ANALYSING THE NEXUS BETWEEN PRODUCT MIX ELEMENTS AND PRESCRIBING CHOICES AMONG DOCTORS IN TELANGANA

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ABSTRACT
The pharmaceutical business in India is growing at the fastest rate. This study aims to look at the numerous factors that influence doctors' prescription habits. It is based on a thorough evaluation of current literature and survey data gathered from a representative sample of doctors from various locations and specialisations. The study investigates the influence of numerous factors in affecting doctors' prescription behaviour, such as demographic traits and product mix variables. Several criteria, including product quality, product packaging, product safety/efficacy, product brand name, product frequency of dose, new patented goods, and branded generic drugs, were shown to have a substantial effect on prescription behaviour. The study found that pharmaceutical marketing and financial incentives significantly influenced doctors' prescription behaviour. This research advances our understanding of the various elements that impact prescription behaviour and emphasises the significance of designing interventions to improve evidence-based prescribing practices.
Keywords: *Prescribing behaviour, Product mix, Pharmaceuticals, Pharmaceutical sales.*

1.Introduction

Prescription behaviour is an important aspect of medical practice that influences the degree of treatment offered and its cost. Nonetheless, the impacts on prescription practises are complex and diverse, involving interactions between the healthcare system, the patient, and the physician. Several studies have been conducted to investigate the factors that impact prescription behaviour. According to certain studies, a doctor's demographic characteristics, such as age, gender, and educational level, might influence how they prescribe. A World Health Organization (WHO) research, for example, revealed that younger clinicians prescribe more drugs than older physicians. Additional study indicates that patient characteristics (such as health condition and socioeconomic level) might impact prescription decisions. Promoting evidence-based prescription practices and enhancing healthcare delivery rely on understanding the factors that impact prescribing behaviour. By recognising the factors that influence prescription behaviour, policymakers and healthcare professionals may develop interventions to encourage evidence-based prescribing practices, reduce wasteful spending, and improve patient outcomes. Prescription behaviour is an important component of medical practice since it affects the quality and cost of treatment. The doctor-patient relationship and the healthcare system are only a few of the many and varied factors that influence how doctors prescribe. These variables may include the doctor's traits, such as age, gender, and degree of expertise, the patient's characteristics, such as health and socioeconomic position, and healthcare system elements, such as drug accessibility and cost.

This study aims to look at the factors that impact doctors' prescription behaviour across different geographic areas and medical specialities. The study's purpose is to identify the elements that impact prescription behaviour, such as the influence of pharmaceutical marketing and financial incentives. This research provides advice for improving evidence-

based prescription practices by highlighting the several variables that impact prescribing behaviour.

The study's findings are likely to contribute to the development of initiatives and policies targeted at improving healthcare delivery and patient outcomes. By supporting evidence-based prescription practices, doctors may save money while also improving the safety and efficacy of medicines. Overall, this research is critical for increasing our understanding of the variables that impact prescription behaviour and improving healthcare quality. Doctor-prescribing behaviour is a complicated phenomenon driven by several causes. Some predictors of doctor prescription behaviour are as follows:

Patient-related factors: Patient attributes such as age, gender, medical history, socioeconomic situation, and cultural background might influence doctors' prescription behaviour. For example, doctors may prescribe different prescriptions to older patients than to younger ones, or they may consider a patient's financial position while prescribing medication.

Physician-related factors: Prescription behaviour can also be influenced by physician factors such as age, gender, years of experience, and medical specialisation. A younger physician, for example, maybe more inclined to prescribe newer treatments, whereas an older physician may be more likely to prescribe older, well-established medications.

Drug-related factors: Prescription behaviour might also be influenced by the qualities of the drug being given. For example, a medication's perceived efficacy, safety, and side effects can all impact whether or not a doctor prescribes it.

Health system-related factors: The healthcare system in which a physician works might also have an impact on prescription behaviour. Factors such as pharmaceutical availability, formulary limits, and insurance coverage can all have an impact on doctors' prescription decisions.

Pharmaceutical industry-related factors: Pharmaceutical firms' marketing initiatives can also impact prescription behaviour. Pharmaceutical firms may supply doctors with information about new treatments, samples or gifts, or cash incentives to persuade doctors to prescribe their goods.

Patient-doctor interaction: The doctor-patient relationship might also influence prescription behaviour. Doctors' prescribing decisions might be influenced by patients' expectations, preferences, and views regarding drugs.

Overall, several variables impact doctors' prescription behaviour, and a greater knowledge of these determinants might aid in improving prescribing practices and patient outcomes.

2. Review of Literature

Scientific promotional tools (Scientific study materials such as journals, textbooks, and works of literature, as well as activities such as organising free disease detection camps and company participation in Conferences) that were found (=.428, P =.00) to change the drugs that doctors prescribe, because scientific promotional tools have a positive and significant effect on consultants' prescribing behaviour[1].

Even though doctors have complete and utter authority over prescription pharmaceutical sales, pharmaceutical marketing and promotion strategies are held

accountable for irrational prescribing practices and their consequences. There is a link between the availability of drug samples and the behaviour of doctors when issuing prescriptions for hypertensive patients. Due to the inability to deliver drug samples, more first-line therapies were prescribed than when samples were available. As a result, accepting samples might have catastrophic consequences[2]. This study emphasises the need to conduct a multi-facility analysis to determine how pharmacological samples impact prescribing practices. Most doctors are worried about drug costs and patient insurance coverage, and they consider these factors when selecting what prescriptions to issue. Pharmaceutical sales representatives have a significant impact on physicians. By taking into account the attitudes and characteristics influencing physician behaviour in the two countries, strategies may be developed to improve physicians' decisions and, as a result, clinical and financial effectiveness and efficiency. New pharmaceuticals on the market, brand prescriptions, conference sponsorship, marketing materials, and free medication samples are all factors that influence how doctors write prescriptions. The manner in which salesmen market their firms has a big impact on their level of influence. The study's major result is that two factors, the introduction of new pharmaceuticals to the market and the employment of promotional tools, have a higher effect than any other two[3]. Pharmaceutical marketing has a substantial influence on a doctor's prescribing behaviour. While "promoting" pharmaceutical goods in journals or other written materials has been shown to have little effect on a doctor's prescription, "public relations" has been proven to be the most effective promotional approach. It is important to emphasise that the method by which pharmacological information is presented and the social influences on decision-making are equally important variables in the prescription of new drugs. These elements are not just associated with biological evaluation and critical appraisal. When evaluated within this broad context, prescriptive diversity becomes more understandable. The findings are intriguing because they demonstrate a link between certain factors (scientific literature, marketing materials, consistent follow-up[4], CMEs and conferences, personalised activities) and doctor prescription behaviour, which is heavily influenced by medical representative PR and brand perception of a company or product. Based on the study's findings, the pharmaceutical sector may develop better marketing strategies while taking these mediating effects into account.

The survey found that physicians agree with the medical representative that scientific promotional tools have a stronger influence on increasing prescription behaviour than other promotional materials. When employed as other promotional tools, medical reps and physicians are perceived differently. Furthermore, it has been observed that common promotional goods have a greater influence on doctors than consultants[5]. The APB of healthcare practitioners is governed by a set of cultural norms. The behaviour of clinical leaders while prescribing antibiotics has an impact on the practice of junior doctors. Senior doctors feel they are absolved from following policy and practice in a culture of perceived independent decision-making that relies more on personal knowledge and experience than written policy. Prescribers make APB changes by the standard of care in the clinical groups in which they work. Peers' antibiotic prescribing practices are untouched by outside involvement because of a "non-interference" culture.

3. Research Methodology

The research progressed on the basis of various factors of the patient to doctor relation including drug management from the health care institutions. The work carried out in SPSS by taking a sample number N=192 with product quality sampling, packing as well as brand name included for alpha T-test.

Research Hypotheses

H_1: Product mix factors have a significant relationship with doctor prescription behaviour in Hyderabad, Telangana.

STATISTICAL TOOL APPLIED: One sample t-test.

Decision rule: If the significant value is less than the significance level (0.05) at a 95 per cent confidence level, the null hypothesis can be rejected.

H_{1a}: Product quality has a significant relationship with doctor prescription behaviour in Hyderabad, Telangana.

H_{1b}: Product packaging has a significant relationship with doctor prescription behaviour in Hyderabad, Telangana.

H_{1c}: Product safety/efficacy has a significant relationship with doctor prescription behaviour in Hyderabad, Telangana.

H_{1d}: Product brand name has a significant relationship with doctor prescription behaviour in Hyderabad, Telangana.

H_{1e}: Product frequency of dose has a significant relationship with doctor prescription behaviour in Hyderabad, Telangana.

H_{1f}: New patented Product has a significant relationship with doctor prescription behaviour in Hyderabad, Telangana.

H_{1g}: Branded generic Product has a significant relationship with doctor prescription behaviour in Hyderabad, Telangana.

H_{1h}: Unbranded generic Product has a significant relationship with doctor prescription behaviour in Hyderabad, Telangana.

4. Data Analysis and Findings

Sample statistical analysis has been done on all the influencing factors and the results are discussed below.

4.1 Reliability using Cronbach Alpha:

Case Processing Summary

		N	%
Cases	Valid	193	100.0
	Excluded[a]	0	.0
	Total	193	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.734	8

Hypothesis Testing:

H_{1a}: Product quality has a significant relationship with doctor prescription behaviour in Hyderabad, Telangana.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Product Quality association with Prescription behaviour	192	4.3167	1.30177	.09384

One-Sample Test

	Test Value = 1					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference Lower	Upper
Product Quality association with Prescription behaviour	35.317	191	.000	3.31781	3.1334	3.5040

At a 95% confidence level, the significance value (0.000) is smaller than the significance level (0.05). The null hypothesis may be rejected, indicating that there is a substantial relationship between product quality and doctor prescription behaviour, implying that product quality has a major impact on doctor prescribing behaviour. The average value is 4.32, while the average difference is 3.32.

H_{1b}: Product packaging has a significant relationship with doctor prescription behaviour in Hyderabad, Telangana.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Product Packaging association with Prescription behaviour	192	3.7448	1.29931	.09388

One-Sample Test

Test Value = 1

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Product Packaging association with Prescription behaviour	29.260	191	.000	2.74489	2.5588	2.9288

A significant value (0.000) is less than the significance level (0.05) at a 95 per cent confidence level. The null hypothesis can be rejected which means there is a significant association of product packaging with the Doctor's prescribing behaviour which implies product packaging has a high influence on the Doctor's prescribing behaviour as the Mean value is 3.74 and the mean difference is 2.74.

H_{1c}: Product safety/efficacy has a significant relationship with doctor prescription behaviour in Hyderabad, Telangana.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Product's Safety/Efficacy association with Prescription behaviour	192	4.1416	1.46380	.10573

One-Sample Test

Test Value = 1

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Product's Safety/Efficacy association with Prescription behaviour	29.741	191	.000	3.14073	2.9343	3.3480

At a 95% confidence level, the significance value (0.000) is smaller than the significance level (0.05). The null hypothesis may be rejected, indicating that there is a strong correlation between product safety/efficacy and doctor prescription behaviour, implying that product safety/efficacy has a very high effect on doctor prescribing behaviour. The average value is 4.14, while the average difference is 3.14.

H_{1d}: Product brand name has a significant relationship with doctor prescription behaviour in Hyderabad, Telangana.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Brand Name of the product association with Prescription behaviour	192	2.7458	1.01953	.07367

One-Sample Test

Test Value = 1

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Brand Name of the product association with Prescription behaviour	23.736	191	.000	1.74579	1.5987	1.8889

The significant value (0.000) is less than the significance level (0.05) at a 95 per cent confidence level. The null hypothesis can be rejected which means there is a significant association of product brand name with Doctor's prescribing behaviour which implies product brand name has an average influence on Doctor's prescribing behaviour as Mean value is 2.74 and the mean difference is 1.74.

H_{1e}: Product frequency of dose has a significant relationship with doctor prescription behaviour in Hyderabad, Telangana.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Product's frequency of dose association with Prescription behaviour	192	3.8448	1.07653	.07778

One-Sample Test

Test Value = 1

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Product's frequency of dose association with Prescription behaviour	36.706	191	.000	2.84385	2.6805	2.9980

At a 95% confidence level, the significance value (0.000) is smaller than the significance level (0.05). The null hypothesis may be rejected, indicating that there is a strong correlation between product frequency of dosage and doctor prescription behaviour, implying that product frequency of dose has a high effect on doctor prescribing behaviour. The average value is 3.84, while the average difference is 2.84.

H_{1f}: New patented Product has a significant relationship with doctor prescription behaviour in Hyderabad, Telangana.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Patented product association with Prescription behaviour	192	4.3802	1.03156	.07445

One-Sample Test

Test Value = 1

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Patented product association with Prescription behaviour	45.406	191	.000	3.38031	3.2344	3.5281

At a 95% confidence level, the significance value (0.000) is smaller than the significance level (0.05). The null hypothesis may be rejected, indicating that there is a substantial correlation between the patented product and the doctor's prescription behaviour, implying that the patented product has a very high effect on the doctor's prescribing behaviour. The average value is 4.38, while the average difference is 3.38.

H_{1g}: Branded generic Product has a significant relationship with doctor prescription behaviour in Hyderabad, Telangana.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Branded Generic product association with Prescription behaviour	192	3.9645	1.27150	.09186

One-Sample Test

Test Value = 1

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Branded Generic product association with Prescription behaviour	32.297	191	.000	2.96374	2.7836	3.1455

At a 95% confidence level, the significance value (0.000) is smaller than the significance level (0.05). The null hypothesis may be rejected, indicating that there is a strong correlation between Branded Generic products and Doctor's prescription behaviour, implying that Branded Generic product has a high effect on Doctor's prescribing behaviour.

H_{1h}: Unbranded generic Product has a significant relationship with doctor prescription behaviour in Hyderabad, Telangana.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Unbranded Generic association with Prescription behaviour	192	1.1763	.39185	.02827

One-Sample Test

Test Value = 1

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Unbranded Generic association with Prescription behaviour	5.537	191	.000	.15645	.1015	.2130

At a 95% confidence level, the significance value (0.000) is smaller than the significance level (0.05). The null hypothesis may be rejected, indicating that there is a substantial correlation between Unbranded Generic and doctors' prescription behaviour, implying that Unbranded Generic has relatively little impact on doctors' prescribing behaviour, since the mean value is 1.16 and the mean difference is 0.16.

5.Conclusion

This paper concludes that product quality has a very high influence, product packaging has a high influence, product safety/efficacy has a high influence, product brand name has an average influence, product frequency of dose has a high influence, the patented product has a very high influence, branded generic product has a high influence, and the unbranded generic product has a very low influence on the prescription behaviour of doctors in Hyderabad, Telangana.

6.Scope for future research

A study on the factors of product mix related to doctor prescription behaviour is an intriguing research issue that might give important insights into the pharmaceutical business. Here are some prospective future study areas in this discipline: The impact of pharmaceutical companies' promotional methods on prescription behaviour: This study can look at how marketing techniques like free samples, gifts, and sponsored events influence prescribing behaviour. Examining the impact of a physician's knowledge and experience on prescription behaviour: This study can look at how a doctor's experience and knowledge of various drugs influence their prescribing decisions. An investigation into the impact of price methods on prescribing behaviour: This study can look into how price tactics like discounts and bundling affect prescription behaviour. Impact of patient demand on prescribing behaviour: This study might look at how patient demand for certain drugs affects prescribing behaviour. Examining the impact of regulatory policies on prescription behaviour: This study might look at how government rules and policies influence prescribing behaviour.

The effect of the physician-patient relationship on prescription behaviour: This study can look at how the quality of the physician-patient relationship influences prescription behaviour.

The study of the effect of medication efficacy and safety on prescription behaviour: This research might look into how a drug's efficacy and safety affect prescribing decisions.

These are only a few ideas for future study in this area. Each of these categories can give useful insights into the factors that drive prescribing behaviour and can assist pharmaceutical firms in better understanding how to effectively market and sell their goods.

Disclosure

The authors report no conflicts of interest in this work.

References

1. Ali, Zaigham, et al. "Relationship between doctors' prescribing behaviour and pharmaceutical promotional tools: A Pakistani case." Iranian Journal of Public Health 44.5 (2015): 709-10.

2. Goyal, Ravindra, and Pranav Pareek. "A review article on prescription behaviour of doctors, influenced by the medical representative in Rajasthan, India." IOSR Journal of Business and Management 8.1 (2013): 56-60.

3. Boltri, John M., Elizabeth R. Gordon, and Robert L. Vogel. "Effect of antihypertensive samples on physician prescribing patterns." FAMILY MEDICINE-KANSAS CITY- 34.10 (2002): 729-731.

4. Theodorou, Mamas, et al. "Factors influencing prescribing behaviour of physicians in Greece and Cyprus: results from a questionnaire-based survey." BMC Health Services Research 9 (2009): 1-9.

5. Shamimulhaq, Saad, et al. "Factors influencing prescription behaviour of physicians." The Pharma Innovation Journal, ISSN (2014): 2277-7695.

6. Biswas, K., and U. K. Ferdousy. "Influence of pharmaceutical marketing on prescription behaviour of physicians: a cross-sectional study in Bangladesh." Journal of Accounting & Marketing 5.2 (2016): 1-4.

7. Prosser, Helen, Solomon Almond, and Tom Walley. "Influences on GPs' decision to prescribe new drugs—the importance of who says what." Family Practice 20.1 (2003): 61-68.

8. Ahmed, Rizwan Raheem, et al. "Mediating and Marketing factors influence the prescription behaviour of Physicians: An Empirical Investigation." Amfiteatru Economic Journal 18.41 (2016): 153-167.

9. Arslan Siddiqi, Shahzad Hussain, et al. "Relevant influence of promotional tools by the pharmaceutical industry on prescribing behaviours of doctors: A cross-sectional survey in Pakistan." African Journal of Pharmacy and Pharmacology 5.13 (2011): 1623-1632.

10. Charani, Esmita, et al. "Understanding the determinants of antimicrobial prescribing within hospitals: the role of "prescribing etiquette"." Clinical Infectious Diseases 57.2 (2013): 188-196.