice*, 3(4), pp. 237–243. Available at: https://doi.org/10.1093/innovait/inp132.

Tseng, C.-W. *et al.* (2016) 'Giving formulary and drug cost information to providers and impact on medication cost and use: a longitudinal non-randomized study', *BMC Health Services Research*, 16(1), p. 499. Available at: https://doi.org/10.1186/s12913-016-1752-4.

Tušek-Bunc, K. *et al.* (2010) 'Explanatory model of prescribing behavior in prescription of statins in family practice', *Wiener klinische Wochenschrift*, 122(S2), pp. 79–84. Available at: https://doi.org/10.1007/s00508-010-1336-y.

Twillman, R.K., Kirch, R. and Gilson, A. (2014) 'Efforts to control prescription drug abuse: Why clinicians should be concerned and take action as essential advocates for rational policy', *CA: A Cancer Journal for Clinicians*, 64(6), pp. 369–376. Available at: https://doi.org/10.3322/caac.21243.

Vancelik, S. *et al.* (2007) 'Impact of pharmaceutical promotion on prescribing decisions of general practitioners in Eastern Turkey', *BMC Public Health*, 7(1), p. 122. Available at: https://doi.org/10.1186/1471-2458-7-122.

Venkataraman, S. and Stremersch, S. (2007) 'The Debate on Influencing Doctors' Decisions: Are Drug Characteristics the Missing Link?', *Management Science*, 53(11), pp. 1688–1701. Available at: https://doi.org/10.1287/mnsc.1070.0718.

Wang, H. *et al.* (2013) 'Prescription Pattern and Its Influencing Factors in Chinese County Hospitals: A Retrospective Cross-Sectional Study', *PLoS ONE*. Edited by B. Caramelli, 8(5), p. e63225. Available at: https://doi.org/10.1371/journal.pone.0063225.

Webb, S. and Lloyd, M. (1994) 'Prescribing and referral in general practice: a study of patients' expectations and doctors' actions', *British Journal of General Practice* [Preprint].

Wood, S.F. *et al.* (2017) 'Influence of Pharmaceutical Marketing on Medicare Prescriptions in the District of Columbia', *Plos One*, 12(10), p. e0186060. Available at: https://doi.org/10.1371/journal.pone.0186060.

Workneh, B.D. *et al.* (2016) 'Influence of Medical Representatives on Prescribing Practices in Mekelle, Northern Ethiopia', *PLOS ONE*. Edited by A.M. Noor, 11(6), p. e0156795. Available at: https://doi.org/10.1371/journal.pone.0156795.

Yamada, T. *et al.* (2012) 'Factors Associated With Spontaneous Reporting of Adverse Drug Reactions in Japan', *Pharmacoepidemiology and Drug Safety*, 22(5), pp. 468–476. Available at: https://doi.org/10.1002/pds.3378.

Yaqub, R.M.S. *et al.* (2024) 'Interpersonal Dynamics in Pharmaceutical Marketing: Understanding the Influence on Doctor Prescription Patterns in Developing Countries', 4.

Yonemori, K. *et al.* (2012) 'Content Analysis of Oncology-Related Pharmaceutical Advertising in a Peer-Reviewed Medical Journal', *Plos One*, 7(8), p. e44393. Available at: https://doi.org/10.1371/journal.pone.0044393.

Zafar, S.Y. *et al.* (2013) 'The Financial Toxicity of Cancer Treatment: A Pilot Study Assessing Out-of-Pocket Expenses and the Insured Cancer Patient's Experience', *The Oncologist*, 18(4), pp. 381–390. Available at: https://doi.org/10.1634/theoncologist.2012-0279.

Zarei, E. *et al.* (2023) 'Interaction between physicians and the pharmaceutical industry: A scoping review for developing a policy brief', *Frontiers in Public Health*, 10, p. 1072708. Available at: https://doi.org/10.3389/fpubh.2022.1072708.

Zipkin, D.A. and Steinman, M.A. (2005) 'Interactions Between Pharmaceutical Representatives and Doctors in Training', *Journal of General Internal Medicine*, 20(8), pp. 777–786. Available at: https://doi.org/10.1111/j.1525-1497.2005.0134.x.