Factors Influencing the Prescribing behaviour of Medicines by Doctors: A Study on Anti-Allergic Drugs.

Doctoral Thesis Submitted

In partial fulfilment of the requirements for the award of the degree of

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In
MANAGEMENT

By

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December 2022

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This is to certify that the thesis entitled **"Factors influencing the prescribing behaviour of medicines by doctors: A study on Anti-Allergic drugs in India",** submitted by Viswanath Bandi in partial fulfilment of the requirements for the award of the Degree of Doctor of Philosophy is an original work carried out by him under our joint guidance. It is certified that the work has not been submitted anywhere else for the award of any other Degree or Diploma of this or any other University. We also certify that he complied with the plagiarism guidelines of the University.

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Date: December 2022
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ABSTRACT

The physician's prescription decision is complex and multifactorial, involving various stakeholders across the value chain, under whose influence, they make a prescribing decision from the available alternatives, that best suit patient recovery. Research has been conducted to examine the factors influencing the physician's prescribing behavior of medicines along with the identification of the most influential components constituting physician's professional factors, product-related factors, product promotional factors, and physician's personality factors. The sample size consists of 171 respiratory physicians, qualified ENT Specialists, and chest physicians practicing in and around Hyderabad, Nizamabad, Karimnagar, and Warangal cities located in the state of Telangana, India. The literature review has been performed to identify the GAP towards formulating the research objective, based on which conceptual design and Questionnaire developed with statements that correspond to all factors except for the physician's personality trait factor, where personality instrument has been integrated (HOGAN MVPI) in this research study. The study was undertaken during 2018-2019. The pilot study was performed for its data feasibility, reliability, consistency, and validity. The collected data were analyzed using statistical tools like SPSS Version 21, with data cleaning, descriptive statistics for measuring the central tendency, test for Normality, correlation test for variance, and measuring relationships among the variables. This is followed by confirmatory factor analysis and regression analysis ANOVA for model testing and testing the hypothesis.

The results demonstrated the robustness of the theoretical model explaining the factors like physician's professional factors comprising of education, clinical experience, and colleagues' experience, followed by Product related factors like the Safety of the drug & cost of the drug (less expensive), dosage superiority, and patient expectations are found to exhibit significant influence in the physician's prescribing behavior. Since all the physicians are different, 3 personality traits were found to influence the physician internally to resonate externally with the above factors in the entire prescription decision process. However, our research showed that product promotional factors were not significant enough to influence their prescribing decisions.

Results from the research will enable authorities towards developing and reinforcing the standards of the healthcare ecosystem enabling physicians to efficiently meet patients' healthcare challenges with effective solutions from the available alternatives.

For a pharmaceutical marketer, this research will enable the development optimal marketing mix with efficient resource utilization, based on physician's needs either by customized initiatives or engagements, which ensure the best point of care to patients towards improving their quality of life and well-being.

Key Words: Physician Prescribing behaviour; factors Personality.

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LIST OF ABBREVIATIONS

S.No	Abbreviation	Full form
1	IPM	Indian Pharmaceutical Market / Industry
2	FDA	Food and Drugs administration
3	DCGI	Drug control general of India
4	IQVIA	Global provider of advanced analytics, technology solutions, and clinical research services to the life sciences industry
5	MR	Medical Representative
6	JOHN	Indian society of otolaryngology, Head and Neck Surgery
7	ICS	Indian Chest Society
8	OPPI	Organization of Pharmaceutical Producers of India
9	NEEM	National List of Essential Medicines
10	ENT	Ear, Nose, and Throat Surgeon
11	MS	Master of Surgery
12	MD	Doctor of Medicine.
13	DNB	Diplomate of National Board
14	DLO	Diploma in Otorhinolaryngology
15	DTCD	Diploma in Tuberculosis and Chest Diseases
16	MVPI	Motives, Values, Preferences Inventory (MVPI)
17	MBTI	Myers–Briggs Type Indicator (MBTI)
18	ESTJ	Extraverted, Observant, Thinking, and Judging personality traits
19	INFP	Introverted, Intuitive, Feeling, and Prospecting personality traits.
20	BCI	Basic Character Inventory
21	HADS	Hospital Anxiety and Depression Scale
22	SDS	The severity of Dependence Scale
23	BFI	Big Factor 5 inventory

CHAPTER – I

INTRODUCTION

Chapter I

INTRODUCTION

1.1 Introduction to Indian Pharmaceutical Industry:

(Devi PUM et al., 2018) in their research towards assessing the service quality of supply chain management in the Indian pharmaceutical industry (IPM), stated that IPM is the world's 3rd largest by volume with annual revenues of about USD 38 billion as projected by reports comprising of Making in India, IBEF India Pharma Outlook, Brand India, AIOCD, and Pharmaceutical Export Promotion Council, with exports moving to 19.14 million USD in FY'19 in comparison to 17.27 billion USD in FY'18, which includes bulk drugs, intermediates, drug formulations, biologicals, Aayush & herbal products, and surgical. (Dhar, S. et al., 2007) According to the study conducted on India's value proposition, the domestic pharmaceutical market was valued at US$ 18.86 billion in FY19.

Branded generics constituted 70–80% of the market, valued at US$ 13.2–15.0 billion in FY19. This is the result of world-class capabilities in developing formulations, leadership, and the vision of taking IPM to the global arena with a presence in all the regulated markets, like the USA, Canada, Europe, and Japan, apart from the rest of the world markets.

With growing urbanization, an increase in pollution levels, an increase in life expectancy (women and men are 68 and 65), respectively), and lifestyle changes (food, stress), most of the population is at increased risk of getting diagnosed with lifestyle diseases at an early age, leading to suffering and managing the disease for the rest of their lives (chronic disease), in comparison to the traditional and seasonal diseases, which are acute in nature. The World Health Organization's health statistics report has named the following 10 diseases as responsible for the maximum number of deaths (Fig. 1.1.1).

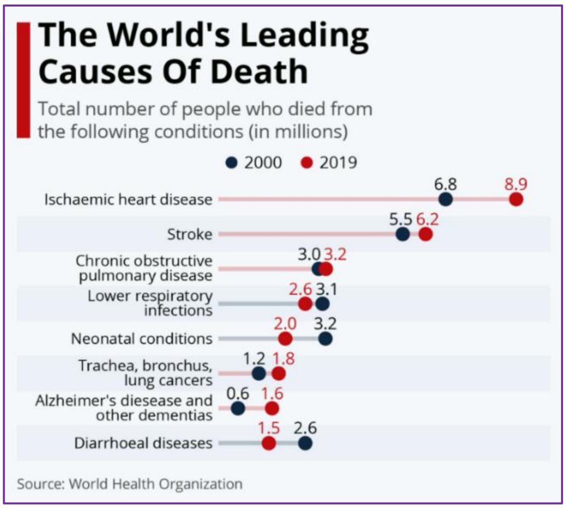


Fig-1.1.1: WHO World Health Statistics, 2019

A recent India health system review conducted by the Asia-Pacific observatory on health systems and policies on behalf of the World Health Organization (WHO) in collaboration with local agencies like the Indian Council for Medical Research (ICMR), the Public Health Foundation, and the Institute of Health Metrics and Evaluation further reiterated that at the national level, factors like rapid urbanization, an increase in disposable income, the emergence of the insurance sector, changes in lifestyle, and access to better healthcare facilities have brought healthcare within the reach of common Indians who otherwise could not afford it like in the past.

The Indian pharmaceutical industry has improved the health and quality of life of patients as it has ensured that quality drugs are within the reach of and affordable to the common man. This has resulted in the reduction of treatment costs and an improvement in the patient flow to the healthcare centers, which aim for better treatment with quality drugs in place. As a result, there has been a remarkable drop in disease burden, from 61% in 1990 to 33% in 2016.

Post-economic reforms, IPM has been registering decent growth due to infrastructure development and technology base creation, leading to the production of a wide range of therapeutic products. As a result of this, India is currently accredited as the global pharmacy of the developing world and has attained cost-competitive manufacturing capabilities to provide quality medicines at affordable costs.

1.1.1 Evolution of the Indian Pharmaceutical Industry:

(Akhtar G et al, 2013) in their overview stated that the Indian Pharmaceutical Industry has reached the current level since its inception dating back to the early 20th century, with the nation's intention of becoming self-reliant, with greater interest and investments in science and pharmaceuticals. This has led to the birth of two firms that mark the foundation of the Indian pharmaceutical Industry based on a scientific approach at all steps, right from discovery to development to manufacturing and adoption of newer technologies and methods. They are Bengal Chemical and Pharmaceutical Work (BCPW) Ltd started in 1901 by Acharya PC Ray and Alembic chemical works Co. Ltd, started in 1907, by TK Grajjar, Rajmitra, and others. Further to this, (Karunakar B et al, 2017) in their overview, captured the evolution of the Indian Pharmaceutical Industry, in an ever-changing regulatory environment with disparities among nations.

Based on the dynamics of the market, IPM evolution can be captured broadly into 3 categories,

- IPM evolution from 1900 to 1970
- IPM evolution from 1970 to 1990
- IPM evolution from 1995 onwards

1.1.1.1 IPM evolution from 1900 to 1970:

1940: Drugs and Cosmetics Act: This act was introduced for manufacturing drugs. Under this act, both small and bigger units continue to come under the purview of the act and are authorized for manufacturing with a valid license issued upon meeting all the eligibility criteria. The license is issued by the state drug controller upon meeting all the eligibility criteria.

1947: MNC's Operations: Multinational companies (MNCs) started operating in India, either by importing their low-priced drugs or high-Quality specialty drugs. To provide employment opportunities for the skilled and promote indigenous manufacturing capabilities in the country for shaping up the sector, the government has eased the regulatory guidelines. This has resulted in MNCs setting-up formulation units for developing their finished products from the imported bulk into the country.

1951: Industrial Licensing Act: With the Industrial Licensing act coming into effect, along with stringent regulations in place, giving little freedom for the expansion of businesses led to a dominant role for state-owned institutions. At this stage of development, Indian pharmaceutical companies relied heavily on foreign companies for their bulk drug requirements.

1960: Bulk Drug Manufacturing: Active Pharmaceutical Ingredients (APIs) act as critical components for any finished drug formulation for human consumption. Towards self-reliance, the Indian government has incentivized encouraging the indigenous manufacture of bulk drugs within the country instead of importing. (Joshi HN et al,2003) in their analysis stated that this was one of the levers for the organizations to grow to their potential towards the end-to-end manufacturing of both bulk (API) and formulations across therapeutic areas, making nation self-reliance and contributing to the economic growth within the IPM and beyond, in the way of export to other countries.

1.1.1.2 IPM evolution from 1970 to 1990:

1970: The Indian Patent Act -1970: Under this act, a Product Patent was not granted for any product used in Pharmaceuticals. Only a Process patent was issued for 5 years either from the patent granting date or 7 years from the patent filing date. (Brandl K et al,2013) further stated the spectacular rise of the IPM in their work has indicated the emergence of entrepreneurship and innovation exchange. (Mytelka LK et al, 2006) their paper described various routes of promoting innovation at home with the patent Act in place, The government has encouraged domestic companies with benefits and incentives to develop the generic version of the innovator drug through a different manufacturing process (reverse engineering), scoring part with the innovator, and making it available at an affordable cost for the patients, which has helped towards increasing healthcare access.

1980 -1990: The Surge of Indian Pharma: With Indian Patent Act in Place which offers only Process Patents for 5-7 years and no protection on product patents, many Multinational companies MNCs) operating in the country were reluctant to launch their global blockbuster brands targeting specific chronic diseases in India which call for premium pricing. (Rajec Wasserman, S. R. et al., 2013) While evaluating the flexibility of international patent law on pharmaceuticals, While the MNCs stayed with their decision of withholding the introduction of patented molecules and drugs in India, the Indian companies, with their farsightedness, competitive edge, and superior scientific expertise in the adoption of reverse engineering, was successful in developing a generic version of the innovator drugs at a low cost through a different manufacturing process. As a result, domestic companies started performing well in comparison with MNCs, with an improvement in market share. Experts consider that the 1990s economic liberalization was the vital decision that helped the Indian pharmaceutical industry become what it is today.

1.1.1.3 IPM evolution from 1995 onwards:

1995: Drug Price Control Order: This act was introduced to prevent unethical combinations from being made available in the market and making huge profits from essential medicines. As a result of which MNCs had to reduce their holding to 40% w.r.t Indian venture.

1995: WTO-TRIPS: India entered WTO and modified the trade-related aspects of intellectual property rights (TRIPS) which embark on international standards for protecting trade secrets. As a result of which product patents in pharma came into effect in the country effective from 1st Jan'2005 for 20 years by amending the patent act of 1970 in line with the TRIPS agreement.

1999: Mashelkar Committee: Looking at global potential, Indian companies with enough Skill force in place, started initiating the work beyond the product process, towards discovering the product development process. In this direction both domestic companies, International pharmaceutical organizations, both small & big, started funding their discovery projects which took them forward in new drug development and made profits.

Post suggestions by the Mashelkar committee, under the Department of Science and Technology, pharmaceutical and pharmaceutical development support fund (PDF), a drug development promotion board has been created for promoting innovation in the pharmaceutical industry. As a result of which India's pharmaceutical industry pushed for a bigger focus on innovation. This finding reaffirms that local Indian companies have the lead provided by the government.

2005: TRIPS and VAT Implementation: From 1st Jan 2005, by amending the Indian Patent Act of 1970 towards complying with the TRIPS agreement, product patent in the pharmaceutical sector has been introduced in India. From 1st April 2005, Value Added Tax (VAT) has been introduced in the country with 4% on pharmaceuticals towards uniform pricing, thereby making them affordable with better access to patients.

2006: National Pharmaceutical Policy: For the benefit of Patients & the Indian Pharmaceutical industry, the Government of India has introduced National Pharmaceutical Policy in 2006 with the following objectives,

- Ensuring the availability of good quality medicines at reasonable prices.
- Improving the accessibility of essential medicines for the common man.
- Facilitating higher investment for increased production of good quality medicines
- Promoting greater R&D and promoting domestic pharma to compete globally
- Developing India as the preferred global destination for pharma R&D and manufacturing

2013: National Pharmaceutical Pricing Authority: (Karunakar B et al, 2016) stated that in July 2013, the National Pharmaceutical Pricing Authority (NPPA) brought 348 drugs under price control through the DPCO 2013 act. As an independent Regulator for the pricing of drugs and to ensure the availability and accessibility of medicines at affordable prices. The Functions of the National Pharmaceutical Pricing Authority vary from Implementing, enforcing, managing, assisting & advising the central government on changes/ revisions in the drug policy.

Edelweiss's research has carried out a detailed therapy-wise analysis report during 2019, indicating that 24% of currently branded generics constituting IPM are coming under the purview of price control, and the price hikes are attached to the weighted Price average. This was negative during FY'16 and became positive in FY'18.

The Economist in their Intelligence 2015 report, while analyzing the driving factors influencing healthcare spending in low and middle-income countries like India, indicated that an improvement in healthcare access, affordable drug pricing for and rising acceptance of essential medicines under price control by NPPA in the presence of competition further going to contribute for the growth of the market.

2014: JAN AUSHADI: With government Initiatives like JAN AUSHADI - a mission of offering affordable generic medicines, the apex bodies should always maintain the standards with rules in place with timely amendments. The government and regulatory authorities are expected to continue to focus on:

- Reducing taxes and import duties reduced taxes and import duties.
- Incentives for setting up manufacturing units and for higher R&D
- Improving the quality of healthcare infrastructure.

Edelweiss's research in 2015 indicated that, in line with its core objective, under the Jan Aushadi initiative, around 800 drug prices, in both the therapies (acute + chronic) across the therapies like anti-cancer, anti-infective, respiratory, and gastrointestinal medicines, were 50%-90% more economical in comparison to the similarly branded generics available in the market. With a potential up to 20% of IPM sales, Currently, Jan Aushadi with an annual turnover of Rs 1.2 billion, is being operated through 5000 dedicated stores, which will be increased to 7500 stores by 2020 and to 10000 by 2021. The evolution of the Indian Pharmaceutical Industry can be depicted below in the figure.1.1.2

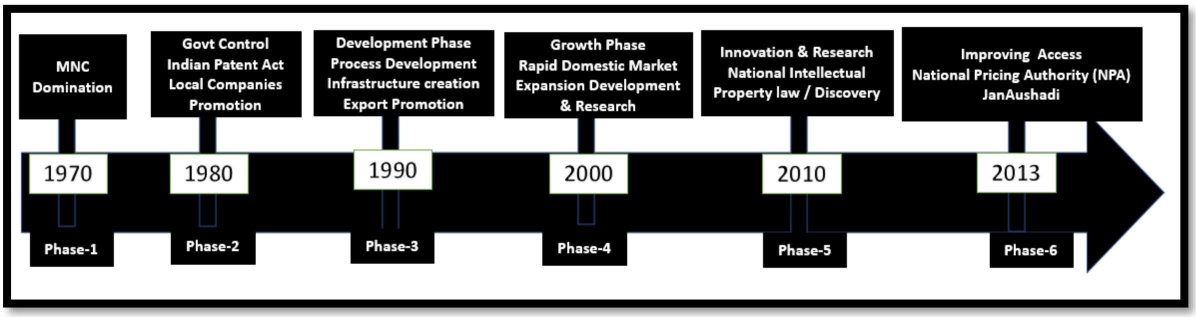


Figure-1.1.2: Evolution of the Indian Pharmaceutical Industry (Adopted from Karunakar B et al, Indian Pharmaceutical Industry – The changing dynamics, Int. J. Mgmt. Res. & Bus. Strat. 2016, Vol. 5, No. 2, April 201633-56.)

1.2 Components, therapies, and Segments of the Indian Pharmaceutical Industry:

(Nandy, M. et al, 2022). While indicating the profile of Indian pharmaceutical companies has given crystal clarity concerning a structural overview of IPM functioning with the suggested classifications based on the type of formulation prepared and the type of disease segmented or indicated for which the drug belongs as shown in Figure 1.2.1.

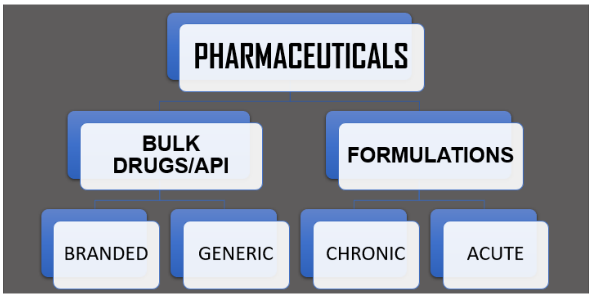


Figure-1.2.1: Classification of Pharmaceuticals (adopted from Nandy M et al. 2022, A profile of the Indian pharmaceutical companies. Relationship Between R&D and Financial Performance in Indian Pharmaceutical Industry, 29–47)

(Chokkakula BM, Kolapalli VRM et al, 2018) investigated the corporate strategies adopted by IPM for restructuring as shown in Figure-1.2.2, with the recent estimates that IPM is dominated by branded generic drugs with 70% of the market share followed by OTC with 21% market share and 9% market share with patent drugs.

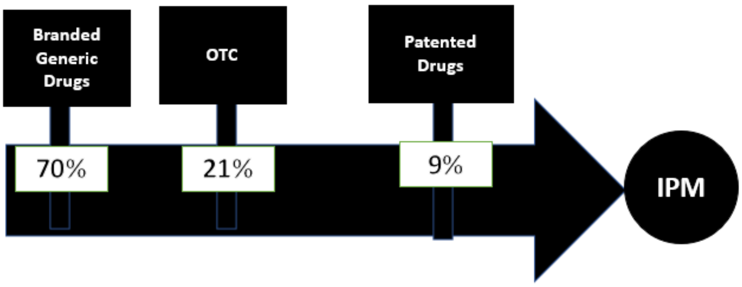
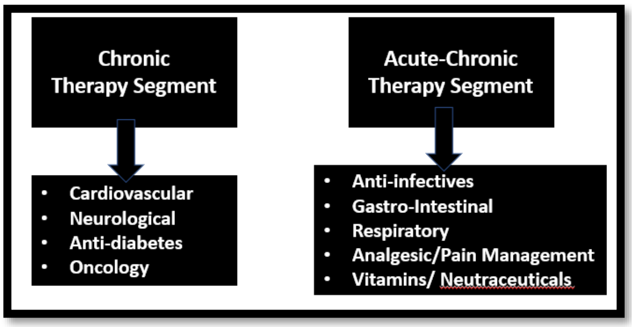


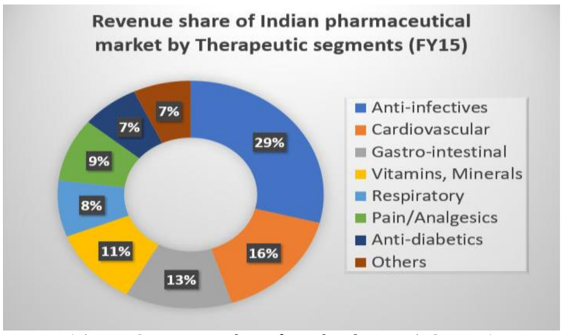
Figure-1.2.2: Composition of Generic drugs, OTC drugs, and patented drugs

D&B is the leading global provider of business decision-making in data and analytics knowledge with 2 centuries of experience indicating that based on the therapeutic groups, the Indian Pharmaceutical market can be divided into two segments (figure 1.2.3). They are,
a) Acute Therapy Segment and b) Chronic Therapy segment



(Figure-1.2.3: Pharmaceuticals by therapeutic segment)

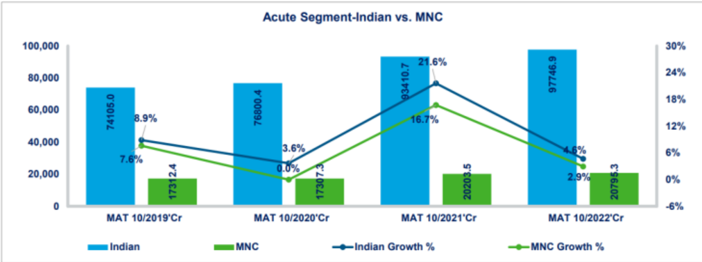
(Chokkakula BM, Kolapalli VRM et al, 2018) have shown that revenue-wise the leading therapeutic segments include Anti-infective drugs with 29% of the revenue due to the intensity of infections followed by chronic segments like cardiovascular drugs, Gastrointestinal drugs, respiratory drugs, antidiabetic drugs, and other categories of drugs as shown in Figure-1.2.4



(Figure-1.2.4: Revenue share of IPM by Therapeutic Segment)

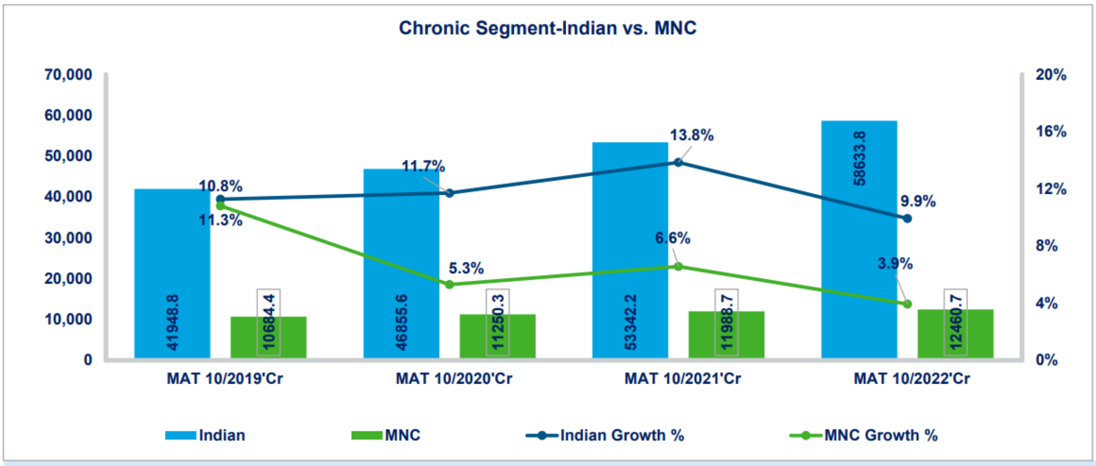
IQVIA and AIOCD AWACS Report for the month of October 2022 has shown that,

- IPM was valued at Rs.189636.6 crores with a growth of 6%.
- The trade sector was valued at Rs. 160054 crores, contributing to 84.4% of IPM.
- In the acute segment, Indian companies have grown by 4.6% MNCs have grown by 2.9% for MAT Oct’22 as shown in the below figure 1.2.5



(Figure-1.2.5: Year on-Year Indian Pharma Market MAT OCT 2022 Value in INR Cr)

- In the chronic segment, Indian companies have grown by 9.9% while MNCs have grown by 3.9% for MAT Oct’22, as shown in the below figure 1.2.6.



(Figure-1.2.6: Year on-Year Indian Pharma Market MAT OCT 2022 Value in INR Cr)

White paper and the Indian pharmaceutical market IQVIA 2022 report further emphasized that with the improvement in screening, diagnosis, healthcare facilities, management, reach, affordability, and accessibility to the patients, the incidence of lifestyle diseases is on the rise. As a result, the chronic therapy contribution is increasing consistently year on year both in terms of value and growth over the acute therapy whose contribution is fluctuating year on year both in terms of contribution and growth.

The report as a part of their recommendation indicated that organizations focusing on brands in acute therapy are working towards increasing penetration into the market, whereas organizations focusing on brands in chronic therapy are focusing their efforts on top-tier towns where there is a significant opportunity to grow. So, this approach of top organizations makes their approach therapy-focused

As per IMS MAT Oct'22, the Indian Pharmaceutical market is primarily driven in growth by organizations in comparison to MNCs with brands either comprising of single dosage form, non-fixed drug dosages, or fixed dosage form

As per IMS MAT Oct'22, as per organizational level (Figure-1.2.7),

- Top 10 organizations form 44% of IPM MAT Oct'22.
- Organizations ranked between 31 to 40 continue to grow faster on MAT Oct'22.

RANKINGS		CORPORATIONS	MONTH Oct'22		
MAT	MON		Values In Cr	MS %	Growth %
		IPM	**16241.80**	**100**	**2.99**
1	1	SUN*	1219.80	7.51	5.25
2	2	ABBOTT*	988.67	6.09	3.15
3	3	CIPLA	888.74	5.47	4.05
4	4	MANKIND	735.71	4.53	5.60
5	5	ALKEM*	699.05	4.30	8.85
6	7	LUPIN LIMITED	560.43	3.45	1.78
7	9	TORRENT PHARMA*	535.36	3.30	4.42
8	8	INTAS PHARMA*	546.38	3.36	7.97
9	6	MACLEODS PHARMA	561.12	3.45	3.26
10	11	DR REDDYS LABS	468.59	2.89	-1.56

(Figure-1.2.7: Top 10 organizations in IPM MAT Oct'22)

(Chokkakula BM, Kolapalli VRM et al, 2018) showed that with the increase in awareness, disposable income, and improvement in lifestyle, more and more people are at risk of chronic conditions which is the fuel of growth for pharmaceutical companies. Having identified the growth lever, organizations have started working towards consolidating their leadership position with existing products & aligning their portfolios towards growing therapeutic areas like gastrointestinal, respiratory, cardio-diabetic, and oncology segments with differentiated products either through product differentiation or Joint Venture (JV) with innovators for getting them promoted to the respective specialist physicians.

While improving the health and quality of life of the public, the industry has contributed to India's economic growth with

- 2.7 million People getting employment either directly or indirectly in various high-skill sectors like manufacturing, R&D, and other branches as per the growth estimate by the IHS market in 2015 for Indian life sciences Vision 2030.
- Annually USD 11 billion trade surplus is generated by industry, emerging as the top 5 sectors contributing to the reduction of countries' trade deficit as per the estimate of Export Import Data Bank, Department of Commerce, PHARMEXCIL, IDMA "Journey towards Pharma 2020 & beyond."

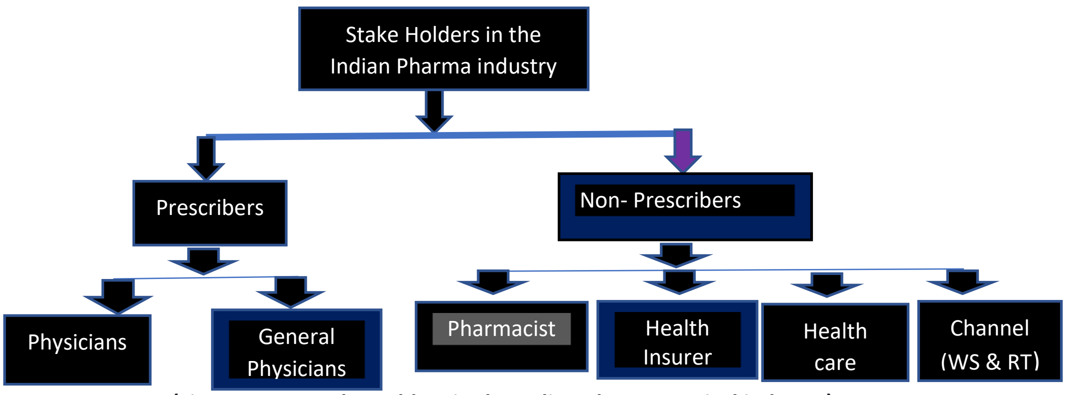
- Indian pharmaceutical industry has emerged as one of the top 8 sectors attracting FDI (Foreign Direct Investment) with more than USD 2 billion in the last three years, as per the report released by the department of industrial policy and promotion a database representing the RBI database on Indian Economy.

1.3 IPM's global statistics:

- 1 in every 3 pills taken by a patient in the USA is of Indian origin. (Source: IQVIA)
- 25% of medicines used by patients in the UK are of Indian origin, which indicates the commitment to better collaboration between the two nations (source: working paper report by Exim bank,2019).
- Since 2009, 37% of AIDS patients in Africa are treated with medicines of Indian origin, which indicates trust and penetration in the African markets. (Source: African business magazine)
- A recent FICCI report on pharmaceuticals in 2019, has indicated that Patients are at the heart of treatment, IPM aspires to become 130 billion USD by 2030, by adopting newer and cutting-edge technologies (like AI), improving operational efficiency, and supplying quality medicines to all patients across the globe at affordable prices.

1.4 Stakeholders in the Indian Pharma industry : (Tanya M, 2010) and (Ganesh PP et al, 2014) from their research on stakeholders in the pharmaceutical business and the boundaries in the doctor-patient relationship in India, showed that physicians are at the center of making the prescription decision as they are the primary target of most pharmaceutical companies' relationship marketing efforts and serve as an intermediary between the pharmaceutical firm and the patient/consumer with doctor-patient relationship and trust being central to the healing art of medicine.

As shown in Fig-1.4.1, Customers of a pharmaceutical company can be divided into prescribers and non-prescribers.



(Figure-1.4.1: Stake Holders in the Indian Pharmaceutical industry)

Prescribers: Who writes the drug prescription by themselves? Examples: Specialists and General Practitioners

Non-Prescribers: Those who don't participate in drug prescription by themselves but have either direct or indirect influence on the drug being prescribed. They constitute Pharmacist, Health insurers, healthcare policymakers, and wholesalers

Pharmacists: (Burmann C.et al, 2011) in their research emphasized the need for Customer Centricity as a Key to Success for Pharma. Pharmacists are the important stakeholders in controlling the availability of the brand either at pharmacies or at retail outlets. In the case of government / Public sector hospitals, the treatment cost is reimbursed in the form of either free diagnostic testing or free disbursement of medicines. In these situations, pharmacists tend to substitute the physician's prescribed drug with its equivalent generic drug. Hence it is important to educate on the medicines that are being promoted to doctors towards their availability in the pharmacy so that the former dispenses the brand that is being prescribed by the physician.

Health Payer/ Insurer: (Anuj Kumar, Karthaveerya, et al. 2014) investigated the concepts, components, and future importance of pharmaceutical market access in emerging markets has indicated the importance of health insurance reimbursements to the patients has become the next level of access and growth. The payer is one of the most prominent dominant stakeholders, who demonstrates a high degree of control from pricing to reimbursement of drugs prescribed to the patient.

Payers are enabled to render patient services in collaboration with specialized agencies having expertise in healthcare in the field of reimbursements to formulary decisions. Payers are also a part of developing treatment protocols and play a very influential role in physicians' prescription behavior.

Pharmaceutical organizations are collaborating with payers in leveraging market access in reaching out to the needy critical mass which will be beneficial for the patient, Payers, and finally to a pharmaceutical organization about their existing product as well as for successful new product launch in the market.

Health policy Makers: (Anuj Kumar, Karthaveerya, et al. 2014) in their research showed the role of government bodies and regulatory agencies are a complex group of stakeholders that play a key role in developing a suitable operational environment for the operating pharmaceutical companies in the form of developing country-specific healthcare policy framework.

Regulatory bodies: The ministry of health and family welfare, and the Ministry of Chemicals and fertilizers of the government of India play a major role in regulating the pharmaceutical sector in the country (Sarada RR, Nilesh LB, et al., 2012). In India, state government authorities are responsible for licensing a drug maker's research and manufacturing facilities. But the federal Central Drugs Standard Control Organization (CDSCO) and Drug Controller General of India (DCGI) are responsible for approvals of preclinical and clinical trials, new drug applications, and the import of drugs from abroad by pharmaceutical companies for marketing in India. (Viswanath B, Rao ORS, et al, 2019) in their review of factors influencing the physician's prescribing behavior, it has been found that only those drugs approved by DCGI, based on efficacy, safety, and tolerability are being granted permission for promotion to physicians by pharmaceutical companies through their dedicated field force towards their prescription to the patients in need for their recovery from the disease condition.

Specialist Societies and Taskforce: (Viswanath B, Rao ORS, et al, 2019) in their review of factors influencing the physician's prescribing behavior implicated the importance of professional societies and task forces as Professional Societies or Associations (PA) refers to a group of people in the same profession who come together to form a professional association or a society. The creation of this organization is purposeful and is meant to facilitate the achievement of very specific objectives, especially in providing service and enhancing the careers of professional members.

The association actively creates expertise through Continuing Professional Education and Development (CPD) Programs, research, knowledge management, guidelines, and publications. It develops frameworks for continued practice to make sure that professionals retain adequate knowledge and skills after they complete their professional education. It contributes to the event of professional standards for practice, education, regulation, and public safety. It has a coordinating and consulting role among the public, regulatory bodies, and policymakers, including the Ministry of Health and educational institutions.

Advocacy groups: Patient advocacy organizations (PAOs) are generally nonprofit expert groups that disseminate information to caregivers and patients on various aspects of disease management right from awareness services to advocacy services by reviewing the available evidence and coming up with recommendations in the chosen domain as the teams, (Susannah L. Rose et al., 2013) that, all aware of the potential implications of the medical condition on the Patient and the society at large and have a mission and take actions that seek to help people affected by those medical conditions or to help their families.

These organizations advocate for and provide services to, millions of people with physical and mental conditions (Allergy, diarrhea, malnutrition, cancer, diabetes, mental illness, and cardiovascular disease) through their outreach, meetings, counseling, websites, and published materials. A PAO usually seeks to raise public awareness of a disease's symptoms, risk factors, and treatment options and promotes research to cure or prevent that disease.

Channel partners: (Anuj Kumar, Karthaveerya, et al. 2014) and (Ganesh PP, Bhola SS, et al, 2014) in their research emphasized the important role of channel partners as they maintain the stocks of the drugs prescribed by the physicians in sufficient quantity for getting the prescription honored and the patient gets the prescribed medicine for recovery. They also play an important role in communicating to the physician about the ongoing value addition offers on specific drugs or suggesting substitution for some prescription drugs. In this way, both retailers and wholesalers help the pharmaceutical organization in increasing sales.

(Burmann C.et al, 2011) and (Ganesh PP, Bhola SS, et al, 2014) from their research indicated the three main customer groups in the industry. They include patients, physicians, and payers. So, the entire pharma sales effort by a sales representative is directed toward three customer segments first physicians, second hospitals, wholesalers, pharmacies, and the third one is end customers, (i.e., patients).

(Kumar Anuj et al, 2014) indicated that since the main objective of all the stakeholders is to increase market access, it is essential to understand the needs with a collaborative approach among various stakeholders in the current complex healthcare system.

In the developed world, as the pharmaceutical market is very much dynamic, accessing the market is key to the success of either brand or organization. Leading companies have initiated establishing market access departments, thereby making them an integral part of the organization.

(Mehta P et al, 2014) in their work focusing on developing interventions towards enhancing the value from the insights generated from the market felt that in the case of emerging markets, due to the existing challenges, market access, has still not developed as a function in comparison to developed markets. As a result, most pharmaceutical companies are managing the individual components of the market access like Price, channel, stakeholders, and government agencies as they lack well-established processes, Plans, and talent.

1.5 Steps involved in the Drug Prescription process:

World Health Organization (WHO) advocates a systematic six-step process for the prescription of medicines by physicians, which ensures the accuracy of drug prescription, thereby avoiding errors, which consists of the following steps:

1) To evaluate and diagnose the patient’s problem.

2) To specify the therapeutic objective

3) To select the appropriate drug therapy

4) Initiating the therapy with appropriate details, also considering non-pharmacologic aspects

5) Giving information, instructions, and warnings about the drug therapy to patients for their adherence.

6) To evaluate therapy regularly and monitor treatment results and consider discontinuation of the drug, upon therapy completion or patients’ complete recovery.

1.6 How does a physician take a prescribing decision?

Clinicians’ drug decision on medication falls under 3 groups (Varsha G et al., 2017). They're innovator drugs, branded generic drugs, and a generic version. Innovator medication is first discovered and developed by a pharmaceutical company. They're approved by the FDA by submitting a New Drug Application along with data regarding evidence of characteristics of preparation form, manufacturing, chemistry, stability, effectiveness, safety, labeling, and packaging. After the permission from FDA, the innovator company can only introduce this innovative new medication for a period of patent protection (about 20 times or as specified).

The brand-name drug is generally retailed at a high price to recover charges incurred in the invention and development of medications. The chosen channel for promoting innovative medications are clinicians and druggists.

As per, (Mahmoud MA et al., 2016), a branded drug medication has a greater influence, relative to generic drugs, on physicians in prescribing to patients. Physicians prefer to prescribe branded medicine to patients due to several reasons. This includes

a) Physician’s clinical experience for a great amount of time.

b) Patient’s financial position for affordability.

c) Trust between Patient and Physician

Ethical drug promotion in the country by a pharmaceutical organization is the way of promotion to physicians which comes under the strict preview of DCGI and the same can be undertaken by the promoter in various ways.

They include.

a) Detailing doctors by medical representatives.

b) Mailing brochures and literature to doctors or pharmacists.

c) Advertisement in health care journals.

d) Symposiums and Society Meetings

e) Clinical meetings & public relations campaigns.

(Bandi V et al, 2017) in the review indicated the essential factors under which a physician takes a prescribing decision toward curing the patient from a pathological condition. In this regard, the role of a physician is very dominant in India. Pharmaceutical companies operate through a dedicated, qualified, trained field force for serving the entire value chain partners comprising of Stockists towards ensuring brands supply, Chemists for ensuring brands availability towards physician's Prescription to the patient for the promoted brands aiming recovery, improvement in Quality of life and health of the patient.

Medical representatives (MRS) put effort into and try to influence the prescription pattern of physicians in favor of their promoted branded generics over the available alternatives with the help of scientific communication dissemination in various forms through their time-bound visits to physicians. (Avadhut AP et al, 2014) their research indicated the physician's acceptance of technology-enabled product promotion through iPads over conventional promotion, this has helped the marketers with the physician's information (both Personal and Professional) enabling them to identify the physician's needs and come up with solutions at the fingertip. As a result of which the market has become highly fragmented and competitive.

The Organization of Pharmaceutical Producers of India (OPPI) has recognized the technological developments happening across the world and incorporated the Internet together with the well-liked medium of product promotion to physicians by Medical Representatives of the appointed organizations.

OPPI Code of Pharmaceutical Practices, 2012 has defined pharmaceutical promotion with the publication by the Organization of Pharmaceutical Producers of India, which mentions pharmaceutical promotion as, "any activity is undertaken, organized or sponsored by a member company which is directed at healthcare professionals to market their product with physicians endorsement, channel availability through all media, including the web and mobile SMS." this means that physician's technology acceptance phenomenon is an outcome of physician's attitude, perception, and behavioral intention towards the technology.

1.7 Problem and Its Background: (Hossain MM et al, 2013) in their review stated that deciding on the accurate medication after judgment is the most important task of a physician, as the medication is one of the most efficient ways of handling sickness of the patients. Hence a prescription is a medical decision (Rx) with a health-care plan of medical care for a patient (individual case) and is enforced by a good and qualified physician. Therefore, the Physician’s tradition is a decision to buy the product, on behalf of the consumer. The pharmaceutical segment is maybe the only segment, wherein a counsel/ conciliator (the physician) and, not the end-customer (patient) decides on the product to be consumed, as the consumer isn't knowledgeable.

It's because of the prescribing power of the physician; that all pharmaceutical companies are forced to influence through their marketing efforts to impact Physicians to prescribe their promoted products to the patients.

Faced with several contending substitutable branded generic products (with the same constituents) but at different prices, physicians must decide which product to be given to patients. Besides medical factors, non-medical factors also weigh on the Physicians., so much so, at times, some physicians are non-rational in defining medicines, thereby causing problems of over-drug dosage leading to life-threatening complications. On the other hand, consumers’ anticipations are also rising as they tend to acquire knowledge from the online medium and are posing searching questions to Physicians and indeed enquiring about substitutes.

Hence, it becomes very important to understand the dynamics of the physician’s prescribing decision, led by the various external factors (medical and non-medical) with varied intensity originating from various promoted products from different pharmaceutical organizations, under whose constant influence the physician makes a prescribing decision. Since patient recovery is the aim of the physician, understanding the role of the above external factors with the physician’s internal factors, of which the physician is made up, will ensure a clear picture of the dynamics of the physician’s prescription decision. Therefore, it is important to examine the factors and identify the most influential factors influencing the specialist respiratory physician’s prescribing behavior taken as an example in the current research study, the snapshot of which has been shown in below Figure 1.7.1

Drug Type	Agencies / Regulatory Apprivak FDA / DCGI	Clinical Studies CTRI	Composition Approval USP/BP/IP	Recommendations by Societies	Advocacy Groups	Pharmaceutical Companies
Innovator Drug Branded Generics	Approvals	Study registration	Dosage form details	Regional/ Zonal / National Conferences	Neurtral bodies , work for Agencies	Manufacturing products as per Protocols / standards . Mantaining the product quality with certificate of analysis for release in to the Market for Patiets usage.
	Labelling	Study results display	Formulation details	Workshops on latest / practical learnings	Epidemiological studies	Promotion of exisitng Products and Introduction of new products focusing on Patientes benefits
	Packaging	Regulation of the study	Dosage form details	Consensus Development / Release	Current Practices / Recommendations	Promotion led by Mktg and Sales Team. Marketing team supporting sales team with materials, KOL connect. Working on suggestions received from KOLs and sales team.
	Efficacy		API standards	Updates in the chosen fields	Reglating the Standards	MR is the centre of Brand Promotion to the Physician by a Smart individual with regular visits discussing /updating physician for the promoted brand (its benefits) over alternatives for physician's prescription as suggested by Marketing team.
	Safety		Excepient details	Courses / Recongitions	Addressing grivences	Brand promotion through Detailing, Brochure, Samples, Compliments with Brand Names on them
	Adverse events Profile		Shelf life details	Collaborations with other societies	Patients and Physician's expectations	offering Personalized services, sponsoring for CMEs, Conferences, workshps
	Age of Use		SOP details	Collaboration with Industry on the Projects		Conducting disease screening, awareness initiatives alogn with the physicians.
	Monitoring for availability with standards with regular inspections.		Inter-action details	Setting up an interface for Physician-industry collaboration and Coordination.		Ensuring across the pharmacies at adequate level with a proper distribution channel and following to the OPPI code of conduct

(Influencers of Physician's Prescribing decision. Figure 1.7.1)

1.8 Need of the Study:

IPM is dominated by branded generics, where brands with similar molecules but with different names are being promoted by different pharmaceutical companies to physicians using various tools of marketing, for a place in physicians' prescribing decisions, in a highly competitive market.

Hence understanding the factors influencing the physician's prescribing decision from the Indian context will help all stakeholders across the value chain in improving the efficiency and effectiveness in their roles or functions, which add value to the physician for improving their decision-making in the form of prescription for the welling of patients with optimal utilization of resources.

With an increase in the incidence of lifestyle diseases, their management calls for a longer duration of treatment from specialist physicians, which is later followed by the family physician. Hence understanding the factors influencing the prescribing behaviour of respiratory physicians in the Indian context has been undertaken through this research study.

1.9 Factors influencing the Physician's prescribing behavior:

Studies on factors influencing the physician's prescribing behavior were conducted by researchers across the world, both from developed and developing countries, as the dynamics are either different or continue to evolve in a changing regulatory environment, leading to an increase in healthcare costs for patients (insured or uninsured).

Hence, for health and economic reasons, it is imperative to study the factors affecting the physician's prescribing behavior, which continues to change to influence their prescribing decision of a particular branded drug among available alternatives.

The pharmaceutical market is a complex system in which several stakeholders put their interests. Product diversities and geographical coverage push organizations to establish their strategy on an individual level (Dickov et al, 2011). At the time of the physician's prescription decision, contextual factors consisting of drug attributes, cost-benefit ratio, and Physician's habit Persistence (representing a set of circumstances or facts) are present during their prescribing process were also found to get modulate the level of uncertainty, in influencing their prescribing decision.

(Murshid et al,2016) indicated that at the time of the physician's prescription decision, contextual factors consisting of drug attributes, cost-benefit ratio, and Physician's habit Persistence (representing a set of circumstances or facts) that are present during the physician's prescription decision are found to modulate the level of uncertainty, may influence the physician's decision thereby explaining the theoretical linkages between marketing strategies of pharmaceutical firms, contextual factors and the decision of the physician regarding drug prescription.

(Luminița Michaela Ion) their research has indicated that physicians' suitable prescription is influenced by several factors that act on the decision to prescribe medication, such as drug characteristics like quality, price, and availability, the patient's state, the prescriber. (Alvanz, et al, 2003) further confirmed that physicians professional background is often besieged with information, regulation, and suggestions that affect prescribing decision

(Saroj Kr Datta et al, 2013) their research confirmed that pharmaceutical marketing is often more sales-driven than marketing-driven due to the more attention being paid to the execution parts of marketing, leading to a lack of market research exercises towards determining promoted brand identity and physicians' perception about the same towards their prescribing decision.

(Alabbadi I, et al, 2013) showed that physicians are always continuously exposed to various tools deployed by pharmaceutical organizations to get their brand prescribed to patients. Their research has shown that along with awareness of the price of the drug, patients caring nature towards meeting their expectations, and their personalities were also stated to have a statistically significant positive effect on physician's prescribing behaviour.

(Hansen et al, 2016) Their systemic review of the factors influencing successful prescription decisions by physicians confirmed that multiple factors were influencing prescribing behavior of physicians, such as external factors, coordination and collaboration among medical team members, line of reporting, and patient plus individual factors.

(Hailu et al, 2021) their research study from Ethiopian hospitals showed that nearly two-thirds (55.9%) of physicians demonstrated their influence on their prescribing behavior through promotion strategy, product strategy, place strategy, and price strategy adopted by pharmaceutical organizations in their drug prescription habits.

The summary of studies along with details is represented below in the table 1.9.1.

No	Tag	Title	Author & Year	Gist	Linkage to Research
1	Journal Research Article	Investigating the Factors Affecting Doctor's Prescribing Behavior in Jordan: Anti-Hypertensive Drugs as an Example European Journal of Social Sciences. Vol. 38 No 3 May 2013, 380 – 391.	Alabbadi I (2013)	Strong correlation confirming physician's prescribing behavior concerning factors.	Provided background for hypothesis on Physician's Prescribing behaviour.
2	Journal Research Article	Conceptualization of branding: strategy based on the Indian pharma sector. International Journal of Pharmaceutical & Healthcare Marketing, Vol. 7 No. 2, 2013, 175-198,	Nath Sanyal, S., Datta S.K.& Banerjee AK, (2013).	Significant correlation confirming Physician's Prescription decision concerning elements of a brand in a branded generic from India.	The impact of emotional branding apart from a scientific understanding of the drug, in the presence of alternatives influencing the physician's Prescribing behaviour, needs to be assessed.
3	Journal Article	Moderating effects of contextual factors on the relationship between pharmaceutical marketing strategies and physician prescription decision: A review. Tropical Journal of Pharmaceutical Research July 2016; 15 (7): 1559-1568	Mohsen Ali Murshid, Zurina Mohaidin & Goh Yen Nee, (2016)	Physicians' Prescription behavior is influenced by marketing efforts in developing countries.	The impact of marketing efforts with contextual factors needs to be assessed in the physician's prescribing behaviour in the Indian context.

4	Systemic review	Factors Influencing Successful Prescribing by Intern Doctors: A Qualitative Systematic Review Pharmacy (Basel). 2017 Jun; (2): 32.2-9	Christina R, Hansen, Colin P Bradley & Laura J Sahm, (2016)	Significant correlation confirming physician's prescribing behavior is influenced by multiple factors	The existence & impact of educational interventions on physicians' Prescribing behavior needs to be probed in the Indian context.

Summary of the studies focusing on the physician's prescribing behaviour. (Table 1.9.1)

The physician's personality is one of the factors influencing the prescribing decision, according to research from Jordan (Alabbadi I et al, 2013). Understanding the role and impact of each one of their personality traits in the presence of external factors and their interplay with each other will help a lot towards a better understanding of physician's prescription behavior (Saroj Kr Datta et al, 2013) research from India demonstrated that emotional branding influences physician's prescribing decision apart from the scientific understanding of a drug.

Hence, Understanding and identifying the most influencing personality traits of the physician, eliciting feelings as well as other crucial aspects will enable better understanding with a significant correlation establishing the relationship between emotions and their relation to the physician's personality. (Murshid et al, 2016) Their research study reaffirmed that the factors affecting the physician's prescription behavior expressed the need for further investigation on the extent of influence of contextual factors like drug attributes and physicians' persistent behavior towards the prescription choice of a drug.

(Hansen et al, 2016) in their systemic review, confirmed the influence of multiple factors on physician prescribing behavior in a complex operating environment, and highlighted that apart from addressing the presumed knowledge gap of physicians, the research emphasized one need and deployment of educational interventions which are physician-specific and unique, derived from their natural make-up, of which personality is made up of.

(Hailu et al, 2021) their Ethiopian research displayed that 55.9% of physicians displayed to get influenced by promotion strategy, product strategy, place strategy, and price strategy adopted by pharmaceutical organizations in their drug prescription habits. However, measuring the impact and influence of individual pharmaceutical marketing mix strategies that influence physicians in taking a prescribing decision will enable the understanding of the role and impact of physician's makeup, which leads to the formation of the behaviour followed by the habit of choosing a branded drug among alternatives available in the market.

1.10 Concepts / Theories / Philosophies on Physician's Prescription behavior:

Several theories have been formulated to help predict and understand health-related behaviour. Well-studied theories related to changing an individual's behavior include the social cognitive theory, the theory of reasoned action, the theory of planned behavior, and the health belief model.

The trans-theoretical model, also known as stages of change, addresses an individual's readiness to change. The prolixity of creations principle describes factors that affect the embracing of a given practice or gesture.

One of the well-tested cerebral propositions is the proposition of planned actions (TPB). The TPB has been used successfully in prognosticating a wide range of health professional gestures. According to the TPB, specific actions can be prognosticated on the strength of a person's intention to make those actions. Intentions are, thus, the precursors of actions, and the stronger the intention, the more likely it's that the actions will do as represented in below figure 1.10.1

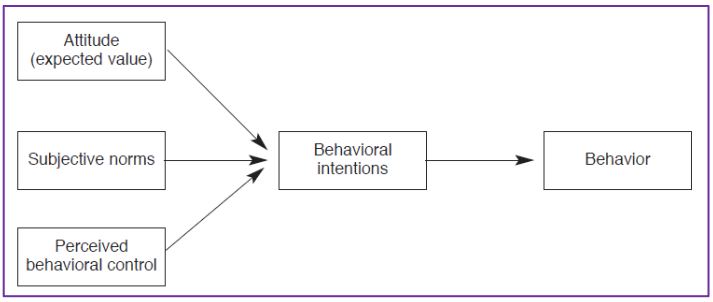


Figure 1.10.1

The intention strength is determined by three variables, They Include, Attitudes toward the behavior, subjective norms (SNS), and perceived behavioral control (PBS) over it. These variables, in turn, are based on salient beliefs about the physician's behavior.

(Wiedyaningsih et al. 2016) explored the possible usefulness of the proposition of planned behavior (TPB) in forecasting intentions to prescribe unconsidered compounding medication form and to determine the salient beliefs associated with this intention among general clinicians from Indonesia, verified that the TPB model furnished information that attitude, principles subjectify, and perceived behavioral control were useful predictors for intentions to recommend to a patient. previous actions variable increases the proportion to explain the variance of intention. The state was the most important predictor of clinicians' intention to recommend unconsidered compounding medication forms for pediatric patients.

1.10.2 Limitations of TPB in the Physician's Prescribing behaviour:

(Zhou et al,2019) based on the theory of planned behaviour, performed a cross-sectional survey in Chinese country hospitals, and analyzed physicians' intentions, attitudes, subjective norms (SNS), and perceived behavioural control (PBC) on prescriptions and their actual behaviour on the selection of essential medicines. The research showed that attitude and other influencers, institutional environment, and PBC significantly affected behavioural intention. However, the control extent of cognition behaviour of physicians prescribing had no significant positive effect on the priority usage of essential medicines.

(Ali Murshid M et al, 2017) their review assessed the current models which were a combination of both exploratory research and theoretical models employed in the prescription research, and they have come up with attitude-behaviour-like reasoned action theory and therefore the Planned Behaviour Theory. A vital proposition of these theories is that individualities are rational in decision-making. As a result, the cognitive approach can be utilized to interpret behaviour.

A physician's decision-making process is a facet of prescribing that has been addressed by cognitive models. However, (Godin et al, 2008) and (Falko F et al, 2014) reported that the idea of TPB has some downsides, as the model doesn't consider the emotional approach. It has been found that the TPB has been criticized for its exclusive focus on rational reasoning, excluding unconscious influences on behavior and the role of emotions beyond anticipated effective outcomes. Moreover, the static explanatory nature of the TPB does not help to understand the evidenced effects of behavior on cognitions and future behavior.

(Conner et al. 2017) suggested the incorporation of emotional variables as a valuable approach of modifying the behavioural propositions of physicians prescribing decisions.

- (Hiebler-Ragger M et al, 2018) from their research confirmed that correlation analysis found the link between primary and better emotions also as their reference to personality.
- Further regression analyses indicated that personality dimensions mediate the connection between personality and better emotions.

1.11. Motivation for the research study:

Most studies related to factors affecting physician's prescribing behavior have taken place in several countries, focusing on the influence of drug/product Quality, price, availability, promotional activities, the impact of detailing and quality of medical representative, and brand loyalty, as parameters.

However, apart from (Karagianni D et al, 2012) and (Alabbadi I et al, 2013) from Greece and Jordan to the best of the researcher's knowledge, limited attention has been devoted to studying internal factors constituting the physician, whose interaction with the external factors are enabling the physician's prescription behavior.

Hence initiating a research study, which decodes the physician's internal makeup with the external factors, which can lead to physician-specific prescription behavior, from an emerging market like India from the Asian subcontinent dominated by branded generics, with wide diversity in culture, will help in understanding and identifying the relationship among these influencing factors affecting the physician's prescribing behavior, when prescribing anti-allergic drugs, from specialist respiratory physicians comprising of ENTs and Chest Physician's taken, as an example in this study.

The output of this research will help policymakers towards taking appropriate measures, frame guidelines and interventions for better environmental conditions, and educational interventions towards improving physicians' efficiency and effectiveness for their better diagnosis and treatment.

For marketers, the output will enable the crafting of physician-specific marketing initiatives based on the impact of disease and the offered solution to the patient, in addition to engagements for a predictable physician's prescribing behavior in favour of their promoted product, laying the foundation for physician-patient-centric care. The main goal of this proposed research work is to analyze the effect of factors like physician professional factors, product-related factors, product promotion factors, and physicians' personalities on physician prescribing behavior in the Indian setting.

1.12 Scope of the Study:

The Scope of the research study defines the borderlines within which the research study will be undertaken by engaging the respondents with their responses. Though the scope of the research is limited, the findings could be generalized,

- **Content-wise scope**: The research study is limited to examining and identifying the most important factors influencing the prescribing behavior of medicines by specialist respiratory physicians.
- **Geographical Scope**: - The scope of the research study is limited to the inclusion of specialist respiratory physicians from the metro city of Hyderabad (in and around) followed by Warangal city and towns like Nizamabad and Karimnagar, all located in the state of Telangana state of India.
- **Scope in terms of the Nature of the Practice:** The research study has included specialist respiratory physicians comprising ENT and Chest, practicing in their clinics, government hospitals, or in a corporate hospital with both types of treatment facilities namely Primary care and secondary care.
- **Gender-wise scope:** The research study has included both male and female, respiratory physicians from both ENT and Chest specialties from the metro city of Hyderabad followed by Warangal city and towns like Nizamabad and Karimnagar.
- **Sample-wise scope:** The research study has been conducted based on the responses received from the estimated sample size of 171 respondents comprising both male and female specialist respiratory physicians with various types of practice as described above from the chosen geographical boundaries.

1.13 Thesis Outline:

The thesis has been divided into five major chapters. These chapters are preceded by the executive summary and are followed by references and an appendix. The details of the layout are as follows:

Chapter I: This chapter introduces the basic elements, components, and evolution of the Indian Pharmaceutical Industry. The physician's prescription process, the stakeholders involved in the entire value chain along with their role have been discussed along with the challenges in measuring factors affecting the physician's prescription decision. The rationality of developing a framework from the existing research which encompasses the limitations of the theoretical models is brought forward in this chapter.

Chapter II: In this chapter, a review of relevant literature is presented which was undertaken to identify gaps in the research undertaken so far which led to the development of a research framework for undertaking the study.

Chapter III: In this chapter step by step detailed process followed towards realizing the research objectives was explained.

Chapter IV: In this chapter, detailed data analysis was performed with the collected data using various statistical tools to arrive at the results which were interpreted in conclusions.

Chapter V: The chapter summarized the findings of the research that was discussed in the previous chapter. The summarization is based on data analysis. The result, discussion, and conclusion are the presentation of the findings of the research in compact form.

References – These consist of the details of the sources from where reference has been taken or cited.

1.14 Significance of the Research Study:

The physician's prescription decision may be a complex process that involves a variety of effects.

- In numerous cases, the choices of physicians are multifactorial. Physicians may take up several strategies while taking a prescribing decision, and several kinds of critical heuristics in conducting their duties of patient treatment.
- Despite the several opinions on Physician's decision-making in literature, none of the propositions can solely explain the medical rule decision of physicians and its affiliated factors.
- As a result, complex propositions are employed to understand how several factors impact physicians' decision-making in general practice. This has redounded in demands for further theoretical exploration to develop better interventions demanded to change the gesture of physicians.
- According to recommendations made by several experimenters, there is an important need for further understanding of the abstract frame of physicians' defining actions, which is defined by their internal makeup with external factors.

Therefore, conducting a research study with specialist physicians in analyzing and identifying the most important factors in their prescribing decision from an Indian context, the first of its kind and which is an example of the branded generic market will unveil the multiple perspectives views on decision stuff.

1.15 Summary of the Chapter:

The chapter attempts to provide the probable reasons behind the selection of the stated topic that has motivated to carry out the research. After going through the chapter background of the study and the need to carry out the research a clear and preliminary direction to think and proceed is also finalized. It also addressed the research gaps that have tried to be fulfilled through the present work. The chapter has presented a basic understanding of the topic and has also defined the scope within which the work has to be carried out. One of the important outputs could be related to establishing the need for deep insight into the problem, a systematic investigation of the impact of factors influencing the physician's prescribing behavior.

CHAPTER - II
REVIEW OF LITERATURE

CHAPTER - II

REVIEW OF LITERATURE

2.1 Introduction:

In India, patients purchase medicines as per the prescription of physicians, making a physician's prescription a decision to buy the product on behalf of the consuming end-user. As a result, most pharmaceutical organizations leverage their marketing tools to influence physicians to prescribe their products. Faced with several competing alternative branded products (with similar ingredients) but at different prices, physicians decide which product to be prescribed for their patients.

The literature review was undertaken from the existing literature by accessing the articles from the information sources like journals, textbooks, presentations, thesis, and others, covering theories, and concepts that emerged out of the contributions made in this segment to date by researchers and academicians from all parts of the world. This exercise of reviewing the literature is an important step of research as, it,

- Enabled the researcher to record, analyze and evaluate previous research works.
- Improved the researcher's understanding of the scope of research performed in the past
- Offered support to the researcher in identifying the gaps, inconsistencies, and questions that could not be answered in the previous research works.

This led to further narrowing down, towards arriving at the research objective, and identification of variables towards developing the model that best explains the factors influencing the physician's prescribing behaviour , which was taken forward with the help of a well well-drafted questionnaire relevant to the Indian context.

With close to 20 years of experience in pharmaceutical sales and marketing, the scholar has been experiencing differences in response from Physicians, concerning their prescribing decisions of a brand over the available alternatives in a similar segment, promoted with a different marketing mix from competing pharmaceutical companies. Hence, the Physician's decision to prescribe a brand versus an alternative option is of paramount importance to be investigated.

Based on personal interest, for a better understanding of the dynamics of physician prescribing behaviour, from the literature, the scholar has probed the important factors influencing the physician's prescribing behavior in various markets like developed markets, which were predominantly driven by innovator brands, whereas in developing markets, the market is primarily driven by branded generics.

To understand the factors influencing the physician's prescribing behavior across the geographies and in particular India, where various forms of available literature on this topic were studied to answer the basic question of 'why physicians do not respond similarly to a brand, for making a prescribing decision to their patients'?

This question was further narrowed down to reach finally to the topic under study. The literature review undertaken for this research has been broadly divided into two steps:

- Step-1: As of date literature review on the factors influencing the physician's prescription behavior, focusing on the theories and the research methods deployed till 2022 from 1980 onwards, towards finalizing the research objectives and the topic focusing on India.
- Step 2: This step led to the finalization of the physician's group to be targeted along with the methodology to be adopted apart from the selection of scale with the help of a validated tool.

2.2 Literature reviewed-an overview: A detailed literature review was undertaken, to capture the contributions made to date, broadly covering the various aspects involved in the topic. The details of the literature review in terms of different sources of information like journals, articles, systemic reviews, meta-analyses, Ph.D. Theses books, seminar proceedings, etc., are presented in the table below 2.2.

Summary of topic-wise literature survey						
No	**Broad Topic**	**The Type of Literature reviewed**				
		Research Articles	**Theses/ meta-analysis**	**Books / Seminar proceedings**	**Total**	**Relevant to topic**
1	Physician's Prescription behavior	72	8	02	82	25
2	Physician's Professional factors link to the prescription decision	35	04	01	40	28
3	Physician's Personality factor linking to Prescription behavior	33	02	01	36	26
4	Product-related and Product Promotion factors link Physician's prescription decisions.	71	5	2	78	36

Table 2.2: Summary of topic-wise literature survey undertaken

The understanding of each constituting factor as derived from the literature helped to position themselves in the overall environment of the research problem. Contextual knowledge of each content and its relationship with other factors modifying behavior is pivotal in the construction of the model.

2.3 The Literature reviewed on the topic :

A detailed list of various literature reviewed is presented in the table below. The table provides details of the citation along with the gist of the literature reviewed and the link to the present study along with gaps that are to be addressed in the present research study.

2.3.1 Factors Influencing the Physician's prescribing behaviour :

Studies on factors influencing the physician's prescribing behavior were conducted by researchers across the world both from developed and developing countries, as the dynamics are either different or continue to evolve in a changing regulatory environment, leading to an increase in healthcare costs for patients (insured or uninsured). Hence, for health and economic reasons, it is imperative to study the factors affecting the physician's prescribing behavior, which continues to change to influence their prescribing decision of a particular branded drug among available alternatives.

The pharmaceutical market is a complex system in which several stakeholders put their interests. Product diversities and geographical coverage push organizations to establish their strategy on an individual level (Dickov et al, 2011). At the time of the physician's prescription decision, contextual factors consisting of drug attributes, cost-benefit ratio, and Physician's habit Persistence (representing a set of circumstances or facts) that are present during the physician's prescription decision are found to modulate the level of uncertainty, may influence the physician's decision thereby explaining the theoretical linkages between marketing strategies of pharmaceutical firms, contextual factors and the decision of the physician regarding drug prescription (Murshid et al, 2016).

Physicians' suitable prescription is influenced by several factors that act on the decision to prescribe medication, such as drug characteristics (quality, price, and availability), the patient's state, the prescribed er, professional background (Luminița Michaela Ion) and are often besieged with information, regulation, and suggestions towards their prescribing decision (Alvanzo et al, 2003). Pharmaceutical marketing is often more sales-driven than marketing-driven due to the more attention being paid to the execution parts of marketing, leading to a lack of market research exercises towards determining promoted brand identity and physician's perception about the same towards the prescription decision (Datta SK et al, 2013). Physicians are always continuously exposed to various tools deployed by pharmaceutical organizations to get their brand prescribed to the patients. Research has shown that along with awareness of the price of the drug, patients caring nature towards meeting patient expectations, and their personalities were also stated a statistically significant positive effect on physician's prescribing behavior (Alabbadi I et al, 2013). Pharmaceutical marketing is frequently more sales-driven than marketing-driven owing to the concentration on marketing execution. There is a lack of market research studies to examine the promoted product's physician perception for the prescription. (Datta SK et al., 2013).

Pharmaceutical corporations regularly use a range of strategies to expose physicians to get their brand recommended to patients. Studies show that the personalities and attitudes of physicians toward meeting patient expectations as well as their awareness of the cost of the prescription have a statistically significant positive influence on their prescribing behavior (Alabbadi et al., 2013).

(Krunal V et al, 2020) research involving 100 physicians comprising of GPs, Physicians, Gynecologists, pediatricians, and dentists from India, assessed the impact of various promotional tools. The study has indicated the varying impact of promotional tools like detailing by an MR and engaging them in a CME or medical camp. However, customer relationship has emerged as one of the crucial elements towards physicians' preference for the promoted brand by the respective MR. Hence understanding the specialist physician's preferences, and make-up, then devising various types of promotional tools by the marketer can improve the MR effectiveness leading to a greater impact on the physician's perception of the available alternatives, thereby leading to prescribing the promoted brand to the patient.

(Ahmed RR et al, 2020) conducted testing of a novel conceptual model towards understanding the physicians prescribing behavior mainly from urban centers showed that marketing efforts, patient characteristics, drug characteristics, cost-benefit ratio, trustworthiness, and physician's persistence consist of both psychological and behavioral factors to comprehend the physician's decision to prescribe the drugs.

However, the predictive control of TPB, SR theory, persuasive theory, social power theory, and agency model does not consider personality in their model. Hence understanding the role and impact of physicians' personalities on their prescribing behaviour will help towards improving awareness and dynamics of the prescribing decision process.

(Hansen et al, 2016) The systemic review of factors influencing the successful prescription decisions by physicians confirmed that multiple factors were influencing prescribing behavior of physicians, such as external factors, coordination and collaboration among medical team members, line of reporting, and patient plus individual factors. The summary of all the studies is shown in the table below 2.3.1.

S. No	Tag	Title	Author & Year	Gist	Relevance to the study
1	Journal Research Article	Investigating the Factors Affecting Doctor's Prescribing Behavior in Jordan: Anti-Hypertensive Drugs as an Example European Journal of Social Sciences. Vol. 38 No 3 May 2013, 380 – 391.	E Abulhaj, rahim Alabbadi, (2013).	Strong correlation confirming physician's prescribing behavior concerning factors.	Provided background for hypothesis on Physician's Prescribing behavior.
2	Journal Research Article	Conceptualization of branding: strategy based on the Indian pharma sector. International Journal of Pharmaceutical & Healthcare Marketing, Vol. 7 No. 2, 2013, 175-198,	Nath Sanyal, S., Datta, S.K.& Banerjee AK, (2013).	Significant correlation confirming Physician's Prescription decision concerning elements of a brand in a branded generic from India.	The impact of emotional branding apart from a scientific understanding of the drug, in the presence of alternatives influencing the physician's Prescribing behavior, needs to be assessed.
3	Journal Article	Moderating effects of contextual factors on the relationship between pharmaceutical marketing strategies and physician prescription decision: A review. Tropical Journal of Pharmaceutical Research July 2016; 15 (7): 1559-1568	Mohsen Ali Murshid, Zurina Mohaidin & Goh Yen Nee, (2016)	Physicians' Prescription behavior is influenced by marketing efforts in developing countries.	The impact of marketing efforts and their relation with contextual factors need to be assessed.
4	Systemic review	Factors Influencing Successful Prescribing by Intern Doctors: A Qualitative Systematic Review Pharmacy (Basel). 2017 Jun; (2): 32.2-9	Christina R, Hansen, Colin P Bradley & Laura J Sahm, (2016)	Significant correlation confirming physician's prescribing behavior is influenced by multiple factors	The existence & impact of educational interventions on physician's Prescribing behavior need to be probed
5	Research Article	Social and behavioral theories and physician's	(Ahmed RR et al, 2020)	Research showed that marketing efforts, patient	Background to the study. physician's psychological and

		prescription behavior. Sustainability, 12(8), 3379.		characteristics, drug characteristics, cost-benefit ratio, and physician persistence were, followed by trustworthiness.	behavioral factors to comprehend the physician’s decision to prescribe the drugs. questionnaire-based on literature research has been adopted as TPB, SR theory, and Persuasive theory did not consider personality in their model. Hence incorporating our study will share the dynamics of the prescription process.

(Table 2.3.1: Summary of studies on physician’s prescribing behaviour.)

The physician's personality is one of the factors influencing the prescribing decision, according to research from Jordan (Alabbadi I et al, 2013). (Ahmed RR et al, 2020) the model explained the prescription behaviour among urban physicians and demonstrated that factors like marketing efforts, patient characteristics, drug characteristics, cost-benefit ratio, and physician’s persistence, are followed by trustworthiness.

About the physician’s psychological and behavioral factors to comprehend the physician’s decision to prescribe the drugs. However, the predictive control of TPB, SR theory, persuasive theory, social power theory, and agency model does not consider personality in their model. Understanding the role and impact of each one of their personality traits in the presence of external factors with each other will help a lot towards a better understanding of physician's prescription behavior (Datta SK et al, 2013) research from India demonstrated that emotional branding influences physician's prescribing decision apart from the scientific understanding of a drug.

Hence, Understanding and identifying the most influencing personality traits of the physician, eliciting feelings as well as other crucial aspects will enable better understanding with a significant correlation establishing the relationship between emotions and their relation to the physician's personality.

(Murshid et al, 2016) Their research study reaffirmed that the factors affecting the physician's prescription behavior expressed the need for further investigation on the extent of influence of contextual factors like drug attributes and physicians' persistent behavior towards the prescription choice of a drug. (Hansen et al, 2016) in their systemic review, confirmed the influence of multiple factors on physician prescribing behavior in a complex operating environment, and highlighted that apart from addressing the presumed knowledge gap of physicians, the research emphasized one need and deployment of educational interventions which are physician-specific and unique, derived from their natural make-up, of which personality is made up of.

2.3.2 Impact of Product-related Factors on physician's prescribing behaviour:

Previous research findings indicate the impact of different elements constituting product-related factors on the physician's prescribing behaviour. Product elements comprised of the product's attributes and benefits in terms of therapeutic response, relative advantage, cost-effectiveness, in terms of compliance, or treatment adherence were found to influence physicians prescribing behaviour.

As indicated by various researchers (Miller et al, 1973) (Philips LD et al, 1984) and (Fremantle et al, 2002) concerning the components of the product's characteristics like, the active ingredients, evidence of product efficacy, patient characteristics, presence of side effects for the drug, successful self-use of product, product abuse potential, confidence in manufacturer, availability of the product in the community pharmacies, cost of the drug to the patient and range of dosage forms available for the product were found to influence physician's prescribing decision (Sweileh et al, 2004).

In addition to these product-related characteristics, the clinical effectiveness of a drug has also emerged as one of the most important factors for consideration among physicians for prescribing a drug to patients as emphasized in the research conducted in Cyprus and Greece (Theodorou et al, 2009). Research from Romania further reiterated the importance of drug characteristics like the increased quality of a drug (active ingredients) constituting a key priority influencer for a physician's prescribing decision, apart from other factors like the patient state and physician's professional background (Luminauminta Mihaela, 2013).

Apart from the above product elements constituting product-related factors such as efficacy and quality, they were followed by price (affordability) and the value for money along with the reputation of the promoted organization were found to be critical in influencing the physician's prescribing decision from the research conducted in Sri Lanka and Bangladesh (Sayandhan et al, 2013) and (Biswas et al, 2016).

Studies confirmed that in addition to product elements like quality, efficacy, and Price, factors related to pharmacodynamics and pharmacokinetics were found to be kept in mind by physicians while taking the prescribing decision of a drug which are in the benefit of the patients. The pharmacodynamics factors include absorption, distribution, metabolism, excretion, action, safety, affordability, guideline recommendation, psychological expectations, and patient adherence, as found in a study with a sample size of 100 physicians from Lahore, Pakistan (Saleem et al, 2016) and equally pharmacokinetic factors were important, as the product with low efficacy, low bioavailability, and pharmacokinetic characteristics was excluded in the competitive environment of pharmaceutics leading decrease in visibility and the chance of being prescribed by physicians as confirmed from the research study from Iran (Sharifnia et al, 2018). The summary of all the studies is shown in the table below 2.3.2.

No	Tag	Title	Author & Year	Gist	Relevance to the study
1	Original article	Main Factors Affecting Physicians' Prescribing Decisions: The Iranian Experience. Iranian Journal of Pharmaceutical Research (2018), 17 (3): 1105-1115	Sharifnia SH et al (2018)	Physicians Paid attention to the products' characteristics while prescribing a medicine.	The existence and the impact of Product related factors in Physician Prescription decisions. However, the impact of these factors is to be assessed w.r.t the Indian context.
2	Short Communication	Prescribing patterns: A key factor in rational use of drugs in Lahore, Pakistan. International Current Pharmaceutical Journal, November 2016, 5(12): 118-119	Saleem et al (2016)	The study revealed a significant correlation between product-related factors like ADME, action, and safety, being kept in mind by physicians while taking the prescribing decision	The existence and the impact of elements comprising ADME from Product-related and its impact on other factors in the Indian context need to be assessed.

3	Research Article	Influence of Marketing Mix in Prescribing Pharmaceutical Products by Ophthalmologists in Sri Lanka. Tropical Agricultural Research. Vol 20:260-268(2013)	T. Sayandhan, et al. (2013)	The study showed that Product-related factors comprising product efficacy and quality were the most critical factors in specialist physicians' prescribing decisions apart from other factors.	Assessing product-related factors based on Quality and efficacy among multiple specialists in the presence of other factors towards physician's prescribing decision from the Indian context.
4	Research Article	Influence of pharmaceutical marketing on Prescription practices of physicians. PARIPEX - INDIAN JOURNAL OF RESEARCH Volume: 4 | Issue: 9 | Sept 2015, 133-134	Gyaneshwari, et al. (2015)	The study concluded that physicians prescribing decision is based on product purity and company image apart from other factors.	Assessing the impact and influence of Product characteristics with other factors among specialists across various geographies will enable a better understanding of the factors affecting the physician's prescribing decision.
5	Research Article	Influence of pharmaceutical marketing on prescription practices of physicians. Journal of the Indian Medical Association, 111 (1), 2013	Roshni Narendran M, et al. (2013)	The study revealed that among all the factors, Product Quality and good company image are still factors that influence physicians' prescription decisions.	A study assessing the influence of product characteristics and its impact on other factors among specialist physicians of various practice set-ups like Primary care/ secondary care will enhance a better understanding of the factors and their priority in the prescribing decision concerning the Indian perspective.
6	Research Article	Factors influencing GPs' choice between drugs in a therapeutic drug group. A qualitative study Scandinavian Journal of Primary	Busman A et al. (2007)	The study showed that GPs consider efficacy & price as important factors when they choose drugs in a	Application and assessment of GP's balance of both internal and external factors when choosing between analogs, among Indian specialists will enable in

		Health Care, 2007; 25: 208-213		therapeutic drug group. GPs balance both external factors outside their control and internal factors related to the consultation when choosing an analog. Internal factors: ideal prescribing and their perceptions of patient adherence, expectations, and circumstances.	the identification of the important factors when physicians choose a drug in a therapeutic group.

Table 2.3.2: Summary of studies on Product-related factors influencing physician's prescribing behaviour

(Sharifnia et al, 2018) indicated that the factors influencing the overall physician's prescribing decision, namely, environmental factors, pharmaceutical marketing strategies, and Product characteristics in a market that is driven by innovator brands with patient insurance coverage. There is a need to assess the exact effect of the above factors with more focus on the physicians into groups, towards improved understanding at the physician level, which is relevant to the Indian context as the market is dominated by branded generics, and most of the patients pay their treatment charges by themselves.

(Busman A et al, 2007) from their study comprised of British physicians, further indicated the importance of product efficacy and balancing both external and internal factors towards their prescribing decision.

Hence, assessing the impact of product efficacy and its influence on both external and internal factors among Indian specialists will help towards a better understanding of physicians' prescription behaviour.

(Saleem et al,2016) in their research among 100 Lahore physicians, emphasized the physician's psychological expectations on their prescribing decision apart from considering the specific product-related factors ADME, guidelines recommendations of the drug for their prescribing decision. Further research toward deeper understanding with optimal resource deployment can strengthen their understanding of physicians' psychological components along with their influence or better understanding of physicians' prescribing decisions.

(Sayandhan T et al, 2013) their research involving ophthalmologists from Sri Lanka assessed the factors in prescribing pharmaceutical products and confirmed that product efficacy and quality were the most critical product-related factors in addition to the empathetic nature of physicians relating to their attitudes, motives, interests, and expectations.

Assessing the impact of product-related factors along with other factors in the Indian context can enhance a better understanding of factors influencing physicians. (Gyaneshwari et al, 2015) and (Narendran RM et al, 2013) in their research confirmed that product purity and the promoted organizational image were as important as product-related factors influencing physicians' prescribing decisions. Assessing and understanding the impact of product-related factors like product purity with other factors, in a large dispersion of specialist physicians, across various geographies with various practice set-ups, will enable a better understanding of factors affecting physician prescribing decisions in an ever-changing dynamic market.

2.3.3 Impact of Product Promotional Factors on physician's prescribing behaviour:

The prescription of a drug by a physician has always been the objective and the source of revenue for pharmaceutical organizations. Physicians' prescribing decision is influenced by the marketing strategies of pharmaceutical organizations, with the deployment of various types of promotional tools aiming for branded drug promotion, which are acted upon, by a team of professionally qualified and trained sales executives.

The primary objective of brand promotion to physicians has always been on improving awareness and perception of the promoted brand over the existing options, in addressing the patient healthcare challenges with a secondary objective of promoting sales and increasing revenue for the organization.

(Vishnu Parmer et al, 2014) their research assessed the factors influencing the prescription behavior of physicians, showed and that two factors impact a lot more than any other factor, including the promotional tools deployed as a part of marketing strategies by the promoted brand organization through sales representatives and the other one is new drug introduction in the market. The promotional tools are designed based on 4Ps like product, place, promotion, and price, aiming to motivate physicians leading to their stimulation of behavioral change in their prescription pattern for the promoted brand.

(Boltri et al, 2002) and (Theodorou et al, 2009) In their research findings, indicated the impact of different elements of Product Promotion on physicians' prescribing decisions.

(Gibbons et, al,1998) their research showed the preference of specialists for scientific dissemination at major conferences which was found to help towards updating their knowledge and enabling them to make an appropriate prescribing decision over compliments that they receive from Sales Representatives representing a pharmaceutical company during the brand promotion. However (Boltri et al, 2002) in their research confirmed that in the case of general physicians, there was a significant influence of promotional tools like gifts over scientific dissemination tools for their prescribing decision.

(Wazana et al, 2000) their review comprising 29 studies investigated the extent and impact of the relationship of Sales representatives from the industry on physician's attitudes, knowledge, and behavior, revealed that Physician's interactions with Sales representatives were associated with the latter's request for incorporation of the drug/ brand in the hospital formulary leading to change in the physician's prescribing behavior.

(Hengartner MP et al, 2022) (Kling, S et al, 2022) and (Riggs JF et al, 2016) in their research investigated the relationship and its impact on achieving the balance between the physician and pharmaceutical industry bridged by sales representatives in the form of sales/ revenue, which is the result of physician's prescribing decision, has shown that attending Pharmaceutical Company-sponsored CMEs, International speaker symposiums, Symposiums (lodging), gifts, and funding physicians as speakers lead to an increase in the prescription of sponsored company brands with an increase in drug prescription.

(Brett AS et al.2003) from their hospital-based research reiterated that both experienced and inexperienced physicians continue to have a permissive view about a variety of marketing activities and their relationship with pharmaceutical organizations.

(Gallen, AS et al.2004) in their review of identifying factors that influence Physician's Prescribing of Pharmaceuticals, identified several factors which were part of the pharmaceutical marketing mix, comprising Peer influence, Financial and managed care considerations, pharmaceutical representatives, and drug samples.

(Chew LD et al, 2000) their review analyzed the effect of drug sample availability on physician's prescribing behavior and found that the most accepted view was medicines as free samples are beneficial to the patients and indirectly the good caring response comes from the physicians to their patients, that's why it should be reconsidered as an important element of promotional mix towards influencing the prescription behavior of physicians.

(Morgon MA et al, 2006) their research assessed the impact of physicians' interaction with industry on their prescribing behavior and concluded that physicians would act in acby they think is proper while accepting incentive items from pharmaceutical representatives. The research has shown that accepting free drug samples was appropriate more often than any other item, thereby making them commonly judged to be influential on physicians prescribing practices.

(Mamas Theodorou et al, 2009) assessed factors influencing prescribing behavior of physicians from Greece and Cyprus through a questionnaire-based survey had shown that the most important factors considered by physicians when they prescribe drugs are drug Clinical effectiveness – a product-related factor and Sales representative as their main source of promoted drug/ brand information, right after scientific or medical journals in the case of a new drug, as they don't trust the process and certification for generic products.

(Warrier R et al, 2010) their systemic review further confirmed that Physicians prescribing decisions were more towards promoted brands with extensive sampling and their inclination towards prescribing generic drugs, OTC drugs, and cheap drugs reduced drastically. (Oshikoya KA et al, 2011) their research assessed the sources of drug information and their influence on the Physician's prescribing behavior from a teaching hospital.

The research showed that, for the information on drugs, physicians' sources of information were colleagues, books, Journals, the internet, scientific papers, drug promotion forums/ new product launches, and pharmaceutical sales representatives-PSRs. In addition to this nearly, 50% of physicians acknowledged that sales representatives as an accurate and reliable information resource on drugs, and they increased physician's awareness of the promoted drugs, as a result, physicians acknowledged their prescribing behaviors were influenced by information from sales representatives representing a pharmaceutical organization.

(Ibrahim Alabbadi et al. 2013) Investigated the factors affecting Jordanian physician's prescribing behaviour with Anti-hypertensive drugs as an example has found that marketing strategies which include interaction and gifting along with Physician's Professional factors and Physician's personality factors are the most important factors considered by physicians in Jordan when they prescribe drugs regardless of drug characteristic.

(Saad Shamin-ul Haq et al, 2014) their research indicated that certain factors, which influence the prescription behavior of physicians such as the introduction of new drugs in the market, brand Perception and sponsorship to conferences, Promotional tools, and drug samples. The research has further confirmed that the influence on physicians for a promoted drug/brand's prescription heavily depends on how the salesperson promotes their brand to the physician. (Ibrahim I et al, 2015) their research assessed the impact of pharmaceutical sales representatives on the prescription decisions among Sau and confirmed that 57% of physicians among the participants strongly agreed that frequent visits from pharmaceutical sales representatives are an important factor in physicians' drug selection with leaflets being the most effective reminder method of drug promotion.

(Ehab Mudher Mikhael et al, 2014) Their research assessed the gift acceptance and its effect on prescribing behavior among Iraqi Specialist Physicians and found that physicians were not brand consistent as they exhibited a habit of shifting either from brand to generic or generic to another generic, with promotional strategies like gifting from the pharmaceutical companies even in the absence of clinical evidence about drugs efficacy and safety.

(Kumar R et al, 2016) their research assessed the physician's prescription behavior with a branded drug over its generic alternative and has concluded, that, physicians prescribe drugs by brand name believing it to have better efficacy and reliability regarding product-related factors and the incentives that are given to the physicians, which constitute the marketing mix elements for the pharmaceutical organizations. Also seems to be the reason behind the brand name being mentioned in the prescription.

(Zaigham Ali et al, 2016) conducted research on measuring the change in prescribing behavior of physicians by using pharmaceutical industry promotional tools has also further confirmed that sponsoring physicians to a conference or taking care during the conferences, discussing the brand through the scientific literature, and common point discussion is found to influence physician in taking a prescribing decision, whereas sales representatives personal touch, and personal selling doesn't impact physician's prescribing behavior.

(Lofty et al, 2016) conducted a systematic review on the Knowledge, beliefs, and attitudes of physicians in 6 low and middle-income countries regarding interacting with pharmaceutical companies, highlighted that physician's main intention with pharmaceutical companies backed promotion is to get the latest information on drugs, disease management in the form of CMEs, conferences, and rewards offered by pharmaceutical promotion.

The review also confirmed that the physician's perception of interaction with the pharmaceutical companies does not find to influence their prescribing behavior. (Biswas K et al, 2016) performed a cross-sectional study to assess the influence of pharmaceutical marketing on the prescription behavior of Bangladeshi physicians. The study has confirmed that a sales representative's personnel activity, relation, and reputation of the company influence the prescription behavior of a physician. That's why pharmaceutical marketing influences the prescription behavior of physicians greatly. The research also acknowledged that the public relation" strategy was found to be the most effective strategy that influences a physician's prescription remarkably while "the advertisement" of the pharmaceutical products in a journal or other printing object attracts the physician concentration least.

(Miller S et al, 2017) in their research focusing on the drug firm's payments and physician's Prescribing behaviour, further concluded that those physicians receiving payments from pharmaceutical companies prescribed higher-quality drugs on average, and in the case of physicians receiving payments from the firms experiencing the patent expiry, physicians were quick enough to migrate in prescribing generic equivalent to their patients, which is in line with physicians who do not receive payments.

(Fickweiler F et al, 2017) in their systemic review has further shown that Physician–pharmaceutical industry and its sales representative's interactions and acceptance of gifts from the company's PSRs have been found to affect physicians' prescribing behavior and are likely to contribute to irrational prescribing of the company's drug. (Fugh-Berman A et al, 2018) their research further confirmed that Promotion has been shown to increase physicians' prescription of targeted drugs, and increases prescription costs, as drug samples are among the most effective marketing tools that companies have. Sales representatives may bear food, gifts, or money-making opportunities, all of which influence physicians. Gifts do not need to be large to have a powerful effect on human relationships. The study found that promotional strategies vary by country but the use of pharmaceutical salespeople (drug reps) and KOLs is common in many countries.

(Shamsi HAS et al, 2019) Their research evaluated the impact of promotional drug literature provided by a medical representative on a physician's prescription decisions at a tertiary care hospital has found that the drug information provided in the promotional brochures can be incomplete and unreliable with questionable credibility. Hence a physician should not rely solely on brochures. They must undergo a strict process of assessment regarding the information provided, especially related to efficacy and safety.

(Avituv FE et al, 2020) their research performed a Comparison of gift acceptance by physicians from two different specialties namely psychiatry and general medicine. The study revealed that Psychiatrist's offices have a greater number of gifts as they are perceived as friendly by pharmaceutical representatives. Moreover, the presence of these ''small gifts'' in the physician's room may influence patients' perception of the physician. Many physicians think that they cannot be influenced by gifts. However, when physicians accept such gifts, they are perceived to offer lower-quality care.

(Taneja, et al. 2008) their research conducted in India assessed the impact of the different kinds of promotional tools offered by the pharmaceutical industry on the prescribing behaviour of physician's research has revealed that physicians have classified promotional tools into 5 types, which included personal selling, sponsorships, educational promotional tools, scientific promotional tools, and personal touch. Physicians' perception towards personal selling was independent of demographic factors concerning sponsorship, physicians with higher income are more receptive in comparison to lower income whereas, with respect to educational promotional tools, private serving physicians have shown greater inclination in comparison to physicians from the government sector.

(Waheed KA et al, 2011) conducted an empirical study in assessing the prescription loyalty behavior of Indian Physicians. The major two findings affecting physicians prescribing loyalty behavior are, Tangible rewards to physicians by the pharmaceutical companies and the professional values of sales representatives. Factors like PSR Personality, drug quality, and corporate reputation were not supportive of influencing physicians prescribing behavior in this study.

(Bamoriya H et al, 2012) explored marketing factors influencing physician's prescription behavior using the AHP approach and found that availability of a brand, relationship marketing, Sampling efforts, and physician's professional factors like lengths of practice & patient volume has a significant influence on physicians' perception of marketing factors.

(Kasliwal N, et al. 2013) several factors which vary from medical to psychosocial factors. (Engagement, Sales representative quality & effect). The study reveals that the impact of these psychosocial factors varies across different demographic characteristics of the physician and young physicians are more influenced by them as compared to senior physicians. (Roshni Narendran M, et al. 2013) had shown in their research Professional Sales Representatives showed good rapport with the physician towards arranging launch meetings, the reputation of the company and product factors like quality of the drug and brand names significantly influenced prescription behavior, while direct mailers, advertisements in journals, and giving letters pads and other brand reminders were less effective. Product quality and good company image continue to influence physicians prescribing decisions.

(Datta SK et al, 2013) their research confirmed the role and importance of branding with physicians paying attention to the scientific understanding of the promoted brand apart from emotional branding elements. (Gupta et al, 2018) further confirmed, that the pharmaceutical communication strategic impact was similar both in urban physicians and rural physicians except for e-mailing which had more impact on urban physicians.

(Krunal V et al, 2020) Concluded that the significant positive impact of 4 promotional tools MRS brand detailing, CME, conducting camps, and CRM (customer relationship management) activities on their prescription behavior among Indian physicians whose practice is more or less very close to that of general physicians. (Rahul S et al, 2022) from their critical review of

Indian physicians, pharmaceutical marketing on physician's prescribing behavior has indicated how pharmaceutical organizations target physicians with various types of marketing tools like medical publications, organizing seminars, conferences in India or abroad, gifts, and sometimes incorrect information through their MRS to influence physician prescription for their promoted brand. The summary of all the studies is shown in the table below 2.3.3.

No	Tag	Title	Author & Year	Gist	Relevance to the study
1	Original article	Factors Influencing Prescribing behavior of Physicians in Greece and Cyprus: results from a Questionnaire-based Survey, BMC Health Services Research, Biomed Central, 2009,9,150	Mamas Theodorou et al (2009)	The most important factors considered by physicians when they prescribe drugs are a) Drug Clinical effectiveness b) Sales Rep as the main source of information right after scientific or medical journals in the case of new drug c) Not trusting the process of approval and certification for generic products	Understanding the impact of these important factors in the Indian context, from Physicians of various practice set-ups will help marketers for developing customer-centric marketing strategies for efficient allocation of resources
2	Research Article	To study the prescription behaviour of physicians regarding brand and generic names. International Journal of Basic Clinical Pharmacology. 2016, Aug; 5(4):1327-1330	Kumar R et al. (2016)	The study concluded that physicians prescribe drugs by brand name, believing it to have better efficacy and reliability, and the Incentives given to physicians by pharmaceutical companies as their marketing strategy also seem to be the reason behind brand name prescribing.	Studying the impact of Brand name along with other Marketing mix factors with physician's personality traits in taking a prescribing decision of a brand from an Indian context.
3	Research Article	Drug Firms' Payments and Physicians' Prescribing Behavior in Medicare Part D	Miller et al. (2017)	The study concluded that physicians receiving payments from pharmaceutical companies prescribed higher-quality drugs on average and in the case of physicians receiving payments from the firms experiencing the patent expiry, they were quick enough to migrate in prescribing generic equivalent to their patients, which is in line with	Studying the impact of pharmaceutical marketing incentives along with Physician's attributes & Personality traits on their prescribing behaviour in the Indian context will give and depth impact on the

				physicians who do not receive payments.	physican’s a whole for better understanding.
4	Review Article	Factors That Influence Physicians’ Prescribing of Pharmaceuticals: A Literature Review. Journal of Pharmaceutical Marketing & Management, Vol. 16(4) 2004	Gallen As et al (2004)	The review has identified several factors part of the pharmaceutical marketing mix, that are found to be influencing the physicians prescribing behavior namely: Peer influence, Financial and managed care considerations, pharmaceutical representatives, and drug samples.	Studying the impact of these pharmaceutical marketing mix elements along with physicians’ personality traits from an Indian Perspective can enhance the knowledge of factors influencing towards prescribing decision of a physician.
5	Research Article	Measuring the change in Prescribing Behaviour of Doctors by using pharmaceutical industry promotional tools. Sci.Int.(Lahore),28(5), 87-94,2016	Zaigham Ali et al (2016)	The study has found with sponsoring physicians to a conference or taking care of conferences, discussing the brand through the scientific literature, and Common Point discussion are found to influence physicians in taking a prescribing decision, whereas MR's personal touch and personal selling don’t impact physicians prescribing behavior.	Studying the impact of physician’s conference sponsoring with other factors towards prescribing decision of a physician w.r.t Indian context.
6	Systemic Review	Effect of drug sample availability on physician prescribing behavior: A systematic review. Clinical Reviews and Opinions Vol. 2(4), pp. 41-48, November 2010	Warrior R et al (2010)	Physicians prescribing decisions were more towards promoted brands with extensive sampling and their inclination towards prescribing generic drugs, OTC drugs, and cheap drugs reduced drastically.	Studying the impact of Physician Samples along with other product promotion mixes from specialists across various geographies will enable for better understanding of the factors that affect physicians’ prescribing decisions.
7	Systemic review	Knowledge, beliefs, and attitudes of physicians in low and	Lofty et al (2016)	10 Studies from 6 countries included in this review highlighted that physicians’	Studying the impact

		middle-income countries regarding interacting with pharmaceutical companies: a systematic review. lofty et al. BMC Health Services Research (2016) 16:57		main intention with pharmaceutical companies-backed promotion is to get the latest information on drugs, and disease management in the form of CMEs, conferences, and rewards offered by pharmaceutical promotion. The review also confirmed that the physician's perception of interaction with the pharmaceutical companies does not find to influence their prescribing behavior.	of pharmaceutical interaction and physicians' personality traits with the help of validated instruments from specialists across various geographies will enable for better understanding of the factors that affect physicians' prescribing decisions.
8	Research Article	Mystery Written on Prescription Pads: Exploring Marketing Factors Influencing Prescription Behaviour using the AHP Approach. Journal of Economics and Business Research, Year XVIII, No. 2, 2012, pp. 85-100	Bamoriya H et al. (2012)	Availability of a brand, relationship marketing, Sampling efforts, lengths of practice & patient volume has a significant influence on doctors' perception of marketing factors	Studying the impact of the described promotion mix elements among Indian specialists of the same therapeutic area whose prescribing decision is important for a brand's progress in its life cycle.
9	Original Article	Gift Acceptance and Its Effect on Prescribing Behavior among Iraqi Specialist Physicians. Pharmacology & Pharmacy, 2014, 5, 705-715	Ehab Mudher Mikhael et al. (2014)	The study found that physicians prescribing behavior were not brand consistent as they exhibited a habit of shifting either from brand to generic or generic to another generic, with promotional strategies like gifting from the pharmaceutical companies even in the absence of clinical evidence about drug efficacy and safety.	Studying the impact of the marketing mix elements along with other factors, including physicians' personality traits among specialists from India, with a large sample size along with practice set-up and place of practice will give an in-depth understanding of physicians prescribing decisions.

10	Essay/ Review	How drug companies manipulate prescribing behavior. Colombian Journal of Anesthesiology. 2018;46(4):317-321	Fugh-Berman A et al. (2018)	Drug samples are among the most effective marketing tools that companies have. Drug reps may bear food, gifts, or moneymaking opportunities, all of which influence physicians. Gifts do not need to be large to have a powerful effect on human relationships. The study found that promotional strategies vary by country but the use of pharmaceutical salespeople (drug reps) and KOLs towards shaping the perceptions of a drug's benefits and harms, as well as perceptions about competing drugs. The promotion has been shown to increase physicians' prescription of targeted drugs and increases prescription costs.	Studying the impact of PS/GIFTS/ KOL's peer to Peer influence, along with other pharmaceutical marketing mixes with an Indian Perspective on their prescribing behavior among specialists will give us an in-depth understanding.
11	Original Article	Interactions of doctors with the pharmaceutical industry. J Med Ethics 2006; 32:559–563. DOI: 10.1136/jme.2005.014480	Morgon MA et al. (2006)	Would act by what they think is proper regarding accepting incentive items from pharmaceutical representatives. Although accepting free drug samples was appropriate more often than any other item, samples were most judged to be influential on prescribing practices	Studying the impact of physician samples along with other pharmaceutical marketing mix elements among specialists from the same therapeutic class from an Indian perspective can help towards a better understanding of factors affecting prescribing decisions.
12	Research Article	Interactions between physicians and the pharmaceutical	Fickweiler F et al (2017)	Physician–pharmaceutical industry and its sales representative's interactions	Studying the impact of PS/GIFTS, along

		industry generally and sales representatives specifically and their association with physicians' attitudes and prescribing habits: a systematic review. BMJ Open 2017;7: e016408. doi:10.1136/ BMJ open-2017-016408		and acceptance of gifts from the company's PSRs have been found to affect physicians' prescribing behavior and are likely to contribute to irrational prescribing of the company's drug	with other pharmaceutical marketing mixes, on their prescribing behavior among specialists concerning the Indian context will give us an in-depth understanding.
13	Original Article	Influence of Pharmaceutical Marketing on Prescription Behavior of Physicians: A Cross-sectional Study in Bangladesh. J Account Mark 2016, 5:2	Biswas K et al. (2016)	The study has confirmed that sales personnel activity, personal res, product quality, and the reputation of the company influence the prescription behavior of a physician. That's why pharmaceutical marketing influences the prescription behavior of physicians greatly. The research also acknowledged that the public relation" strategy was found most effective strategy that influences a physician's prescription remarkably while "advertisement" of the pharmaceutical products in a journal or other printing object attracts the physician concentration least	The impact of sales executives on product promotion among specialists belonging to the same therapeutic segment along with other factors will enhance understanding of the factors affecting the physician's prescribing decision
14	Research Article	Factors Influencing Prescribing behavior of Physicians in Greece and Cyprus: results from a Questionnaire-based survey, BMC Health Services Research, Biomed Central, 2009,9,150	Mamas Theodorou et al. (2009)	The most important factors considered by physicians when they prescribe drugs are a) Drug Clinical effectiveness b) Sales Rep as the main source of information right after scientific or medical journals in the case of new drug c) Not trusting the process of approval and certification for generic products	Understanding the impact of these important factors in the Indian context, from doctors of various practice set-ups will help marketers for developing customer-centric marketing strategies for efficient allocation of resources
15	Research Article	Investigating the Factors Affecting Doctor's Prescribing	Ibrahim Alabbadi	The most important factors considered by physicians in Jordan when they prescribe	Understanding & determining the impact of these

		Behaviour in Jordon: Anti-Hypertensive Drugs as an Example. European Journal of Social Sciences. Vol 38, No-3, May 2013, PP 380-391	et al. (2013)	drugs are Drug Price awareness, Patient expectation, doctors' Personality, and Marketing Strategies which includes Interaction & Gifting regardless of drug characteristic	most important factors in the Indian context which are being considered by physicians for selecting the drug to be prescribed in various types of practice will help the marketer, identify & develop customer-centric activities leading to doctor's prescription.
16	Research Article	A Study of Psychosocial Factors on Doctors Prescribing Behaviour – An Empirical Study in India. IOSR Journal of Business and Management, Vol 13, Issue-2, Sep-Oct 2013, PP 05-10	Dr. Neeti Kasliwal (2013)	Prescribing behaviour is a complex activity involving the interplay of several factors that varies from medical to psychosocial factors. (Engagement, Medical representative quality & effect). The study reveals that the impact of these psychosocial factors varies across different demographic characteristics of the doctor and young doctors are more influenced by them as compared to senior doctors.	Understanding the impact of these psychosocial factors, among specialist physicians across will enable the marketer for developing effective marketing strategies in the w.r.t Indian context.
17	Research Article	Prescription Loyalty behavior of Physicians: an empirical study in India. International Journal of Pharmaceutical and Healthcare Marketing. Vol 5, No-4, 2011, 279-298	Waheed KA et al. (2011)	The Major 2 findings affecting physicians prescribing loyalty behavior are, a) Tangible rewards to physicians by the pharmaceutical companies b) Professional values of PSR. Factors like PSR Personality, Drug quality, and corporate reputation were not supportive of influencing physicians prescribing behavior in this study.	Replication of the study further in the Indian context with the target audience from primary & secondary set-ups can offer more insights leading to the effective development of marketing designs.
18	Research Article	Conceptualization of Branding: Strategy based on the Indian Pharma sector.	Saroj Kr Datta, et al. (2013)	Most of the big pharma brands in India are branded generics. As Indian Pharma is price sensitive and many	A clear understanding of emotional elements that effects

		International Journal of Pharmaceutical and Healthcare Marketing. Vol 7, No-2, 2013, 175-198		alternatives are available to the physicians for prescribing under one category, branding plays an important role. Physicians in India pay attention to the emotional branding elements, apart from the scientific understanding of a drug.	prescribing behavior of physicians based on their personality and type of practice will enhance marketers for better understanding, leading to the formulation of effective marketing communications.
19	Research Article	Influence of pharmaceutical marketing on prescription practices of physicians. Journal of the Indian Medical Association, 111 (1), 2013	Roshni Narendran M, et al. (2013)	The study revealed that Professional Sales representatives with good rapport with the doctor, arranging launch meetings, the reputation of the company, quality of the drug, and brand names significantly influenced prescription behavior, while direct mailers, advertisements in journals, and giving letter pads and other brand reminders were less effective. Product quality and good company are still factors that influence prescription.	A study on both physicians' personal, professional & Patient expectations from physicians, will enhance more clarity on the priority of the said parameters w.r.t the Indian Perspective.
20	Research Article	Pharmaceutical Representatives and Prescription Decisions by Physicians in Saudi Arabia. Journal of Marketing Management. December 2015, Vol. 3, No. 2, pp. 69-79	Ibrahim I et al. (2015)	The study confirmed that 57% of physicians in Saudi Arabia are among the participants who strongly agreed that frequent visits from pharmaceutical sales representatives are an important factor in physicians' drug selection with leaflets being the most effective reminder method of drug promotion.	A further study from government, private and Indian clinics will further enhance the clarity on the effect of medical representative visits apart from understanding physician's personal & Professional factors.
21	Research Article	Factors Influencing Prescription	Saad Shamin-ul	The study has indicated certain factors, which	A brief understanding of

		Behaviour of Physicians. The Pharma Innovation Journal 2014;3(5):30-35	Haq et al. (2014)	influence the prescription behavior of physicians such as new drugs in the market, Brand Prescription, sponsorship of conferences, Promotional tools, and drug samples. Influence heavily depends on how the salesperson promotes their brands.	the Indian set-up, and the effect of promotional tools both in Primary care / secondary care, with the help from the marketers in better understanding of physician's prescription behavior from specialties
22	Research Article	Sources of drug information and their influence on the prescribing behavior of doctors in a teaching hospital in Ibadan, Nigeria Pan African Medical Journal. 2011; 9:13	Oshikoya KA et al. (2011)	The study has indicated that concerning the information on drugs physicians' sources of information were colleagues, books, Journals, the internet, scientific papers, drug promotion forums/ new product launches, and pharmaceutical sales representatives-PSRs. In addition to this, nearly 50% of physicians acknowledged that PSRs were an accurate and reliable drug information resource; PSRs increased their awareness of the promoted drugs, and their prescribing behaviors were influenced by information from PSRs.	Studying the impact of these factors among physicians from various locations of practice along with other factors constituting the marketing mix, product-related factors, and Physician Personality concerning the Indian context will enable for an in-depth understanding of factors affecting physicians prescribing behaviour.
23	Research Article	Impact of Pharmaceutical Industry Promotion Mix on Doctor's Prescribing Behaviour on Doctor's Prescribing Behaviour. Asia-Pacific Business Review Vol. IV, No. 4, October - December 2008 pp. 82-95.	Taneja G (2008)	The study reveals that doctors have classified promotional tools into 5 types, which include, Personal selling, sponsorships, educational promotional tools, scientific promotional tools, and personal touch. The perception of doctors towards personal selling, sponsorship, and educational promotional tools is independent of demographic factors. With	Understanding the role and the impact of promotional tools and other factors affecting the physician's prescribing decision can further improve towards effective deployment of tools

				respect to sponsorships, doctors with higher income are more receptive in comparison to lower income, and with respect to educational promotional tools, privately serving doctors are more showing inclination in comparison to government doctors. Touch promotional tools are perceived to be the least influencing factor.	
24	Research Article	Evaluation of promotional drug literature provided by the medical representative at a tertiary care hospital. Int J Pharm Sci Res 2017; 8(4): 1744-50. IJPSR.0975-8232.8(4).1744-50.	Shamsi HAS et al. (2017)	The study concluded that the drug information provided in the promotional brochures can be incomplete and unreliable with questionable credibility. Hence a physician should not rely solely on brochures. They must undergo a strict process of assessment regarding the information provided, especially related to efficacy and safety.	Influence of product promotion by brochures and along with product-related factors, in the presence of other factors among Indian specialists representing different types of practice can further enhance the understanding of the factors affecting physician prescription decision
25	Research Article	Comparative study of the impact of marketing strategies of pharmaceutical houses on prescription practices of doctor's rural vs urban. Int J Basic Clin Pharmacology 2018; 7:1016-9.	Gupta S et al. (2018)	The study has concluded that the pharmaceutical communication strategic impact was similar both in urban and rural except for e-mailing which had more impact on urban doctors.	Understanding the impact of marketing strategies in the presence of patient factors, physician factors, and promotion factors along with the physician's personality will enable to a better understanding of factors influencing the prescribing behavior of the specialist physician
26	Research Article	Minor gifts from pharmaceutical	Avituv FE et al	The study revealed that Psychiatrists' offices have	Understanding the impact of Gifts

		companies to doctors: A comparison between psychiatry and general medicine. Indian J Med Ethics. 2020 Apr-Jun;5(2) NS: 116-9.	(2020)	more gifts as they are perceived as friendly by pharmaceutical representatives. Moreover, the presence of these ‘’small gifts’’ in the physician’s room may influence patients’ perception of the physician. Many physicians think that they cannot be influenced by gifts. However, when physicians accept such gifts, they are perceived to offer lower-quality care	along with other elements of the Marketing Mix/ factors better understanding of factors influencing the prescribing behavior of the specialist physicians belonging to the same therapeutic segment from all geographies.
27	Review article	Physicians and the Pharmaceutical Industry. Is a Gift Ever Just a Gift? JAMA 2000; 283:373-380	Wazana A et al (2020)	The study revealed interactions between the pharmaceutical representative and the physician was associated with the latter’s request for incorporation of the drug in the hospital formulary leading to a change in the physician’s prescribing behavior. Attending company-sponsored CMEs, the company lead ISPs, Symposiums (lodging), gifts, and funding as speakers lead to an increase in the prescription of sponsored company brand with an increase in irrational drug prescription.	Understanding the impact of these Promotion factors and along with the Physician’s Personalities will enable a better understanding of factors influencing the prescribing behavior of the physicians among specialists in the same therapeutic area.
28		Gift Acceptance and Its Effect on Prescribing Behavior among Iraqi Specialist Physicians. Archives of Internal Medicine, 163, 2213-2218	Brett AS et al (2003)	The research wants to find out physicians whether common scenarios involving pharmaceutical marketing were ethically problematic. Despite the recent publicity about ethical problems in relationships between physicians and the pharmaceutical industry, inexperienced and experienced physicians at a single institution continue to have a rather permissive	Understanding the impact of these Promotion factors along with the Physician’s Personalities will enable a better understanding of factors influencing the prescribing behavior of specialist physicians from various practice backgrounds.

				view about a variety of marketing activities.	
29	Original article	European Journal of Molecular & Clinical Medicine, 7(8), 2020.4198-4208.	(Krunal V et al, 2020)	Concluded that the significant positive impact of 4 promotional tools among Indian Physicians whose practice is more or less very close to that of general physicians.	In addition to the identified 4 factors, the other important factors w.r.t MR's efficiency and effectiveness were also incorporated in our research for understanding their influence on physician's prescribing behaviour.
30	*Critical Review*	Exploring The Impact of Pharmaceutical Marketing on prescribing behaviour of doctors in India: A Critical Review. Journal of Positive School Psychology, 3452-3470.	Rahul, S., & Prakash, M. V. (2022)	pharmaceutical marketing has shown an effect of marketing tools on physicians' prescribing behaviour.	Understanding the impact of pharmaceutical marketing factors along with other factors from an Indian perspective will further enhance the understanding of the dynamics of physician's prescribing decision

(Table 2.3.3 Summary of Product-promotional factors on physician's prescribing behaviour)

(Mamas Theodorou et al, 2009) their research investigated the factors affecting physician prescribing behavior of Physicians with an emphasis on Product characteristics and Sales representatives' efforts. Further understanding of an association between physicians' prescribing decisions and physician characteristics like professional and Personal along with physician's various practice set-up profiles from an Indian perspective will lead to an improved understanding of factors influencing physician prescribing decisions leading to interventions and optimal resource utilization.

(Warrier R et al, 2010) their research emphasized physicians prescribing decisions were more towards promoted brands with extensive sampling and their inclination towards prescribing generic drugs, OTC drugs, and cheap drugs reduced drastically across the specialties. Studying a super specialty from a chronic segment would give a better understating of the impact of the product Promotion mix (Physician samples are apart) and their influence on other factors like Product characteristics and physicians' characteristics along with their personality traits from various geographies will enable for better understanding of the factors that affect physician's prescribing decision.

(Oshikoya KA et al, 2011) their research from a Nigerian tertiary hospital confirmed that about 50% of physicians acknowledged pharmaceutical representatives as their reliable source of information for increasing awareness of the drug/ product, towards their prescribing decision among their patients. The commonly used tools include access to books, journals, and scientific papers and organizing meetings with physician's colleague groups, and discussions during drug forums. However (Ketis ZK et al., 2013) in their research studied, the impact of pharmaceutical sales representatives (PSRs) on the prescribing index among Slovenian family physicians (FPs) and found a rare insight into the psychosocial interaction between FPs and PSRs and its possible association with prescribing behavior.

The results of this study indicated that family physician's assessment of MRS does not have any clear associations with their prescribing index. Understanding and studying the impact of the above promotional tools used by pharmaceutical representatives, in the presence of other factors among specialist physicians from diverse practice set-up types (clinics, corporate hospitals, government hospitals) in their prescribing decision from an Indian perspective can further improve on the factors influencing the physician's prescribing decision.

(Ibrahim Alabbadi et al., 2013) their study investigated the factors affecting the prescription behavior of Jordanian physicians practicing at private clinics and hospitals and revealed that marketing strategies, which include gifting, physician-sales representative interaction followed by product characteristics, and physician's personality found to be influencing prescribing decisions.

However, understanding & determining the impact of these most important factors in the Indian context on physicians, even from physicians attached to government hospitals and clinic set-up types will enhance further the understanding of factors affecting physicians prescribing decisions thereby helping the marketer towards arriving, identifying & developing customer-centric activities leading to physician's prescription.

(Ehab Mudher Mikhael et al, 2014) investigated gift acceptance and its effect on prescribing behavior among a relatively low sample size of Iraqi Specialist Physicians and confirmed a positive correlation between gifts on prescribing behavior. (Avituv FE et al,2020) their research assessed the impact of minor gifts from pharmaceutical companies on specialist physicians from psychiatry and general medicine and showed that Psychiatrist was offered a greater number of small gifts due to their friendly nature with pharmaceutical representatives which may influence patients' perception of the physician with respect to the quality of care. Many physicians think that they cannot be influenced by gifts. However, when physicians accept such gifts, they are perceived to offer lower-quality care.

Hence studying the impact of gifts (small/big) constituting one of the main elements of pharmaceutical promotion factor along with other factors, from a sufficient specialist sample size, spread across multiple hospitals, from an Indian context, can further enhance the factors affecting the physician's prescribing decision.

(Saad Shamin-ul Haq et al, 2014) their research further indicated that the prescription behavior of physicians from Karachi city is being influenced heavily by how the pharmaceutical sales representative (PSR) promotes their brands apart from other factors like new drugs/brands introduction in the market, sponsorship to conferences, Promotional tools, and drug samples. (Ibrahim et al, 2015) their research involving physicians from Saudi Arabia showed a positive influence of frequent visits by smart sales representatives to physicians with leaflets as the most effective reminder method of drug promotion.

(Zaigham Ali et al, 2016) from their research involving specialist physicians across specialties only from Lahore found that sponsoring physicians to a conference or taking care of conferences, discussion on the brand through the scientific literature, and Common Point discussion are found to have a positive impact, whereas the pharmaceutical representative (PSRs) personal touch, and personal selling doesn't impact physician's prescribing behavior.

(Biswas K et al, 2016) their cross-sectional study, while assessing the influence of pharmaceutical marketing on prescription behavior among general physicians from Bangladesh, had confirmed that in addition to product characteristic factors, physician's professional factors like the reputation of the company, pharmaceutical promotional factors like Sales representative (PSRs) - activity, personal relation found to have a positive correlation with prescription behavior of a physician. The research also acknowledged that the public relation" strategy was found to be the most effective strategy with a remarkable influence on physicians while "advertisement" of the pharmaceutical products in a journal or other printing object attracted the least concentration from physicians with respect to their prescription decision.

(Elie A. AkI et al, 2016) their systematic review consisting of 10 studies, 6 of which are from countries classified under low and middle-income countries, investigated the knowledge, beliefs, and attitudes of physicians and their interaction with pharmaceutical companies, and highlighted that physician's main intention with pharmaceutical companies backed promotion is to get the latest information on drugs, disease management in the form of CMEs, conferences, and rewards offered by pharmaceutical promotion. The review also shows the physician's perception of interaction with the pharmaceutical companies does not find to have an influence on their prescription decision. The research indicated the need to improve the quality of studies in this field, particularly in terms of using validated survey designs and tools.

(Miller S et al, 2020) investigated drug firms' payments and physicians' prescribing behavior has though concluded that those physicians receiving payments from pharmaceutical companies have identical prescription habits in comparison to those physicians, who have not received payments, indicating similar product characteristics like efficacy and the safety of the branded Vs generic drugs.

(Fickweiler F et al, 2017) their systemic review investigated the impact of Physicians and pharmaceutical companies' interaction and association on physicians' attitudes and prescribing habits, though confirmed with a positive influence, understanding with a definite sample size, with a consistent design, the methodology can further enhance the evidence towards understanding the impact of promotional tools on physician's prescribing behavior, which is relevant for the Indian context and beyond.

(Fugh-Berman A et al, 2018) their review on the pharmaceutical promotion of drugs focuses on product characteristic factors like (drug samples) followed by product promotional factors led by tools like gifts & payments and Physicians' professional factors (KOL/ Thought leader stature), all of which were found to have an influence on physician's prescribing decision influence physicians. The review also indicated that the gifts can be small towards developing a relationship among 3 pillars namely PSR – Physician – branded drug, for the latter's obligation to prescribe the brand promoted by PSR. As Promotional strategies vary from country to country, studying the impact of Promotional tools in the presence of other factors in the Indian context will enhance a better understanding of the factors influencing Physicians prescribing decisions.

(Shamsi HAS et al, 2019) from their research focusing on the evaluation of promotional drug literature provided by the medical representative at a tertiary care, hospitals emphasized that physicians should not solely depend on the drug information provided in the promotional brochures as it can be incomplete and unreliable raising questions on credibility especially related to efficacy, safety calling for revalidation either by self or with the help of physician's Peers.

Understanding the impact of product brochures in the presence of other factors comprising Product Promotion factors, product characteristic factors, Physician's professional factors, and the presence of physician's Personality factors can further enhance the factors affecting the prescribing decision of Indian specialists with proper representation and sample size.

(Krunal V et al, 2020) Concluded that the significant positive impact of 4 promotional tools MRS brand detailing, CME, conducting camps, and CRM (customer relationship management) activities on their prescription behavior among Indian physicians whose practice is more or less very close to that of general physicians.

Hence understanding the impact of other important tools focusing on MR's efficiency and effectiveness with brand demonstration, explaining the brand from scientific literature followed by conference sponsorships to physicians, especially specialist physicians based on their needs and wants, can further help in identifying the impactful factors affecting physician's prescribing behaviour.

Previous research studied in India was led by (Taneja G et al, 2008) (Waheed KA et al. 2011) (Bamoriya H et al, 2012), (Kasliwal N, 2013), (Saroj Kumar Datta et al, 2013) (Roshni Narendran M, et al, 2013) (Gyaneshwari K, 2015) (Kumar R et al, 2016) and (Krunal V et al, 2020) investigated the factors influencing the prescribing behavior had shown that factors like Physician samples, gifts, brochures, brand image, engagements, relationship, visit frequency of PSR representing product promotion factors along with efficacy and safety of the drug, representing product characteristics, physician's psychological factors found to influence their prescription behavior either with limited sample size/specialty spread of physician's practice. Studying the impact of these factors along with physicians' personality factor among Indian specialists will enhance a better understanding of factors influencing the physicians' prescribing decisions.

2.3.4 Physician's Professional Factors on the Prescribing behaviour:

Addressing patient healthcare challenges with a predictable outcome in a definite time frame is the basis of elements constituting the Physician's professional factors. Research has stressed the need for clinical decision-making, the result of a collaboration involving Professional teams led by physicians acting on behalf of patients and representing patients' decisions.

In this regard, pharmaceutical marketing for prescribed drugs is different from other products in two aspects.

- Firstly, physicians are legally and professionally bound to prescribe a drug to a patient, post their examination, with guaranteed efficacy with minimal consequences or side effects profile over the available options for the patient's recovery.
- Secondly, there are not any best quality drugs as their effectiveness varies on patient factors.

(Theodorou et al, 2009) from their research showed that physicians' professional attitude was the next most influencing factor in physicians prescribing decisions. Studies from Romania, (Luminița Mihaela Ion et al, 2013) have shown that the physician's ideal prescription decision is influenced by several factors such as the physician's professional background & patient state, which enables them to choose an ideal product based on their evaluation with respect to product-related factors like drug characteristics (quality, price, and availability) over the available options, making this as the most important criteria resulting to patients recovery. (Hartono et al,2014) in their research tried to develop a model of the physician decision-making process for prescribing prescription drugs in Indonesia.

The study has reaffirmed that the physician's decision is a complex decision involving many interacting factors. The study has found that all categories of drugs have the same opportunities to be prescribed by physicians to patients. The factors that were prominent for a physician towards making a prescribing decision are the physician's professional attitude and commercial interests followed by treatment guidelines, and the purchasing power of patients has an equal role in the decision-making of doctors.

(Davari et al, 2018) in their review, identified 33 factors that were influencing physician's prescription decisions. The most frequent factors were patients' clinical condition, and physicians' attributes which included clinical experience, specialty, continuous professional development, and practice decisions were the most frequently mentioned prescriber-related factor, followed by the pharmaceutical industry's marketing, and promotional strategies. The identified factors showed that prescribing is not only geared toward patient benefit but also toward personal interest. The research indicated a holistic approach with a valid and reliable practice guideline that could reduce the negative impact of a wide range of factors and improve rational drug prescribing effectiveness.

(Christina Ljungberg et al, 2007) their research on hospital physicians' views of factors influencing their prescribing has indicated that physician's professional factors like personal practice, colleagues and therapeutic tradition at the hospital or clinic, patient specification factors, and cost were taken into consideration when prescribing. The research suggested that the importance of clinical experience and information exchange with colleagues should not be underestimated in providing information about drugs to hospital doctors.

(Tan N C et al, 2009) their research of investigating the factors influencing family physicians' drug prescribing behavior in primary care managing a chronic condition indicated that physician professional factors like medical training, patient's disease definition, patient factors, and drug costs in the context of the local primary healthcare system and policy were found to be the most important factors influencing physicians prescribing decision.

(Paul EM Muijrersa, et al, 2005) in their research has found a negative relationship between prescribing according to evidence-based general practice guidelines and the frequency of visits by pharmaceutical industry representatives: more contact with pharmaceutical industry representatives is associated with less prescribing in accordance with professional guidelines.

Researchers found no relationship between prescribing according to guidelines by GPs and how they co-operated with pharmacists on a day-to-day basis.

(Anita Kotwani et al,2010) their research from India investigated the factors influencing primary care physicians to prescribe antibiotics and emphasized the importance of physician's professional factors like clinical experience, interaction, and expectations from patients towards prescribing antibiotics as a part of empirical treatment apart from promotional strategy pressure from PSR in the form of frequent visits.

(Torabipour A et al, 2011) their cross-sectional research investigated the factors affecting family Iranian physicians' drug prescribing decisions Khuzestan confirmed that Physicians' professional factors like naive, age of physicians, and practicing years had a significant relationship with the number of prescribed drugs. (Bamoriya H, et al, 2012) their research from India indicated that physician factors like length of practice, patient volume, availability of a brand, and Promotional factors like relationship marketing, Sampling efforts were found to have a significant influence on physician's perception.

(SriHartono Ujang et al, 2014) their research investigated a model of the physician decision-making process for Prescribing Prescription drugs in Indonesia has reaffirmed that the physician decision is a complex decision involving many interacting factors.

The study has found that all categories of drugs have the same opportunities to be prescribed by physicians to patients. The factors that were prominent for a physician towards making a prescribing decision are treatment guidelines, Physicians' professional attitude and commercial interests and the purchasing power of patients has an equal role in the decision-making of doctors.

(Tigabu BM et al, 2018) from their review assessed the factors influencing prescribing decisions of physicians, and confirmed that physicians' attributes which include clinical experience, specialty, continuous professional development, patient preference, clinical condition and cost of the medicine were the most frequently mentioned prescriber-related factor in addition to pharmaceutical industries marketing, and Promotional strategies.

(Shamsi HAS et al, 2019) their research indicated that the main patient factors that influenced prescribing decisions were physicians' professional factors like age, gender, and clinical experience towards choosing medication preference or untruthful patients, relationship with the patient, adherence to Strict policies and guidelines, and drug availability. In addition to this, for enhancing physicians' scientific knowledge they relied more on the internet where evidence-based material was available, and reading books, apart from knowledge sharing from colleagues.

(Sahm LJ et al, 2018) conducted a qualitative systemic review for assessing the factors influencing successful prescribing by intern physicians has shown that professional factors influenced by the environment, such as high workload, low staffing levels, time pressure, covering more than one ward, doing several tasks simultaneously, Poor communication, and a perceived hierarchical structure and distractions found to have a negative influence on prescribing practice. The summary of all the studies is shown below in table 2.3.4.

S.No	Tag	Title	Author & Year	Gist	Relevance to the study
1	Research Article	Differences in prescribing between GPs. Impact of the cooperation with pharmacists and impact of visits from pharmaceutical industry representatives. Family Practice Advance Access published on 29 July 2005	Paul EM Muijrersa, et al (2005)	Research has not found a positive correlation between the physicians' professional factor of Guidelines following making a clinical decision towards making a prescribing decision in addition to General Physicians' cooperation with pharmacists on a day-to-day basis.	A well-designed study covering physicians from secondary care and understanding the effect of physician's Professional factors like guideline adherence, co-ordination with other stakeholders in the presence of other factors from the Indian context will help in better understanding of physician Prescription behaviors
2	Research Article	Hospital doctors' views of factors influencing their prescribing. Journal of Evaluation in Clinical Practice, (2007) 765–771	Christina Ljungberg et al (2007)	Physician's professional factors like clinical experience and information exchange with colleagues should not be underestimated in providing information about drugs to hospital doctors. Apart from this, the other factors include Physician's patient-specific factors and cost into consideration when prescribing. Personal practice, colleagues, and therapeutic traditions at the hospital or clinic were influential in the prescribing of drugs.	This upon replication at the specialty level in India will give us an in-depth understanding of factors like motivation (Personality) & diagnostic/ patient reason behind doctors prescribing behaviors of a particular product.
3	Research Article	Factors influencing family physicians' drug prescribing behavior in asthma management in primary care. Singapore Med J 2009; 50 (3): 312-319.	Tan N C et al. (2009)	The study revealed that physicians' medical training, patient disease definition, patient factors, and drug costs in the context of the local primary healthcare system and policy were found to be the most important	Understanding the impact of patient factors, physician factors, promotion factors with physicians' personality trait factor will enable a better understanding

				factors influencing physicians prescribing decisions.	of factors influencing the prescribing behavior of the doctors.
4	Research Article	Factors influencing primary care physicians to prescribe antibiotics in Delhi India. Family Practice 2010; 27:684–690	Anita Kotwani et al (2010)	Factors that led public sector physicians at a Primacy Health care Centre (PHC) to prescribe antibiotics were (I) diagnostic uncertainty due to the absence of a lab facility, (ii) patient expectations to get 'capsules', (iii) lack of time to interact with patients and (iv) oversupplied and near-expiry antibiotics. Another factor that influences which antibiotic is prescribed and the overuse of antibiotics in the private sector was found to be medical representatives' Visits and pressure	This upon replication at the specialty level in India will give us an in-depth understanding of factors like motivation (Personality) & diagnostic/ patient reason behind doctors prescribing behaviors of a particular product.
5	Original Article	Factors affecting family physicians' drug prescribing: a cross-sectional study in Khuzestan, Iran. Int J Health Policy Management 2014, 3(7), 377–381	Torabipour A et al (2011)	The study confirmed Physician's Professional factors like a native, age of physicians, and practicing years had a significant relationship with the number of prescribed drugs.	Studying the factors on physicians prescribing behavior at the specialist level with hospital set-up beyond experience and geographical classification will give greater information in understanding the prescription decision of a physician.
5	Original Article	Mystery Written on Prescription Pads: Exploring Marketing Factors Influencing Prescription Behaviour using the AHP Approach. Journal of Economics and Business Research, Year XVIII,	Bamoriya H et al (2012)	In addition to the product promotion factors like sampling, availability, and relationship, professional factors like lengths of practice & patient volume have a significant influence on Physician's perception of prescribing decisions.	Studying the impact of the described marketing mix elements along with Product & Patient characteristics, and physician's personality traits from specialists whose prescribing

		No. 2, 2012, pp. 85-100			decision is important for a brand's progress in its life cycle.
6	Research Article	Model of Physician Decision-Making Process on Prescribing Prescription drugs in Indonesia. International Journal of Information Technology and Business Management Vol 24, No-1, 29th April 2014:1-10	SriHartono Ujang et al. (2014)	The study has reaffirmed that the physician's decision is a complex decision involving many interacting factors. The study has found that all categories of drugs have the same opportunities to be prescribed by physicians to patients. The factors that were prominent for a physician towards making a prescribing decision are treatment guidelines, the Physician's professional attitude and commercial interests and the purchasing power of patients have an equal role in the decision making of doctors.	Study of Physicians in w.r.t Indian context, attitudes across the value chain (primary to secondary), doctor's professional attitude and patients purchasing power, will offer in-depth information and better understanding of the entire dynamics of physician's prescribing decision.
7	Systemic review	Factors Influencing Successful Prescribing by Intern Doctors: A Qualitative Systematic Review. Pharmacy 2016, 4, 24; doi:10.3390/pharmacy 4030024, 1-13	Sahm LJ et al (2016)	Environmental Factors such as High workload, low staffing levels, time pressure, covering more than one ward, doing several tasks simultaneously, Poor communication, and a perceived hierarchical structure and distractions were found to have a negative influence on prescribing practice	Studying the impact of Physician's attributes & Personality traits on their prescribing behavior in the presence of environmental factors like pharmaceutical promotion, and regulatory agencies will give an in-depth impact on the physician for better understanding.
8	Review Article	Factors Influencing Prescribing Decisions of Physicians: A Review.	Tigabu BM et al, (2018)	The physicians' attributes which include clinical experience, specialty, continuous professional development, and practice decisions was the most	Factors influencing the physicians prescribing behavior include the role of the physician's Personal attributes

				frequently mentioned prescriber-related factor in addition to patients' clinical condition, pharmaceutical industries' marketing, Promotional strategies, physician attributes, patient preference, and cost of medicine.	will give an in-depth impact on the physician for better understanding with respect to the Indian context.
9	Research Article	Factors Influencing Prescribing Decisions Among Primary Health Care Physicians in Al-Buraimi Governorate, Oman. Global Journal of Health Science; Vol. 11, No. 4; 2019.	(Al Shamsi et al, 2019)	The main patient factors that influenced prescribing decisions were • Physicians' demographic factors like age, gender, and medication preference or untruthful patients • Doctor-patient relationship, • Adherence to Strict policies and guidelines and Drug unavailability • For enhancing physicians' scientific knowledge, they relied more on the internet where evidence-based material was available, and read books, apart from knowledge sharing with colleagues.	The influence of Patient expectations and physician's professional factors, on their prescribing behaviour will give an in-depth understanding of the prescribing decision's dynamics.

(Table 2.3.4 : Summary of Physician's professional factors on physician's prescribing behaviour)

(Paul EM Muijrersa, et al, 2005) research shows that GP's prescriptions are non-compliant with guidelines without cooperation from other stakeholders from a cross-sectional & self-reporting of data. As the differences between solo and non-solo practices are considerable, with regard to a number of features (gender distribution, proportion of working full-time, visits by pharmaceutical representatives, number of patients, and the presence of GP trainers), the results of the multivariate analysis cannot be generalized to physicians in non-solo Practices.

Hence studying the role and impact of physician's professional factors with other factors in a solo set-up from the Indian context will improve a better understanding of factors influencing the physician's prescribing decision.

(Christina Ljungberg et al, 2007) their research with hospital Physicians showed a positive influence of professional factors like Personal practice, clinical experience, cross-learning from colleagues, a therapeutic tradition at the hospital or clinic, patient specification factors, and the cost taken into consideration in prescribing. As the research was based on semi-structured interviews involving only 15 physicians, understanding the factors affecting the prescribing behavior in a large sample size within a specialty with varied practice types, from an Indian context can further bridge the gap toward better understanding the factors affecting the physician's prescribing decision.

(Tan N C et al, 2009) in their study revealed the influence of physician's professional factors on the prescribing decision in a relatively small sample size without any correlation of the inputs of the participants with their actual prescription.

Understanding the factors affecting the prescription behavior among specialists with a sufficient sample size can help toward a better understanding of the role of factors affecting the prescribing decision in the Indian context.

(Anita Kotwani et al, 2010) their first in-depth qualitative research from India emphasized the importance of physician professional factors like clinical experience, interaction with patients, and patients' expectations, towards prescribing antibiotic a part of the empirical treatment and also tried to explore the motivation for misuse and overuse of antibiotics and understanding of antibiotic resistance by primary care doctors. Understanding the factors and their impact on physicians from all practice types, in their prescribing behavior can lead to better upstanding.

(Torabipour A et al, 2011) research showed the influence of physicians' professional factors like clinical experience, native, and age, there is a need for a better understanding of the impact of demographic factors GPs with respect to the drugs that are being prescribed.

(Bamoriya H et al, 2012) their Indian study showed a positive correlation between Product Promotion factors and Physician's Professional factors in the prescription decision. However, the inclusion of other relevant factors for an example image of the organization and the incentives and their impact with other factors would have improved further the factors affecting physician's prescribing decisions, which the researcher would like to study from the current study among specialists with sufficient sample size and dispersion from India towards better understanding the factors affecting the prescribing decision.

(SriHartono Ujang et al, 2014) re-affirmed that the physician's decision is a complex decision involving many interacting factors. The prominent factors are the physician's professional factors of adhering to treatment guidelines and the patient's purchasing power along with the physician's Personality components like attitude, commercial interest has an equal role in the decision-making of physicians. Distinguishing between medical specialists and general practitioners to assess the behavior in prescribing drugs along with their set-up with information related to the historical data of drug categories (Proportion) in the physician's prescription for a certain period can be further enhanced with respect to the Indian context by studying these factors affecting the physician's prescription decision.

(Tigabu BM et al,2018) the review showed that physician's professional factors were the most frequently mentioned prescriber-related factor in addition to patients' clinical condition, pharmaceutical industries marketing, Promotional strategies, physician attributes, patient preference, and cost of medicine. However, there is a need to establish a causative relationship between identified factors, and prescribing decisions from the Indian context can become an effective contribution toward a better understanding of physicians' prescribing behavior.

(Shamsi HAS et al,2019) their research emphasized that the main patient factors that influenced prescribing decisions were physician's professional factors, Product related factors, and Product promotion factors.

Understanding the impact of these factors among physicians with all practice set-up types (both public hospitals, private hospitals, and clinics instead of primary healthcare Centre with sufficient sample size and a validated questionnaire, can be of help in achieving further statistical power for the results obtained and improve the generalizability of the results.

As studies of clinical decision-making are about people, behavior, and context, they require both quantitative and qualitative approaches to produce more comprehensive holistic views and more valid data for a better understating of physician's prescription decisions, which the current research is all about from Indian specialists.

(Sahm LJ et al, 2016) from their systematic review highlighted the influence of external factors which are in line with professional factors on prescribing behavior with a negative correlation.

Differentiation of the Prescription for which patient is there like outpatient department (OPD) treatment, prescription for admitted Patients, and prescription during the discharge of the patient would further enhance the understanding the prescribing pattern of physicians.

(Rahul S et al, 2022) in their critical review comprising of Indian Physician's has indicated the impact of pharmaceutical marketing tools leading to increase in the prescription cost and burden on the patient.

The research has concluded that it is the right time for pharmaceutical marketing to become more innovative toward brand communication to physicians, both coherently operating within the preview of guidelines set by regulatory agencies like Drug Control General of India (DCGI) and Medical Council of India (MCI), for the benefit of consumer protection and improving the access to treatment with affordability.

2.3.5 Elements of Physician's Personality and their impact on their prescribing behaviour:

(Alan HR. Rosenstein, 2016) in their study on the human factors and their impact on the prescribing behavior and business of medicine, emphasized that Personality is a mirror image and a combination of self & environmental effects. Various factors like Cultural, socioeconomic conditions, demographic factors, and study intensity contribute strongly towards developing values, attitudes, and perceptions leading to the development of specific behavior, representing a specific personality trait. (Barrick et al, 2001) in their study on personality is defined as a set of psychological traits and mechanisms within the individual that are relatively enduring and that influence interaction with, and adaptations to, the environment.

These traits were operationalized as the five factors of personality: extraversion, neuroticism, agreeableness, conscientiousness, and openness to experience.

Available literature shows for assessing human personality various tools have been used. This is true for the medical profession as it plays a vital role with a significant impact on building a career and practice towards rendering the best patient care. (Debbie c et al, 2006) in their research found that health, well-being, and personality are inextricably linked. Evidence about the relationship between personality and performance suggests that occupational psychology has a key role to play in understanding the patterns of behavior associated with underperformance.

(McAdams DP et al, 2010) research on personality development showed that personality traits can be categorized into five comprehensive domains, called the Five-Factor Model: conscientiousness, extraversion, emotional stability, agreeableness, and openness. (Ozer DJ et al, 2006) in their research on personality and the prediction of consequential outcomes have referred personality to as individuals' effective, experiential, and motivational characteristics that reflect their values, attitudes, and coping strategies.

(Brezis M et al, 2008) in the research has been established that each physician has a unique personality and responds differently to various factors which include personal selling factors with a significant relationship between the individual characteristics of the medical physicians and their prescription behavior. (Alan H. Rosenstein et al, 2016) in their research of assessing human factors affecting physician behaviors and their impact on the business of medicine has indicated that most physicians tend to have very strong ego-centric personalities which perpetuate individualism, and autonomy and concluded to provide appropriate education and training to help physicians gain a better understanding of these issues will help when trying to introduce programs to help address physician attitudes and behaviour.

(Benjamin P et al, 2008) their research investigated the impact of physician's personality in managing patients' depressive symptoms through, patient-centered communication in a primary healthcare center and showed that personality traits are heritable and stable, but they are also modifiable. Most physicians complete their medical training while in their twenties, a decade characterized by considerable plasticity in personality traits. Just as work environments could elicit or shape certain traits such as openness and their corresponding habits of mind including empathy and cognitive flexibility, learning environments could be created to reinforce certain habits of mind that enhance diagnostic acumen in addition to patient satisfaction.

A physician's Personality has implications for various stakeholders of the healthcare value chain. Understanding the Physicians personality and its impact is important for better patient care access for the development of quality, trustable physician-Patient centric management. This research work reviews the available research work conducted in this domain from researchers across the world, to bring the findings on the impact of Physicians' Personalities aiming for better patient care.

- Physician's Personality vs Patient centricity,
- Physician's Personality vs Patient Confidence,
- Physician's Personality Dimensions -Stress, Depression
- Physician's Personality vs Empathy
- Physician's Personality vs well-being at work
- Physician's Personality vs medical education

2.3.5.1 Physicians Personality vs Patient centricity:

(Clever SL, J in L,2008) Their study indicated that in today's world of evidence-based medicine, physicians are adopting a Patient-centric approach to managing the disease state with the available therapeutic interventions in their day-to-day practice. This patient-centric approach is proving to be better than the previously used disease-centric approach, as it helps physicians better understand patient's expectations, psychological status, and emotional burden arising out of the suffering problems in addition to the required diagnostic information, which all together lay for a strong collaborative communication from both the end leading to better treatment choice from the physician and adherence from the patient towards early recovery in primary care settings. (Benjamin P. Chapman, Paul R. Duberstein, et al, 2008) investigated the benefit of patient-centric communication and its impact on primary care physician's personality toward proper disease condition diagnosis leading to better treatment selection for early patient recovery. The study was carried out with 46 primary care physicians and 88 patients presenting with depression symptoms with co-morbid conditions.

(Eunice Magalha ES, Patri CC et al, 2012) in their study where all the primary care physicians' personality was assessed using the NEO-Personality inventory. Patients were asked to rate a physician's ability with respect to three factors which include, their illness identification experience, understanding experience, and improvement in communication/ discussion experience.

The study demonstrates that physicians with increased openness led to better illness experience from patients, physicians' emotional sharpness led to better patient understanding, and physicians more dutiful led to better communication with fewer questions in getting patients' family history toward formalizing effective intervention. (Connor-Smith, Jennifer K et al, 2007) their meta-analysis showed that in the case of physicians with a more anxious nature were found to engage less in communication with patients.

The results from the study emphasize the need for training physicians for aligning personality needs with improvements in line with a patient-centric approach for better management of clinical outcomes.

2.3.5.2 Physicians Personality vs Patient Confidence:

(Lemaire and Wallace et al, 2014) in their cross-sectional study, investigated the link between the physician's predetermined personalities Vs performance and wellness outcome, and pointed out that the physician-patient relationship is the central aspect of the development of an effective treatment strategy for the early recovery of patients from the underlying pathological condition, as the Physician-Patient relationship helps the physician to gather the necessary details like suffering, impact on the quality of life, expectations by keeping the patient integrity intact. This leads to the development of patient confidence in the physician's intervention which in turn leads to better treatment adherence and compliance from the patient end toward a faster recovery.

(Stilwell NA, et al, 2000) their research studied the personality type by MBTI vs specialty choice and showed that the physicians exhibited different personalities across various specialties with variation among them within the specialty.
(Clever SL, et al, 2008) their hospital-based study involving 300120 patients confirmed the existence of a relationship between patient satisfaction vs physician communication towards developing effective treatment strategies with better adherence and compliance from the patient end for their early recovery.
(Tiwari P, et al, 2015) studied the Factors influencing patient preference and confidence among Indian surgeons. The research revealed that physicians' communication with patients, physician mannerism with patients during a conversation, and word-of-mouth publicity of physicians by the patient was the most influential in-patient confidence and satisfaction.
(Duberstein P et al, 2006) analyzed the influence of patients' ratings of physicians based on physicians' demographic profiles and physicians' personalities assessed from NEO-FFI inventory in a cross-sectional study of 4616 patients aged 18-65 years involving 96 primary care physicians. The study revealed that patients expressed their satisfaction with those physicians who are more in openness and average in consciousness. This observation is evident in older patient's vs younger patients. The study concluded that the physician's personality identification that promotes communication with patients is crucial in building patient trust, patient adherence, and compliance with the recommended treatment in an effort for developing patient-centric management.
(Ananya Omkar C et al, 2018) studied the influence of the Indian physician's personality type from the patient perception window. The study confirmed that the physician's personality is playing an important role in building the perception of the patient. The study revealed that physicians, whether introverts or extroverts are emotionally stable, analytical, objective, and relationship-oriented in their approach aiming for better patient care. From the study population, extroverts were in favour of asking questions in looking at various options with minimal receiving from the patients whereas in the case of physicians who are introverts there was mostly input from the patients towards developing an effective treatment strategy. The author could not see the use of counseling, empathizing, and guiding the patients.

From this study, we can conclude that physicians' training for self-awareness should be undertaken with prior problem definition. This will help develop physicians to adjust their personalities for an effective physician-patient interaction for a predictable outcome that will be beneficial to all the stakeholders.

(Benjamin CM, Scheepers RA, et al. 2014) performed a systematic review of the impact of clinicians' personalities and their interpersonal behaviours on the quality of patient care. PRISMA criteria were followed for article inclusion in the systematic review. 85 studies met the inclusion criteria, with 4 studies focusing on the clinician's personality and 81 studies focusing on the clinician's interpersonal behaviors. The outcomes that were measured in this systematic review include the quality of the process of care and patient health outcomes. The clinician's personality was based on interpersonal behaviours calculated with available instruments, apart from registering verbal and nonverbal behaviours and affective behaviors.

It has been noted that, apart from the included observational studies, most of the other studies that comprised this systematic review showed little or no effect of clinicians' personality traits and their interpersonal behaviours on the standard of patient care. The systemic review concluded that physicians could adapt their interactions toward patients' needs and preferences instead of displaying certain specific behaviors.

2.3.5.3 Physicians Personality Dimensions-Stress, Depression, Anxiety, burnout Vs Impact on Patient Care:

(Roger C et al, 2012) in their research titled - "physician personality" and other factors in physician health, cited that providing best-in-class patient care is felt as the most important responsibility by physicians. As physicians are experts in their domain and work hard with their daily routine, spanning long hours with a high pace and time pressure, this tight schedule puts physicians at risk of mental distress.

Hence, in addition to the work environment, a physician's personality forms the most important factor for distress as they have a paucity of time to allocate to themselves for relaxation. Burnout among physicians, which is the result of the amalgamation of both internal and external factors, leads to emotional exhaustion, low accomplishment, and depersonalization. This situation may lead to compromised services by physicians, with an increase in errors in their field of expertise leading to unsatisfactory patient care and outcomes.
The author emphasized the need for creating a balanced life among physicians for their welling & providing better patient care. (Alan HR et al, 2017) studied the impact of stress, burnout, and personality on physician attitudes and behaviours that impact patient care and recommended the need to focus on managing stress as it offers solutions to physicians to manage time, and pressure better than professional medical practice. Studies have proved that

physicians' decrease in well-being, satisfaction, engagement, patient care, treatment efficiency, and patient relationship hurt patient care outcomes.

(Bojana P et al, 2011) their study assessed the intensity of burnout syndrome and physician's personality dimensions as well as coping strategies in 3 groups of 160 physicians from 3 different specialties by Maslach burnout Inventory and the temperament and character inventory and manual on the ways of a coping questionnaire. The study has revealed that GPs were found to be high in emotional exhaustion whereas surgeons were found to be high in depersonalization. Among physicians,

1. Self-directedness and cooperativeness were prominent with a low level of BS.
2. Work avoidance was seen in physicians with low attachment quality and a low personal accomplishing nature.
3. While physicians with low BS displayed high control of themselves.

The researcher concluded that the findings of the important role of personality dimensions and coping strategies could help identify individuals with a tendency towards the development of BS and the timely application of preventive strategies.

(Gramstad et al, 2013) explored the influence of physicians' personality traits with respect to stress, depression, and anxiety during their graduation study period. The researcher enrolled 201 physicians and for measuring personality BCI scale measuring 4 traits namely neuroticism, extroversion, conscientiousness, and reality weakness were used, similarly HAD scale for mental health and, SCL-25 for symptom checklist and Stress (PMSS) were used. The main finding of this study was that two personality traits predicted psychological state problems among junior physicians. The trait reality weakness was associated with higher levels of hysteria symptoms, symptoms of depression, and stress reactions, while neuroticism only predicted stress reactions. Furthermore, trait extroversion protected against symptoms of depression. Furthermore, in comparison to males, female students were observed to experience more stress during work.

The study concluded with assessing personality traits can be a useful strategy in identifying at-risk and developing interventions for controlling stress and offering protection from future health problems, especially in medical students with vulnerable personality makeup.

(Brown PA et al, 2019) their international study aimed to investigate the association between personality type and burnout in 77 primary care physicians in Canada and Jamaica with the help of the Maslach Burnout Inventory, Human Services Survey, and therefore the Big Five Inventory. The research further confirmed that burnout was a common problem among primary care physicians. Personality traits like neuroticism, conscientiousness and agreeable nature are also resulting in burnout of physicians.

Hence plans on working physicians' personalities must be in place which can minimize burnout with maintaining optimal health for physicians which will positively impact their work. (Jennifer K et al, 2007) performed a meta-analysis concerning relations between personality and coping on Big Five personality traits and coping using 165 physicians and 33,094 participants.

The meta-analysis concluded that Personality was weakly related to broad coping (e.g., Engagement or Disengagement), but all 5 traits predicted specific strategies. Extraversion (support seeking) and conscientiousness predicted more problem-solving and cognitive restructuring. Neuroticism is less as it predicts problematic strategies like wishful thinking, withdrawal, and emotion-focused coping. Personality more strongly predicted coping in young samples, stressed samples, and samples reporting dispositional instead of situation-specific coping.

(Salyers M et al, 2017) conducted meta-analysis and concluded that towards the improvement of physician's attitudes and behaviors, the other avenues to be looked upon include improving emotional intelligence, mindfulness, resiliency, managing conflicts, communication, collaboration, and leadership in their day-to-day life.

2.3.5.4 Physicians Personality vs Empathy:

(Magalha ES et al, 2012) studied the impact of empathy on medical students and personalities by using the Five-Factor model with the Portuguese version of NEO-FFI (Neuroticism, Extraversion, Agreeableness, Openness to Experience, and Conscientiousness) in 242 medical students. The results showed an association between personality and empathy in medical education. Agreeableness and Openness to Experience are positively associated with self-reported empathy measures whereas Neuroticism, Conscientiousness, and Extraversion do not show associations with empathy. The research concluded that education to enhance empathy in students must consider student personality.

(Torres OY et al, 2015) investigated the association between leave prescription and physician burnout and empathy in a medical care health district in Lleida, Spain. This descriptive study included 108 medical care doctors from 22 medical care centers in Lleida in 2014 (183,600 patients). Maslach Burnout Inventory for burnout and Jefferson Scale of Physician Empathy were employed. Results revealed that high empathy was significantly associated with low burnout. Neither empathy nor burnout was significantly associated with sick leave prescription. The study concluded that Sick leave prescription by physicians is not associated with physicians' empathy or burnout and may mostly depend on prescribing guidelines.

2.3.5.5 Physician's Personality vs Wellbeing at Work:

(Mullola S et al, 2018) studied the influence of physician's personalities based on their specialty on their performance and well-being. 2815 Finnish physicians aged 25-72 years were part of this study.

A big factor scale for personality determination and a workability index for measuring well-being at work were employed in addition to the general health questionnaire. Among specialties high on extraversion, openness, and agreeing nature were found to improve the productivity and well-being of physicians at work and representing mass specialties. In the case of sophisticated super specialties physicians with high consciousness & agreeable nature but with closed mindsets were useful for their performance. A personality trait namely neuroticism was found to have a minimal role. The study concluded that Physicians' personality traits may moderate the association between medical specialty and well-being at work.

2.3.5.6 Physician's Personality Vs medical education:

(Scheepers RA et al, 2013) studied the relationship of physicians' personality traits with their teaching performance both in surgical and non-surgical specialties consisting of 622 attending physicians and 549 residents from the Netherlands.

Attending physicians were rated for their attitude, overall teaching performance, communication, and feedback by residents with the help of the SETQ scale, attending physicians self-evaluated their personality traits on the Big Five Inventory (BFI). The study showed that extroverted quality led to better teaching performance in normal specialties whereas in surgical specialties closed behavior and high consciousness in specialties other than surgery had better feedback from attending residents.

2.3.5.7 Physician's Personality Vs Prescription behavior:

(Gopal Sharma P et al, 2015) from their Indian experience stated that a Prescription is not a simple piece of paper. Each prescription can show many things like the orientation, attitude, personality, etc., of the prescriber. (Majid et al 2018) Physicians' Qualities, the Price of the drug, and drug advertising were found to influence physicians prescribing decisions.

This clearly proves that a physician prescribes a drug based on patient benefit as well as personal benefit. Hence laying down stringent measures and policies involving all the stakeholders will promote towards rational prescribing of effective drugs by physicians for patient benefit.

(Brezis M et al, 2008) their Israel experience established that each physician has a unique personality, and responds differently to various personal selling factors, there is a significant relationship between the individual characteristics of the medical doctors and their prescription behavior.

(Virji A et al, 1991) studied the relationship between patients' attitudes and physician's prescribing behavior and concluded that the physician's prescription decision is influenced by their attitude of giving preference to drug treatment which matches the patient's attitude toward being prescribed medicines even in case of self-recovery. The study also confirmed that among patients who walk in Vs prior appointee patients for consultation, the above behavior was prominently seen in the latter group, thereby building pressure to prescribe medication at the physician level.

(Lemaire et al, 2014) their research studied the influence of physician identification based on three personality components namely work alcoholics, type A, and control freaks tried to find out the link between their performance and well-being.

The study confirmed that most of the physicians who participated in the study were found to have at least one out of the three personality components playing a role in their performance which may compromise their well-being, looking to their continuous urge (as a part of personality component) for improving performance may lead to their compromise in their wellbeing.

(Shah SM et al,2016) their research work from Pakistan tried to identify the factors that motivate and hold them back as a part of a retention strategy among physicians working in primary healthcare centers. The study revealed adequate remuneration, reasonable facilities at residence, high standards of environment, stable government, adequate supplies, and medical facilities can contribute to a high level of motivation among physicians leading to improvement in patient responses and services.

(Kaliswal N et al, 2013) in their empirical Indian study investigated the role of psychosocial factors on doctors prescribing behavior. The study reveals that those non-medical factors, the personality factors of the doctors, and marketing initiatives taken by the companies like MR’s product knowledge and MR as a source of information on new drugs vary across different demographic characteristics of the doctors are more influenced by them as compared to the senior doctors.

(Ibrahim A et al, 2013) investigated the factors affecting doctor's prescribing behaviour in Jordan: Anti-hypertensive drugs as an example. The study concluded that among other factors, a Physician’s personality features a statistically significant positive effect on a physician’s prescribing behaviour. The personality components were mainly consisting of the physician’s quality characteristics namely helpful & unselfish nature, reliability, trustworthiness, co-cooperativeness, sophistication, imagination, and task orientation.

(Ahmed RR et al, 2020) the research work highlighted the uniqueness of every individual owing to a personality, specific to a person, which over a period of times transforms into behaviour. The authors felt the import of utilizing the benefits of personality assessment, especially HOGAN’s MVPI as , personality determination, can be done in 3 aspects of behavior as thought processes, usual tendencies, stress, and tension, define the motivational attributes which finally drive behaviour. The authors further highlighted the importance of assessing the personality through an instrument among healthcare professionals, which helps them to drive their behavior and decisions be it in their personal life or in professional life led by clinical practice, which calls for collaboration with other team members and managing clinics and hospitals. The summary of all the studies is shown below in table 2.3.5.

No	Tag	Title	Author & Year	Gist	Relevance to to the study
1	Research Article	A study of the relationship between patients' attitudes and doctors' prescribing. Fam Pract. 1991 Dec; (4):314-9.	A Virji et al (1991)	The study has shown that the physician’s prescription decision is influenced by their attitude of giving preference to drug treatment which matches the patient’s attitude.	Studying the impact of physician personality vs other factors for determining on the most important factors determining prescription behaviour for better treatment outcome.
2	Research Article	Big pharma and health care: Unsolvable conflict of	Brezis M et al. (2008)	The research has shown that each physician has a unique personality and responds differently to various	Assessing the impact of personality traits and their impact on other factors leading

		interests between private enterprise and public health. Israel Journal of Psychiatry and Related Sciences 2008; 45:83-9.		personal selling factors. There is a significant relationship between the individual characteristics of the physicians and their prescription behaviour	to physician's prescription behaviour among Indian specialists with a widespread will enhance the factors affecting the physician's prescription behaviour
3	Research Article	Model of Physician Decision Making Process on Prescribing Prescription drugs in Indonesia. International Journal of Information Technology and Business Management Vol 24, No-1, 29th April 2014:1-10	SriHarton o Ujang et al (2014)	The factors that were prominent for a physician towards making a prescribing decision are the Physicians professional attitude and commercial interests followed by treatment guidelines, and the purchasing power of patients	Study of Physicians w.r.t Indian context, attitudes across the value chain (primary to secondary), doctor's professional attitudes, and patients purchasing power, will offer one richer information to a marketer, which paly information for developing effective marketing campaigns development.
4	Research Article	How physicians identify with predetermined personalities and links to perceived performance and wellness outcomes: a cross-sectional study. Lemaire and Wallace BMC Health Services Research 2014, 14:616, 2-9	Lemaire et al. (2014)	The study confirmed that most of the physicians participated were found to have at least one out of the 3 personality components were playing role for their performance and wellbeing.	Assessing the elements of Personality with a validated instrument with the other factors in Indian context will improve towards better understanding the factors influencing physicians,
5	Research Article	Investigating the Factors Affecting Doctor's Prescribing Behavior in Jordan: Anti-Hypertensive Drugs as an Example.	Ibrahim A et al. (2013)	The study concluded that among other factors, Physicians personality features a statistically significant positive effect on doctors' prescribing behaviour	Assessing the elements of Personality with a validated instrument with the other factors in Indian context will improve towards better understanding

		European Journal of Social Sciences. Vol. 38 No 3 May 2013, pp.380 – 391			the factors influencing physicians,
6	Research Article	A Study of Psychosocial Factors on Doctors Prescribing Behaviour – An Empirical Study in India. IOSR Journal of Business and Management (IOSR-JBM). Volume 13, Issue 2 (Sep. – Oct. 2013), PP 05-10	Kasliwal N et al. (2013)	The study revealed that that non-medical factors like personality factors of the physicians along with medical factors like Product promotion and Product factors are more influenced towards Prescription decision.	Understanding the elements of Personality with the other factors in Indian context will improve towards better understanding the factors influencing physicians,
7	Research Article	Conceptualization of Branding: Strategy based on the Indian Pharma sector. International Journal of pharmaceutical and Healthcare Marketing. Vol 7, No-2, 2013, 175-198	Saroj Kr Datta, et al. (2013)	The study has confirmed the role of Product promotion in the form of branding, scientific understanding of the drug, and the physician's emotional elements in the prescribing decision.	Understanding the emotional elements constituting the personality in the presence of other factors affecting the physician's prescribing behaviour in the Indian context will improve understanding,
8	Review Article	Viewpoint: Psychiatrists Prescriptions. Telangana J Psychiatry 2015;1(1):21-23	Sharma PG et al. (2015)	The author concluded that each prescription can show many things like the orientation, attitude, personality, etc., of the prescriber – Physician.	Assessing the impact of physician's personality elements in the presence of other factors among Indian specialists towards improved understanding of factors affecting physician's prescription decision.
9	Research Article	Motivation and retention of physicians in primary	Shah SM et al. (2016)	The study revealed that a high level of motivation among physicians can contribute to with	Assessing the impact of physician's personality elements motivation, values,

		healthcare facilities: a qualitative study from Abbottabad, Pakistan. Int J Health Policy Management. 2016; 5(8):467–475.		improvement towards patient responses and services	preferences in the presence of other factors like product factors, professional factors and product promotion factors among Indian specialists will improve in better understanding of physician's prescribing decision.
10	Review Article	Factors Influencing Prescribing Decisions of Physicians: A Review. Ethiop J Health Sci. 2018 Nov; 28(6): 795–804**.**	Majid D et al. (2018)	Physicians' Qualities, Price of the drug and drug advertising found to influence physicians prescribing decision.	Assessing the impact of physician's personality elements on product factors, physician's professional factors and product promotion factors among Indian specialists with adequate sample size will enhance towards better understanding of physicians Prescribing decision.
11	Review Article	Physician personality and patient confidence. The Southwest Respiratory and Critical Care Chronicles 2018;6(26):30–36	Kopel J (2018)	The review has highlighted that a physician with self-knowledge about personality tendencies can uniquely adapt his/her personality preference to each patient for a better outcome with a decrease the time and an increase in the quality of physician-patient interactions	Future medical studies from India assessing physician personality along with patient preferences in the presence of other factors could greatly improve physicians prescribing behaviour because of improved patient-physician interactions for better outcome.
12	Research article	Medical Students' Personalities: A Critical Factor for Doctor-Patient Communication. Int. J. Environ. Res. Public Health 2021, 18, 9201	Suciu, N et al. (2021)	Personality traits express a major influence on medical students' clinical skills and their future professional success with the better physician-Patient relationship, communication leading to a predictable outcome.	Understanding the impact of personality on physician's prescription decision in the presence of other factors with an adequate sample size from Indian specialists will help towards better understanding

					the role of factors affecting the decision.
13	Research article	Mapping Personality Traits of doctors with Big 5 Personality Dimensions. International Journal of Science Research and Review. Vol 6, Issue 12, 2017, 161-165	Lokhande A et al. (2017)	The study has concluded that doctor's personality is positively correlated with the elements of Big factor 5 theory namely, Consciousness, openness, and agreeableness. Extraversion is negatively correlated with personality.	Understanding specialist Physician's motives, values and , preferences in the presence of external factors towards decision making will help towards developing tools for effective prescription decision making towards a better patient care.
Available Research with HOGAN Personality Instrument					
14	Research Article	Predicting Physician Executive Performance. SIOP Symposium,2017.	Kimberly S et al. (2017)	The research showed that several individual differences indicated that several individual difference characteristics differentiate adequate versus excellent executives.	Understanding the physician's personality traits in the presence of other factors towards prescribing decisions and patient-centric care will help for the overall improvement of better patient care, access, and system.
15	Research Article	Transformational and Transactional Leadership in Healthcare seen through the Lens of Paediatrics. The Journal of Pediatrics. Volume 204, January 2019, 7-9.	KA Fletcher et al. (2019)	This research study with HOGAN assessments like MVPI has provided the link between leadership styles and Personality theory which would be useful to Pediatricians while taking decisions or offering practical interventions designed to improve their leadership aiming for patient centric care.	Understanding the impact of personality elements in the presence of other factors on physician's decision making from Indian specialist point of view will enable for better insights on the factors affecting the prescription behaviour

16	Research Article	Do Personality characteristics vary by Gender in Emergency Medicine Residents? Western Journal of Emergency Medicine: Integrating Emergency Care with Population Health, 20(4.1)..	Jordan J et al (2019)	This research study with Hogan assessment including MVPI showed that residents from both genders have exhibited similar on most of the personality traits with male scoring more on sociability, proactiveness, engaging, strategic thinking over female who tend to be more organized and dependable.	Understanding the impact of personality traits in the presence of other factors towards physician's decision making from Indian specialist point of view will enable for better insights on the factors affecting the prescription behaviour
17	Research Article	Personality assessment in orthopedic surgery: AOA critical issues. JBJS, 101 (4), e13.	Tornetta III, P, et al (2019)	Research among orthopedic surgeons has felt the need to deploy the usage of personality assessment tools in the medical profession they can be very helpful in indicating the resident's or physician's area of expertise matching their personality traits. The output of which can be utilized as a resource towards chieving.leadership through an act of improvement along with the current strengths towards prosperity both in personal life and professional career. The research article has indicated the MVPI.	Understanding the personality traits with respect to Indian physician's traits will be offering a better understanding of themselves for improving their patient care and will also help the marketer to develop effective marketing interventions.

(Table 2.3.5 : Summary of Physician's personality trait related factors on physician's prescribing behaviour

In most of the previous studies to the researcher's knowledge, a physician's personality and its impact on various facets or stakeholders of the healthcare system has been documented and studied with the use of some of the available personality instruments for generating insights towards developing actionable points for implementation, irrespective of some limitations, aiming improvement in patient experience with optimal/ stable physician personality in place.

Physician's personality on patient care, patient satisfaction, empathy, and education has been well studied in different parts of the world by many researchers with the help of personality instruments from developed and developing countries.

However, In the case of assessing the impact of physician’s personality on prescribing behavior, so far research work has been limited to very few studies, which focused on Physician's Quality characteristics and psychological characteristics of a well-trained medical representative. To date, very little research work was done toward understanding the same. Hence there is a need for studying physician’s personalities focusing on Physicians' core values, motives, preferences, and their impact on the prescribing decision.

Understanding a physician’s personality not only plays an important role in understanding physicians motivates, values and preferences but also helps us in developing a strong foundation of two-way communication between physician-patient, with effective marketing communication strategies aiming at the adoption of better, cost-effective therapeutic interventions by physicians which benefit patients thereby by transforming disease management to physician –patient-centric management.

The ongoing study undertaken by the researcher aims to study the impact of elements of a physician’s personality in the presence of other factors in influencing the physician’s prescribing decision among Indian specialist physicians.

Among all the Personality testing instruments available, Hogan’s MVPI (Motivation, Values, Preferences, Inventory) which is based on 10 scales representing dimensions that have a historic presence in the literature on motivation for more than 80 years of research and is the only instrument to determine values that motivate a person directly. Standard interest measures allow inference about a person’s motives based on his or her expressed occupational choices but from MVPI one can determine immediately the degree to which a person is motivated.

For MVPI, the most important sources of valid information are item content and correlations between scales score and other well-validated observer’s ratings.

2.3.5.5.1 The 10 MVPI scales are defined as:

1. Aesthetic motive: Interest in art, literature, music, the humanities, and a lifestyle guided by questions of culture, good taste, and attractive surroundings.
2. Affiliation: desire for and enjoyment of social interaction.
3. Altruistic: welfare for others, contributing to the development of a better society.
4. Commercial: Motive with interest in business & related matters.
5. Hedonistic: motives produce an orientation towards fun, pleasure, and enjoyment.

6. Power: Motives that desire success, accomplishment, status, competition & control.
7. Recognition: Motives reflect responsiveness to attention, approval, praise, a need to be recognized, and an appreciation for the role of recognition in human motivation.
8. Scientific: motives are associated with a desire for knowledge, enthusiasm for new and advanced technologies, and a curiosity about how things work.
9. Security: motives reflect a desire for certainty, predictability, order, and control in one's life.
10. Tradition: motives are typically expressed in terms of a dedication to ritual, history, spirituality, and old-fashioned views.
    - For MVPI the most important sources of valid information are item content and correlations between scales score and other well-validated tests and observers' ratings.
    - Among commonly used other instruments like MBTI which provides a revealing insight into their personality, their preferences, and how they interact in relationships and their environment.
    - Hogan's MVPI is a test that reveals a person's core values, goals, and interests.
    - The MVPI identifies what a person wants to do, as opposed to what a person may do, in certain situations.
    - The MVPI is the only inventory that seeks to assess an individual's core values and then compare them to the existing culture and values of an organization/ universe.
    - Hogan MVPI Hogan Assessment differentiates from personality tests in that personality tests tend to ask for responses or reactions to certain scenarios (while looking for patterns of thinking that can then be measured and categorized) in comparison to a values measurement that is reflective of who this person is at his core with Hogan MVPI.

<u>MVPI Vs other instruments:</u>

<u>MVPI VS SDS</u>

- Self-directed Search (SDS; Holland1985) is an interest inventory. It is scored for 6 occupational types namely Realistic, Investigative, Artistic, Social, and Enterprising, conventional.
- MVPI has 10 scales and for motives like hedonism, security, and tradition, SDS has no strong counterparts.

MVPI VS MBTI

MBTI was designed to assess 16 types composed of combinations of 4 basic mental functions namely Sensing, Intuition, thinking, and feeling, followed by 2 attitude/ orientation functions towards life namely Introvert or Extrovert with 2 Orientations to the outer world namely Judging and Perceiving.

Preferences are expressed as continuous scores. With lower scores indicating a preference for ESTJ and higher scores indicating a preference for INFP.

MBTI has 4 scales Vs 10 scales of MVPI, with a positive correlation only between 2 scales (EI+ SN and Affiliation + Aesthetic).

MBTI on an individual basis helps the person understand how their personality will interact with peers, clients, and managers. MBTI provides a revealing insight into their personality, their preferences, and how they interact in relationships and their environment whereas, Hogan's MVPI is a test that reveals a person's core values, goals, and interests. It identifies what a person wants to do, as opposed to what a person may do, in certain situations.

The MVPI is the only inventory that seeks to assess an individual's core values and then compares them to the existing culture and values of an organization, which are the source for the success of an individual and it is with this in mind that MVPI has been developed.

Hence, organizations, therefore, use the MVPI to ensure that a new employee's values are consistent with those within the organization.

MMPI Vs MVPI

- Minnesota Multiphasic Personality inventory is designed to assess serious psychopathology and it is the most widely used instrument with 3 valid keys namely Lie / Bad/correction.
- MMPI has 10 clinical scales - Hypochondriasis, depression, Hysteria, psychopathic deviation, muscularity-femineity (MF), Paranoia, psychasthenia, schizophrenia, Hypomania, and social introversion. More than a 50% positive correlation among scales of both MMPI and MVPI

2.3.5.5.5.2 MVPI and the Self-Directed Search: The below table from Hogan's Personality assessment manual clearly shows inter-correlations between the SDD and MVPI inventories.

Correlations between the Self-Directed Search and the MVPI

Scale	Realistic	Investigative	Artistic	Social	Enterprising	Conventional
Aesthetic	-.12	.03	.66***	.34***	.13*	-.03
Affiliation	-.11	-.05	.15*	.37***	.35***	.07
Altruistic	-.08	.01	.26***	.41***	.13*	.12
Commercial	.15*	.16*	-.04	.13*	.51***	.51***
Hedonistic	-.05	.01	.05	.11	.20**	-.01
Power	.06	.18**	-.02	.19**	.48***	.26***
Recognition	.06	.09	.16*	.25***	.51***	.20**
Scientific	.34***	.47***	-.09	-.10	.18**	.00
Security	.01	.03	-.10	.01	.02	.15*
Tradition	.03	-.06	.14*	.17*	.11	.02

*Note. N = 167; *p < .10; ** p < .05; *** p < .01*

(Table 2.3.5.5.5.2 Correlation of Personality traits of MVPI Vs Self-directed search)

2.3.5.5.3 MVPI and the Myers-Briggs Type Indicator: The below table from Hogan's MVPI Manuel, shows the correlations between the 4 of MBTI scales and the 10 scales of the MVPI.

Correlations between the Myers-Briggs Type Indicator and the MVPI

Scale	EI	SN	TF	JP
Aesthetic	.21	.61***	.16	.29*
Affiliation	-.71***	-.10	.28	.10
Altruistic	-.29	-.11	.40**	.00
Commercial	-.21	-.30*	-.09	-.02
Hedonistic	-.15	.08	-.01	.28
Power	-.19	.02	-.34*	.02
Recognition	-.12	.19	-.03	.25
Scientific	.10	.24	-.36*	.19
Security	.00	-.68***	.09	-.40**
Tradition	-.39**	-.35*	-.09	-.40**

*Note. N = 46; EI=Extraversion-Introversion, SN=Sensing-Intuition, TF=Thinking-Feeling, JP=Judging-Perceiving; * p < .05; ** p < .01; *** p < .001,*

(Table 2.3.5.5.3 correlation between personalities of MVPI Vs MBTI)

The objective of the correlation displays in the above table between MBTI and SDS methods Vs MVPI is to highlight that Hogan's MVPI has not only captured all the human Personality traits factors but also added some of the new elements to human personality, which is in correlation with MBTI and SDS, shows the richness and the extent of research undertaken by Hogan MVPI over other assessment.

2.4 Research Gap:

A research gap is an interruption of the knowledge in the field of research of the chosen study. Every research project must attempt to fill in some piece of information missing in the literature. If gaps are not identified, the study cannot be considered novel research.

The gap refers to the area that has not yet been explored or is under-explored. Gap could be in terms of size, type, location of population, research method, data collection and/or analysis, or other research variables or conditions.

- The competition in the pharmaceutical market in India implies that practicing physicians are exposed constantly to various competing stimuli, thus regular, study of factors affecting the prescribing behavior of physicians is essential for all stakeholders especially pharmaceutical marketers, this information can help policymakers to identify the measures needed to improve the effectiveness of health policy and consequently it can contribute towards a greater economic and clinical efficiency and effectiveness in Indian health care system.
- As most studies related to factors affecting physician's prescribing behavior have taken place in a limited number of countries, for example in the United States, the United Kingdom, Canada, Finland, Italy, Iran, Turkey, New Zealand, Malaysia, Singapore, Malaysia, Slovenia, Romania, Greece, Cyprus, Bangladesh, Pakistan, Ethiopia, Saudi Arabia, Jordon, conducting a study of this type in India among specialists- will help in understanding the factors that affect the physician's prescribing behavior and give more insights to a better understanding of the relationship and impact of these factors when prescribing anti-asthmatic drugs taken as an example.
- Understanding the role of a physician's personality traits with a valid instrument and its impact on prescribing decisions in the presence of other external factors, towards undertaking interventions or measures which can enable physician's with better decision making, improving the relationship and trust from patients and collaboration with all the stakeholders across the value chain.
- These factors can be further enhanced in the Indian context with a relatively sufficient targeted specialist physicians sample size with a clear geographic demarcation pertaining to practice, set-up along with place of practice.
- Better understanding the level/ extent of physician-pharmaceutical company interactions and their impact on patient welfare, among Indian specialist physicians is challenging, and important, leading to optimal resource allocation to utilization and improving the healthcare access to more patients through rational prescribing behaviour habits from physicians.

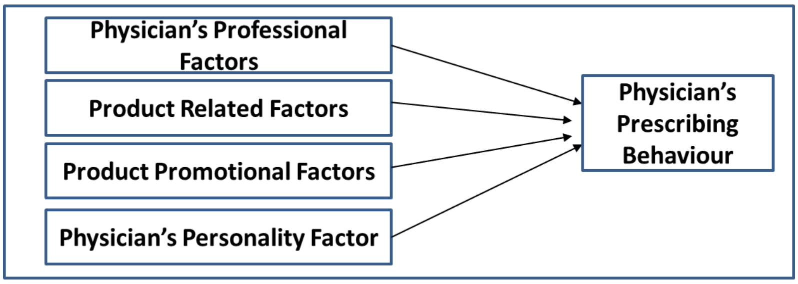
2.5 Conceptual framework based on literature review and gaps:

The Process of a physician's Prescribing decision is very complex owing to the presence of many stakeholders, trying to influence across the value chain. However, a close study of the existing literature revealed that most of the studies are focused on one or the other aspect of factors affecting the physician's prescribing behaviour which concerns the behaviour or personality traits of the physician.

The existing models explaining the dynamics of physician's prescribing behaviour are not adequate to address the influence of factors (both external and internal) affecting the physician's prescribing behaviour.

The literature review further indicated the necessity of a comprehensive model that addresses all the factors (both external and internal) that are affecting the physician's prescribing behaviour.

Hence, a study derived from a model based on, all the above-indicated factors, which are derived from literature research like physician's professional factors, Product-related factors, Product promotional factors, and physician's Personality trait factors (factors derived out of personality traits which constitute a group of psychographic characteristics) through a valid instrument, has been integrated into the model. The proposed Conceptual model framework is being represented in the figure below 2.5.1



2.5.1Conceptual Model Framework :
adopted from Abulhaj et al(2013) European Journal of Social Sciences, 38(3), 380-391.

2.6 Summary of the Literature review

This chapter outlines the conceptual and empirical research which are relevant to the study, attempting to outline the work done on the study of factors affecting the physician's prescribing behavior, mostly adopted through the survey containing a Questionnaire derived from the literature review.

The gist of some of the important studies has been presented in the chapter. As the market is dynamic and dominated by branded generics, understanding the role and impact of a Physician's Personality with a validated instrument in the presence of other factors among Indian specialists has not been tested so far.

The present study attempts to fill this gap, which has been identified after a close review and analysis of the existing literature review towards the creation of a research plan to achieve the research objectives.

CHAPTER – III
RESEARCH METHODOLOGY

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RESEARCH METHODOLOGY

3.1 Introduction:

Research methodology always signifies and explains the detailed systematic and scientific process of the conduction of research. This chapter takes us through the step-by-step process adopted towards reaching the objective of the research study with the help of systematic and detailed methods were presented. The methodology is chosen, and the statistical tools that were deployed in this chapter have been extensively used as a code of conduct to guide the research objective.

It is evident that different problems on the same topic may be subjected to different types of analysis. There can be more than one appropriate way of solving the problem. Choosing the right methodology can affect the accuracy, suitability, and efficiency of the research; hence, due and careful consideration is paid to the selection of the right methodology.

The chapter discusses in detail the research design considered, the sampling technique and the sample size, the sources of data, the type of data, the data collection tools, and the process of data analysis. The pilot study part and the focused group discussion (process details) were also discussed in detail to present a clear picture of the methodology used.

The present work could be considered as a survey-based descriptive work wherein a self-administered questionnaire was used to collect the data, to analyze and identify the most influential factors affecting the physician's prescribing behaviour.

3.2 Research Problem

The study undertaken towards understanding and analyzing factors influencing the physician's prescribing behaviour from Indian physicians would benefit the policymakers in laying down stringent measures for the effective functioning of the healthcare system led by physicians, regulators, etc.

Improvement of the entire ecosystem, towards rational and effective promotion with optimal resource allocation of resources across the value chain for improving patient access with improvement in the standard of care.

- Although a great deal of work is available on the factors influencing physician's prescribing behaviour, the focus has remained on individual factors; the impact of physician's Personality traits has not been considered along with individual factors.
- There are very few research papers that adopt a comprehensive approach to studying specialist Physician's Personality traits with valid instruments on their prescribing behaviour.
- In most of the conducted studies, although adequate Physicians were covered mostly skewed towards cities, however determining the Physician's sample representing with their specialty, Practice set-up (Primary / Secondary/both) and Practice type (own clinic/ Corporate Hospital / Government Hospital), clinical experience and their place of practice (Urban, Extra urban, Rural) can enhance better understanding of factors affecting the physician's prescribing decision.
- There is limited research available on the factors influencing the physician's Prescribing behaviour, especially in the context of Indian specialist Physicians.

Therefore, the problem statement is titled "Analyze and identify the factors influencing the prescription behaviour among specialist respiratory physicians from India taking anti-allergic drugs as an example"

3.3 Research Questions:

Based on the gist of the literature reviewed and discussed in the previous chapter, the study attempts to find relevant answers to the following research questions:

- Identify and analyze the most important Physician's Professional factors influencing their prescribing behaviour ?
- Identity and analyze the most important Pharmaceutical Product related factors influencing physician's prescribing behaviou?
- Identify and analyze the most important Pharmaceutical Product Promotional factors influencing physician's Prescription behaviour?
- Identify and analyze the most important physician's personality traits influencing their prescribing behaviour?

3.4 Research Objectives

After a thorough review of the literature, the undertaken study proposes to achieve the objectives as indicated below:

- To study the influence of Physician's Professional factors on their prescribing behavior,

- To study the influence of Pharmaceutical Product related factors on physicians prescribing behavior.
- To study the influence of the elements of various Pharmaceutical Product Promotion factors on the physician's Prescribing behavior
- To study the influence and impact of Physician's Personality traits on their prescribing behavior.

3.5 Hypothesis's Formulation.

The proposed study will test the following hypotheses. The base premise of these hypotheses is to understand and analyze the factors affecting the prescription behaviour of medicines by physicians in and around the Hyderabad region by taking anti-allergic drugs as an example.

3.5.1 Hypothesis formation for Physician's Professional Factors:

$H1.1_0$ = There is no influence of Physician's Professional factors on physicians prescribing behaviour.

H1.1a = There is an influence of Physician's Professional factors on physicians prescribing behaviour.

3.5.2 Hypothesis Formation for Product-Related Factors:

$H2.1_0$ = There is no influence of Pharmaceutical Product related factors on Physician's prescribing behaviour.

H2.1a = There is an influence of Pharmaceutical Product related factors on physician's prescribing behaviour.

3.5.3 Hypothesis Formation for Product Promotion Factors:

$H2.1_0$ = There is no influence of Pharmaceutical Product Promotional factors on Physician's prescribing behaviour.

H2.1a = There is an influence of Pharmaceutical Product Promotional factors on physicians' prescribing behaviour.

3.5.4 Hypothesis formation for Physician's Personality Trait Factors:

H4.1_0 = There is no influence of the Physician's Personality trait component factors namely affiliation, Altruistic, commerce, Hedonism, power, recognition, science, security, or tradition, on Physicians prescribing behaviour.

H4.1a = There is an influence of the Physician's Personality trait component factors namely affiliation, Altruistic, commerce, Hedonism, power, recognition, science, security, or tradition, on Physicians prescribing behaviour.

3.6 Research Design: -

The research design refers to how the experimenter, backed by a robust literature review, puts together a combination of multiple approaches and constituents of research in a logical manner and highlights the overall blueprint of the research. so that the result of the research problem is efficiently addressed. It principally answers the question of "how" to conduct exploration using a particular methodology.

In relation to the present study, the concept of both descriptive and inferential research design has been used. As stated, the main objective of research design is to formulate the matter under investigation in a more précised form from an operational point of view, the present work also attempts to identify and formulate the subject matter under study more precisely.

The study also attempts to find out and manifest the correlation between physician's prescribing behaviour/ component factors influencing the physicians.

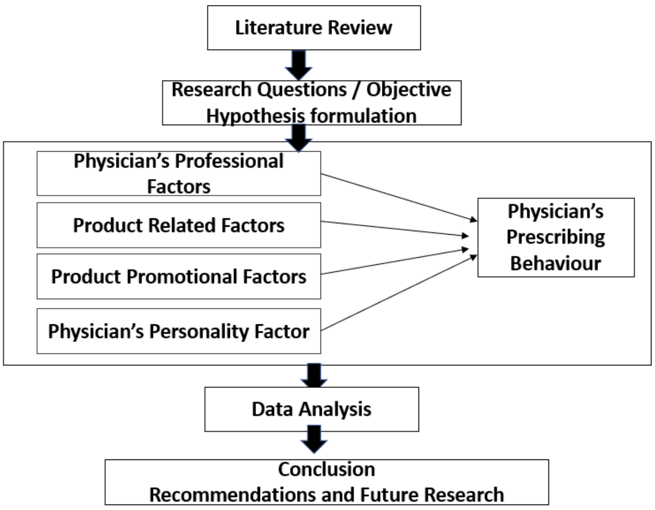
The present study has espoused a check exploration design as it's an effective approach of collecting information from many individuals (Bernard & Bernard, 2013). The data is collected from a sample, and through the process of conception, it's related to a much broader section of the population (Warwick & Lininger, 1975).

With physician's prescribing decision is a complex process with multiple stakeholders playing their roles and various factors influencing physicians to take a prescribing decision. Most of the earlier studies conducted by various researchers toward understanding the factors influencing the physician's prescribing decision have adopted a questionnaire-based approach (Karagianni D et al, 2012) and (Alabbadi et al,2013) and have made useful contributions to the knowledge of the factors affecting the physician's prescribing behaviour, especially on the role of Physician's Personality.

To date, a few theoretical models have been employed in prescription research, like attitude-behavior models like the Reasoned Action Theory and the Planned Behaviour Theory.

(Godin et al,2008) reported that the theory of TPB has some drawbacks and (Lee HJ et al, 2015) indicated that the TPB model does not take the emotional approach into consideration. As a result (Conner et al,1998) suggested the incorporation of emotional variables as a valuable approach to modifying behavioral theories.

Hence a validated personality instrument has been integrated as a part of the quantitative approach which has been validated by the descriptive approach. Statistical tools, techniques ,and scales were employed on the collected data towards drawing conclusions along with the significance of the findings. The present study attempts to study both the internal and external factors influencing physician's prescription decisions as shown in fig 3.6

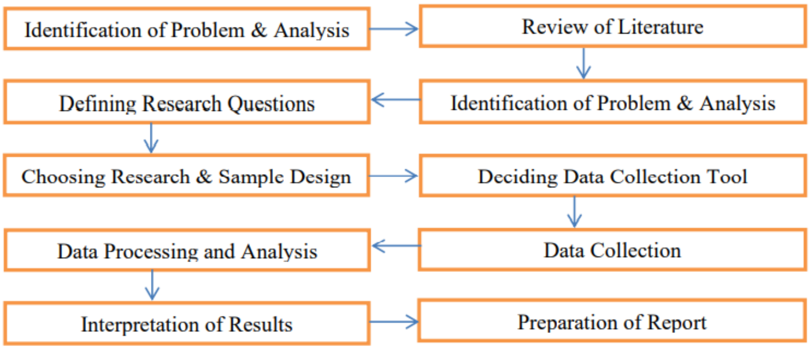


(Figure 3.6) Conceptual Model Framework :
adopted from Abulhaj et al(2013) European Journal of Social Sciences, 38(3), 380-391.

3.7 Stages of Research/ Research Methods:

Research methods highlight the techniques, processes, flow, and strategies that are used either to achieve objective/ objectives, add something to the existing body of knowledge, impart a better understanding of a topic, solve a problem, or discover new facts. The research method is an integrated path chosen by the researchers to conduct their work undertaken.

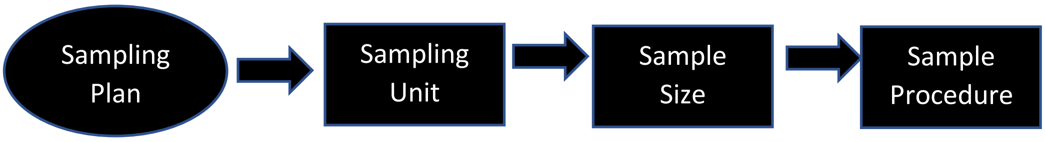
(Sileyew et al, 2019). It could also be viewed as a systematic plan to conduct research pertaining to a selected topic. (Gibbons RV et al, 1998) indicated the research method, which is all about carrying out a systematic, objective, and careful investigation conducted, to obtain facts that could be validated and after that conclusion could be drawn. (Mishra P et al, 2018) further indicated that a research method is a systematic method to explain a problem under consideration analytically.



3.8 Sampling Plan:

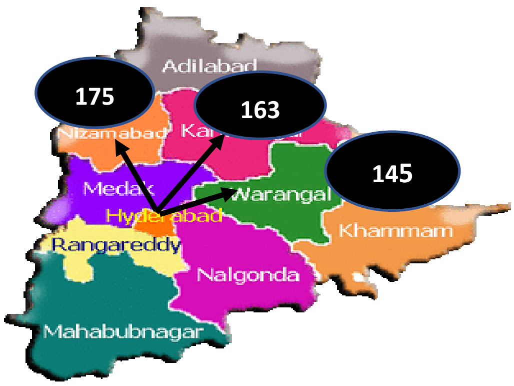
The sampling plan provides details regarding the sample, size, and procedure adopted to collect data regarding the respondents.

<u>Outline of sampling plan</u>



3.8.1 Sampling unit and Size:

It provides details of the category of population to be surveyed. Hyderabad is the capital and largest city of the Indian state of Telangana and the de jure capital of Andhra Pradesh. With the development of industries and improvement of infrastructure, Hyderabad has emerged as one of the nation's best and Telangana state's best medical tourism hub with the establishment of numerous premier healthcare institutes both in the government and Private sector with world-renowned experts in their medical field having decades of experience and expertise.



There are 23 Medical colleges (5Government + 18 Private), 150 corporate Hospitals, and around 350 practitioners in Hyderabad, Nizamabad, Warangal, and Karimnagar extending their services in the field of respiratory medicine, empaneled as ENT surgeons and Chest physicians making it the population/universe of 350 respiratory physicians comprising 184 ENT and 163 chest Physicians, who are registered at the Indian society of otolaryngology, Head and Neck Surgery (IAOHN) and Indian chest society (ICS) for the state of Telangana as obtained from their official society web page.

3.8.2 Sampling Size Determination:

The sampling procedure provides information on the selection criteria consisting of respiratory physicians from the population. As it is not feasible to collect data from all the physicians practicing in and around Hyderabad, a convenience sampling technique was used to reach out to the practicing physicians present in an institute in their departments. Physicians' responses to the provided statements constituting the questionnaire and their suggestions were collected their responses and feedback for the statements constituting the questionnaire for the study.

According to Kothari (2004), the best test of a sample design is how well it represents the characteristics of the population.

The reason for sampling in this study is to lower the cost, increase the accessibility of the study population, and greater the speed of data collection.

Total number of Respiratory Specialists as of 31.03.2017 as shown in the below table 3.8.2.1

City	ENT Specialist	Pulmonologists	Total (N)
Hyderabad	150	140	290
Nizamabad	11	5	16
Karim Nagar	8	8	16
Warangal	15	10	25
Total	184	163	347

Taking the above population as the universe , the sample size is determined through the approach based on precision rate and confidence level. These are being specified for the purpose of the study as follows: The formula for determining the sample size would be (Kothari C.R. – 2014)

$$n = \frac{z^2 \cdot p \cdot q \cdot N}{e^2 \cdot (N-1) + z^2 \cdot p \cdot q}$$

Where, n = sample size, N = Population Size, z = Standard Variate at given confidence level.

The value of Z for the confidence level of 95% is 1.96, e = Precision or acceptable error. The value of 'e' is taken as .05 for this study. p = Sample proportion and q = p -1.

3.8.2.1 Pertaining to the present research topic:

N = 347, z= 1.96, e = 0.05, p = 50% (In the survey it is almost safest to stick with 50% distribution) that is 0.5, **q =** (1 – p) = (1 – 0.5) = 0.5

Geographical Split after Calculation:

City	Total (N)	Determined Sample Size (n)
Hyderabad	290	150
Nizamabad	16	8
Karim Nagar	16	8
Warangal	25	13
Total	347	179

(Sample Size calculation Table 3.8.2.2)

The required sample size for the research has been calculated by taking in to account the current members representing both the societies and applying the formula towards reaching out the target sample size for undertaking research , whose break-up specialty wise has been depicted in the above table.

Based on the educational levels, experience level, Profile of the patients, location of the clinic/hospital, and specialty a physician In and around areas of Hyderabad comprising ENTs, and Pulmonologists will be part of the survey.

During the collection of information, the purpose and objective of collecting data have been fully explained to the respondents along with the use of data strictly used for academic purposes. It was observed that most of the respondents were resistant to giving their personal details.

3.9. Response Details : Initially, out of 347 Universe of respiratory physicians in our geographical area of study, 305 respiratory physicians were approached for their participation in the study, out of which 254 physician's participated in the study for whom the questionnaire was administered, out of that 68 physicians could not start registering their responses and 12 physicians submitted the incomplete questionnaire and finally, 171 physicians have completed the questionnaires, which were considered for analysis purpose as they were properly filled and complete in all the aspects as shown in the below table 3.9.1.

Table 3.9.1 Research area explored in the study

Total Universe of Physicians	No of Physicians Approached	No Physicians participated	No of Physicians Not completed	No of Physicians Responses incomplete	No of the Physician's responses considered	Pilot study respondents
347	305	254	12	08	171	67%

3.10 Data Collection Method:

Data collected from various sources, when subjected to arranging, analyzing, and processing leads to insights that are represented in various types like the structure of an object, symbol, facts, and figures or events. The collected data falls under two categories,

- Primary data sources
- Secondary data sources

Data that is collected for the first time through sources is referred to as Primary data whereas the data already collected earlier but utilized later on by other individuals towards accomplishing various research objectives or objectives, is referred to as secondary data. For our research study, secondary data has been utilized.

3.10.1 Data Sources:

For undertaking this research work both types of data, namely primary data and secondary data were employed for obtaining data.

- **Primary data** – In our research study, responses for the statements forming the questionnaire constitute the main source of Primary data. The respondents were specialist-qualified respiratory physicians belonging either to ENT or Chest specialty, from both genders, offering their clinical practice services either from their own clinics or working in a government hospital or corporate hospitals with end-to-end care, constituting primary care and advanced secondary care in and around Hyderabad followed by cities and towns like Nizamabad, Karimnagar, and Warangal. After primary data collection, the same in a structured form has been arranged, tabulated, and coded for taking to the next step of analysis towards arriving at the insights, whose meaning gets decoded with the focused group discussion, constituting with experts thereby linking with findings from the statistical analysis.

• **Secondary data** –

In the current research study, various types of data from government reports, market reports from various agencies, respective physician's society reports, previous works published in journals by the researchers in the form of research articles, review articles, systematic analysis, guidelines, policy statements, book, information on various personality instruments, in particular, HOGAN's MVPI was considered as secondary data which contributed for the progress of the research were considered as secondary data.

3.11 :Data Collection Process and experience:

Conducted by the researcher one on one with the respondents.

3.12 Questionnaire Designing Process:

Based on the factors derived from the literature review, the questionnaire method of data collection was adopted in the research study.

- The data collection method used in this study is the questionnaire method.
- The questionnaire is chosen as the research instrument because it is a useful and effective method to collect a great deal of information from many respondents.
- Data is collected by presenting a series of statements to the respondents. For each statement, a Likert scale with options ranging from 'strongly disagree' to 'strongly agree' for the statements. Care was taken in the questionnaire to ensure that each part was clear, simply structured, and understandable by all respondents.
- The wording of the statements was checked to avoid ambiguity and to ensure that content is conveyed to the respondents.
- The questionnaire was aimed to elicit opinions from the respondents regarding all four indicators identified through the literature review-namely, Physician's Professional factors, Product related factors, Product Promotion factors, and Physician's personality factors.
- Relevant questions representing each factor have been identified and adapted from the previous studies and specific from the study conducted by Ibrahim A et al (2013) as a major source for designing the questionnaire except for the physician's Personality, where Personality Instrument tool HOGAN's MVPI has been integrated, to increase the validity and reliability of the questionnaire.

The questionnaire with statements has 3 parts,

- o In the first part of the questionnaire, 11 multiple choice statements were asked to gather general information about respondents' demographics like the Physician's name, Place, location, age, Qualification, specialty, experience, gender identity, type of practice, location of practice, and patient clientele.

- In the second part of the questionnaire, 17 questions representing the 3 factors namely physicians' professional factors, Product related factors, and product promotional factors (independent variables) affecting the physician's prescribing behaviour with 1 question as to the dependent variable. For all the statements a 5 points Likert scale was employed for the answers and interlocutors should define their answers as: strongly disagree, disagree, undecided, agree, and strongly agree as suggested (Sullivan GM et al, 2013).

- In the third part of the questionnaire, towards assessing a physician's Personality, Hogan's MVPI instrument comprising 200 questions covering 10 personality traits, which include Recognition, Power, Hedonism, Altruistic, Affiliation, Tradition, Security, Commerce, Aesthetics, and Science and each personality trait having 20 questions were integrated into this questionnaire with a 3-point Likert scale for their answers with disagreeing – undecided- agree.

- Finally at the end three open-ended questions were asked to physicians for their suggestions towards effective ways and means for physician's prescribing behavior as shown in below table 3.12.1.

  A detailed Questionnaire is available in annexure 1

Serial No	Parameters	Total number of statements
1	Physician's Professional factor	4
2	Product related factors	5
3	Product promotional factor	7
4	Physician's Personality (10 Personality traits, each with 20 statements)	200

(Table 3.12.1 : Number of questions break-up constituting each of the factor influencing physician's prescribing behaviour)

The questionnaire developed with the help of a literature survey has been taken forward in the research study with three steps. They include,

- Pre-Pilot study development
- Pilot study
- Post - Pilot study modification

3.12.2 Pre-Pilot study development: During this stage, a tentative questionnaire derived from a literature survey which covers all the components of the identified factors was developed and the same was discussed with the supervisor, physicians (own clinics, government hospital, and corporate) to make the statements clear, understandable and relevant.

To increase the robustness of understanding personality factors from the available various instruments, HOGAN's MVPI instrument was selected as physician's endorsement for its intrinsic nature of understanding the personality components, representing an individual's personality make-up which is thought to be unique for its interplay with the externally applied stimuli representing various other factors.

3.12.3 Pilot study: In this stage, before undertaking the full-length study, a pilot study was conducted with 10% of the total sample size corresponding to 44 responders, to ascertain the feasibility, reliability, and validity of the scale. The pilot study was undertaken to confirm the appropriateness of the instrument for achieving the objectives of the study as the results of the pilot study would help greatly in refining the instrument of the final study. After analysis of the obtained 44 responders, responses, the output was found to be appropriate as the data Complied with co-relation and consistency.

3.12.4 post-Pilot study modification: At this stage, as suggested by the supervisor and few eminent physicians, the aesthetics of the statements were improved making it compact along with a covering letter confirming the purpose of the data , respect for confidentiality for the responses shared for academic research purposes. This has improved physician's conviction and participation in the research study.

3.13 Data Analysis Framework: Statistical Tools and Techniques Used:

Statistical analysis with the deployment of the right tools is the heart of the research study as they display the effects of variables under study in comparison to the dependent variable which describes the objective of the study (Cooley, 1978). For the research study, appropriate statistical tools and techniques were selected for analyzing the research problem towards obtaining meaningful results thereby justifying the research objective undertaken.

In the present research study, the following statistical tools and techniques were used towards analyzing and identifying the most influencing factors in the physician's prescribing decision process.

3.13.1 Descriptive Statistics:

Descriptive statistics have been employed for understanding the central tendency with the help of mean, and variability with the help of standard deviation as a part of organizing and summarizing the data pertaining to the respondents' demographic characteristics.

3.13.1.1Mean:

It is one of the most used central tendency measures. It is generally calculated by dividing the total sum of scores by the number of observations. The concept of mean has been used in the study for the meaningful interpretation of the collected Data with respect to central tendency.

3.13.1.2 Standard Deviation:

A measure of dispersion is widely employed for comparing individual scores deviations calculated as the square root of the variable with implications on the direction adopted by the data for conclusions.

3.13.2 Inferential Statistics:

Inferential statistics tools are used for the verification of the hypothesis and for studying the data in depth for other details. For the current research study, the below-indicated inferential tools were employed. They include,

- Karl Pearson's Coefficient of Correlation
- Multiple Regression
- t-test for Significance of Difference Between Means.

3.13.2.1Karl Pearson's Coefficient of Correlation:

(Guilford JP et al, 1954) indicated that the correlation coefficient depicts the extent of the relationship between two variables to indicate how a change in one variable affects the other variable. The range of which ranges between +1 to -1. In this study, Karl Pearson's coefficient of correlation was used to study correlations between components constituting factors under investigation with respect to physician's prescribing decisions.

3.13.2.2 Regression Analysis: Regression analysis is an inferential statistical tool employed to assess the proportion in the variance of the dependent variable due to the independent variable either along or taken as an aggregate of independent variables.

In this research study, linear regression analysis was undertaken for analyzing the impact and identification of the most influential factors comprising of Physician's professional factors, Product related factors, product promotional factors, and physician's personality trait factors on the prescription behaviour of the physician.

The formula for multiple regressions as indicated below is an extension of linear regression.

$Y = a + b1X1 + b2X2 + \ldots\ldots$

- Y = variable to be predicted
- a = constant or intercept
- b = slope of predictor
- X = scores of predictors

3.13.2.3: t-test for Significance of Difference Between Means:

t – test an important inferential statistical tool used mainly to assess the significance of the difference between two means. In this research study, an independent sample t-test has been performed to assess the difference and influence of the identified factors on the physician's prescribing behaviour among specialist respiratory physicians.

3.14 Factor Analysis:

Factor analysis is performed towards reducing the number of variables and grouping them as a single unit based on their similarities in describing variance. This tool has been performed in the current research study in arriving at "factors" based on commonalities as represented by the loading value, which is equal to or greater than 0.3 taken as the benchmark for consideration and further analysis (Hair and Anderson, 2014). Factor analysis consists of 2 parts,

- Extraction of Factors
- Rotation of Principal components

In our research study, factor extraction and principal component analysis (PCA) were performed, where Eigenvalue determined the extent of variance explained by factors representing the independent variables constituting the physician's professional factor, product-related factor, product promotional factor, and physician's personality factor.

3.15 Use of SPSS (Version. 21)

For our research study, the latest version of SPSS software (version 21) has been used for conducting data analysis towards generating results that best suit the research objective and explain the topic of the research

Table 3.15 Flow of Data analysis for the proposed framework

Step in Data analysis	Purpose	Tool used
Coding and cleaning	Identification of variables; removal of gaps and outliers	Data cleaning (Excel)
Measurement of central tendency	Determination of the distribution of data	Descriptive statistics (SPSS 21)
Measurement of variance	The determination of whether the data set is normal or not	Normality test (SPSS 21)
Measurement of association	Determination of the linear relationship between two variables	Correlation (SPSS 21)
Factor analysis	Identification of factors	Factor analysis (FA) (SPSS 21)
Confirmatory factor analysis	Measurement model to determine convergent and discriminant validity and reliability of constructs model for testing of hypothesis.	Regression Analysis (SPSS 21)

3.16 Focus Group Discussion: (Freitas H et al, 1998) and (Rana M.D et al, 2013) emphasized that Focus group discussion is one of the valuable tools for collecting qualitative data and is mainly useful in social sciences. The results obtained from the Focused Group Discussion are particularly effective in supplying information about how people think, feel, or act regarding a specific topic.

The main objective is to have a discussion among all the members of the group. The interaction calls for participation from all the members with sharing their views and constantly either take motivations or questioning individual views. Finally, efforts are made toward a common conclusion.

The final data arrived at by using a group discussion instrument are the transcripts of the group discussions and the moderator's reflections and annotations. The main advantages of conducting a Focused Group Discussion include,

- Comparatively easier to drive or conduct
- Allows exploring newer insights from the topics.
- Creates more ways of data collection from members of the group from interactions focusing on the topic under research.
- Offers high “face validity” (data) with Low cost about other methods.
- This instrument offers quick results (in terms of evidence of the meeting of the group)
- Also provides the option of increasing the size of the sample group

In this research study, with the findings obtained because of data analysis, focused group discussion among experienced respiratory physicians has been career out to authenticate the findings of the analysis with newer insights that best explain the factors affecting the prescribing behaviour of physicians. The details of questions used in FGDs, and interviews and major findings are provided in Appendix-1

3.17 Summary of the Chapter: The chapter displayed a step-by-step research plan, right from the data source, data collection, validation, integration, analysis, and interpretation, thoroughly implemented with the help of predefined methods and statistical tools towards accomplishing the research objectives. The importance and the contribution of research methodology, conducting a pilot study before and focused group discussion after the final data analysis was elaborately presented in the chapter to arrive at the insights that best explain the factors constituting the research framework and objective.

CHAPTER – IV

DATA ANALYSIS AND INTERPRETATION

CHAPTER-IV
DATA ANALYSIS AND INTERPRETATION

4.1 Introduction:

The Chapter begins with the test of consistency and reliability from the responses obtained through a questionnaire with the help of Cronbach`s alpha. Towards achieving the objectives of the study, data analysis was performed on the data after coding and cleaning. Suitable statistical tools were used to facilitate examining, transforming, and analyzing the data. One of the aims of conducting data analysis was to provide both descriptive and inferential statistical analysis of the data, thus transforming the data to make it possible to obtain quantifiable, objective, and easy-to-interpret results.

As a part of the descriptive statistical analysis, the central tendency and variation of the data were analyzed with KMO, and Bartlett's test of sphericity was performed for testing the variance proportion followed by factor analysis to reduce the number of variables that best explain the maximum variance for data reliability. Inferential statistical analysis was performed to validate the model fitness by performing regression analysis (ANOVA) and t-Test for hypothesis testing by using SPSS 21 Version, which has been conducted individually with all the factors with an objective towards identification of the effective or ideal components forming the factors that are individually affecting the physician's prescribing behavior.

This was followed by the formation of a single aggregate of factors (corresponding to the physician's professional factors, product-related factors, product promotional factors and physician's personality traits) along with their impact on the physician's prescribing behaviour decision.

4.2 Pilot Study with the questionnaire: Frequency distribution and percentage of demographic factors for 44 respondents demonstrated

1) 82% of the specialists are male with 18% comprising female specialists.

2) 55% of the practitioners have based out of Metro followed by 45% of specialists from extra-urban and rural areas.

3) 48% of the practitioners were chest specialists and 52% represented ENT specialists.

4) 52% of the specialists have both types of practice (Primary and secondary) with 50% of specialists having their own clinics with experience varying from 1 to 10 years among 80% of participated physicians and up to 20 patients' daily consultations. The details are shown in table 4.2.1 below.

Frequency distribution and percentage of demographic factors {N=44}

Heading	Details	Frequency	Percentage
Gender	Male	36	82%
	Female	8	18%
Location	Metro city	24	SS%
	Urban	10	23%
	Rural	10	23%
Age	31-40 Years	32	73%
	41-SO Years	10	23%
	Sl-60 Years	2	S%
	>60 Years	0	0%
Highest Degree	MD/DTCD/DNB	34	77%
	MS/MD	10	23%
Clinical Experience	1-S Years	17	39%
	6-10 Years	18	41%
	11-20 Years	9	20%
	>20 Years	0	0%
Specialty of Practice	ENT	23	S2%
	Pulmonologist	21	48%
Nature of Practice	Primary Health care	16	36%
	Secondary Health care	5	11%
	Both	23	S2%
Clinical Set-up	Own Clinic	22	SO%
	Govt Hospital	3	7%
	Private/ Corporate Hospital	19	43%
	Public sector Hospital	0	0%
Patients/ day	Less than 10 patients /day	11	2S%
	11to 20 Patients /day	16	36%
	21 to 30 Patients/day	9	20%
	31 to 40 Patients /day	4	9%
	41 to SO Patients /day	2	S%
	More than SO Patients per day	2	S%
Category of patients (%)	Higher Income Group	18	41%
	Lower Income Group	12	27%
	Both the groups	14	32%

(Table 4.2.1 Demographic profile of respondents (pilot study)

4.2.2 Internal Consistency and Reliability of the Questionnaire:

The internal consistency and reliability of the questionnaire have been tested as a part of a pilot study comprising 44 responses, by calculating Cronbach`s Alpha with the help of SPSS software.

Cronbach's Alpha	No of Items
0.7836	44

(Table 4.2.2)

Interpretation – As shown in the above table, the calculated value of Cronbach`s alpha is 0.7836, which clearly shows the acceptability and reliability of the data, obtained as responses from the physicians toward understanding the factors influencing the physician's prescribing behavior. The same was demonstrated by each one of the variables, which enabled to process of the responses from physicians as per the sample size of 171.

4.2.2.1 Internal Consistency and Reliability of the Questionnaire (N=171):

4.2.2.1.1 Cronbach alpha coefficient of Personality traits: As shown in the below table, Cronbach's alpha coefficient pertaining to physician's personality traits is being demonstrated**.**

Personality Trait	Standardized
Aesthetics	0.84
Affiliation	0.61
Altruistic	0.57
Commerce	0.75
Hedonism	0.65
Power	0.64
Recognition	0.81
Science	0.67
Security	0.70
Tradition	0.54
Overall	**0.93**

(Table no 4.2.2.1.1: Cronbach alpha for physician's personality trait components)

Cronbach alpha coefficient of other factors: As shown in the below table, Cronbach's alpha coefficient pertaining to other factors was demonstrated.

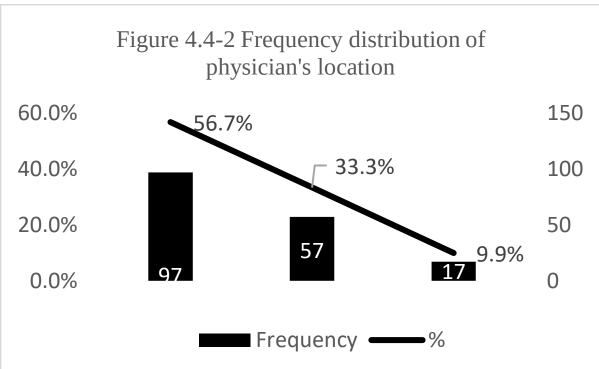
Statement No	Standardized
12	0.93
13	0.93
14	0.93
15	0.93
16	0.93
17	0.93
18	0.93
19	0.93
20	0.93
21	0.93
22	0.93
23	0.93
24	0.93
25	0.93
26	0.93
27	0.93
28	0.93
29	0.93
Overall	0.93

(Table no 4.2.2.1.2: Cronbach alpha for all the component factors)

(Kaiser HF et al, 1974) Indicated that a KMO of more than 0.5 can be considered for factor analysis. After collecting responses from 171 physicians, final analysis was conducted. The details of the questionnaire are given in Annexure-1

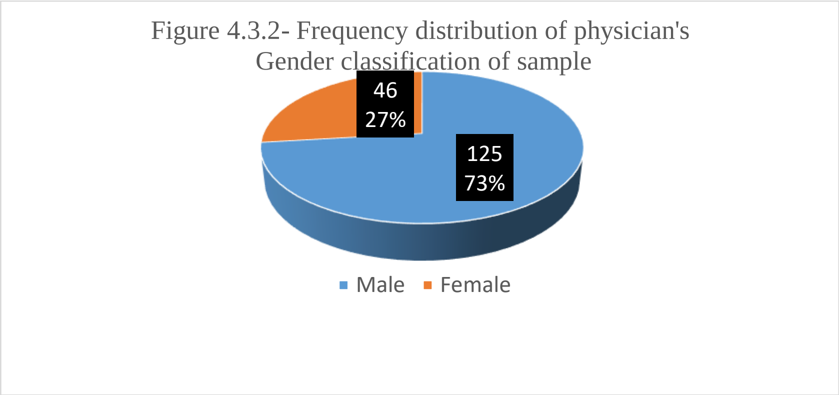
4.3. Profile of the Physician's respondents:

Table-4.3.1-Frequency distribution of Physician's location of respondents, N = 171



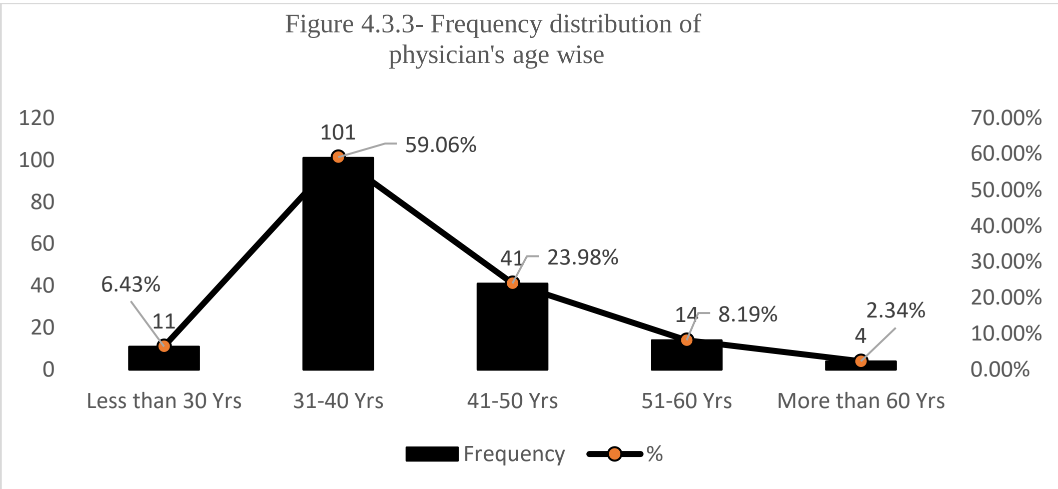
Interpretation: The figure demonstrates that 97 physicians (56.73%) were from the metro city followed by 57 physicians (33.34%) from extra-urban and the remaining 17 physicians (10%) were from rural Places.

The demographic profile of the physician respondents based on gender is represented in the below Figure 4.3.2

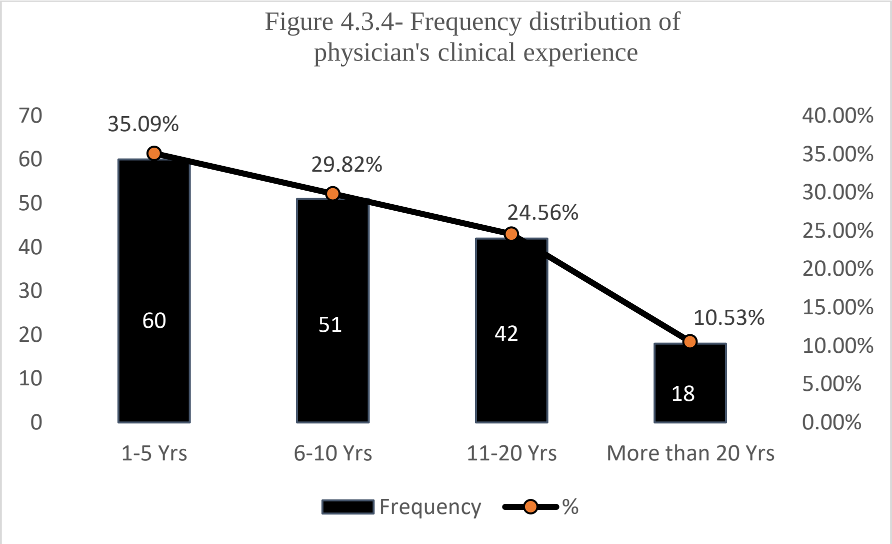


Interpretation: The figure demonstrates the gender identity of the sample of physicians with 125 physicians (73%) are male followed by 46 physicians (27%) female respiratory physicians. Among both genders, Male seems to be more in this segment.

The demographic profile of the physician respondents based on age-wise participation is represented in below figure 4.3.3



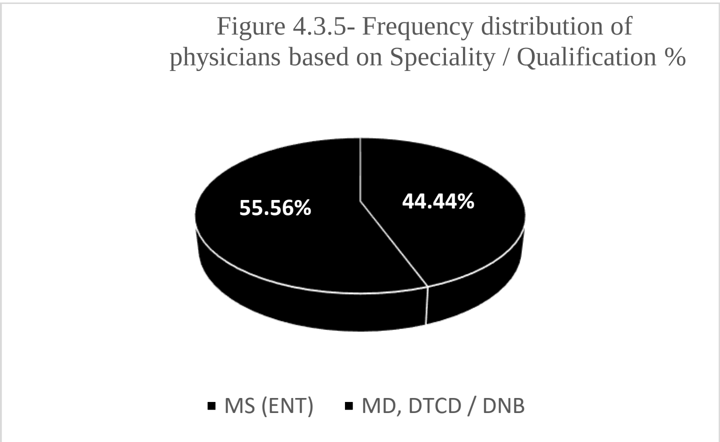
Interpretation: The age wise frequency distribution of physicians indicated the age wise participation of physicians. The data indicated the participation of physicians across all age groups indicating the relevance of outcome on the factors influencing the physician's prescribing behaviour with 6.4% of physicians less than 30 years of age, followed by 59% of physicians in the age group of 31-40 years, followed by 24% of physicians in the age group of 41-50 years and around 10.5% of physicians in the age group exceeding 50 years and above. This clearly show the coverage of physicians across all age group's including the ones from emerging segments. The demographic profile of the physician respondents based on clinical experience as represented in below Figure 4.3.4.



Interpretation:

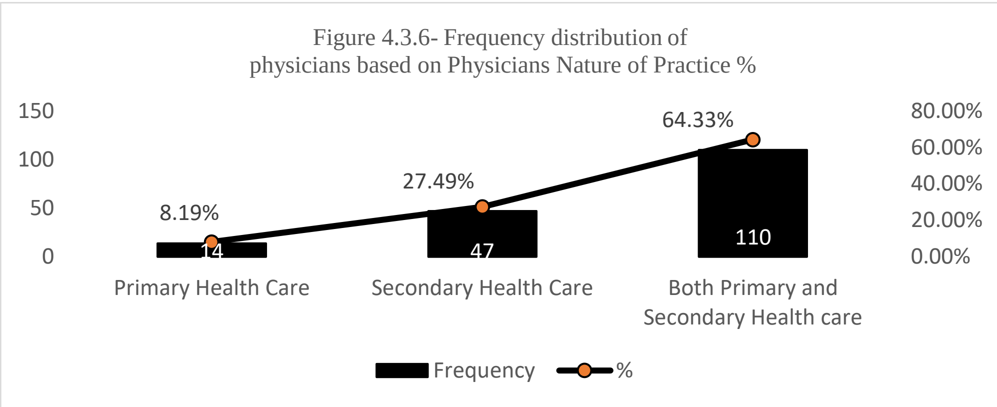
The physician's experience frequency distribution of the sample indicated that 60 Physicians corresponded to 1-5 years of experience, followed by 29.8% of physicians corresponding to 6-10 years, followed by 24.56% of physicians corresponding to 11-20 years of experience, and around 10% of physicians corresponding to more than 20 years of experience, thereby representing physicians across the segments.

The demographic profile of the physician respondents based on the specialty wise of respiratory physicians is represented in below Figure 4.3.5.



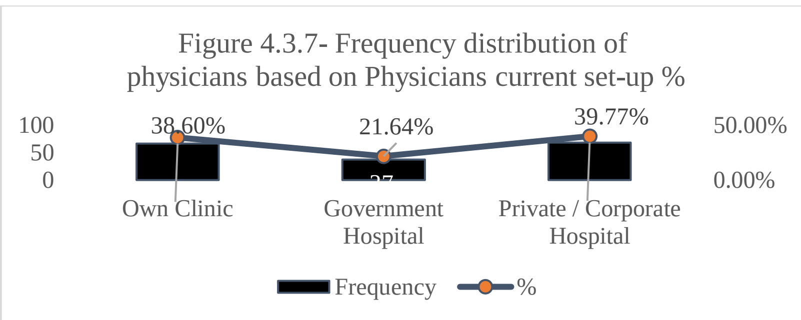
Interpretation: The physician's specialty-wise frequency distribution demonstrated that 76 Physicians corresponding to 44.5% sample size were ENT surgeons followed by 95 physicians corresponding to 55.5% sample size were pulmonologists either with MD or DNB/DTCD qualifications, representing the richness in physician selection.

The demographic profile of the physician respondents based on the respiratory physician's nature of the practice is represented in below Figure 4.3.6.



Interpretation: The physician's frequency distribution based on their nature of practice demonstrated that 14 Physicians corresponding to 8% sample size only have Primary health care practice, followed by 47 physicians corresponding to 27.5% sample size having only secondary health care practice which are referral centers and nearly 64% of physicians corresponding to 110 physicians having both primary and secondary healthcare practice, indicating the center of excellence.

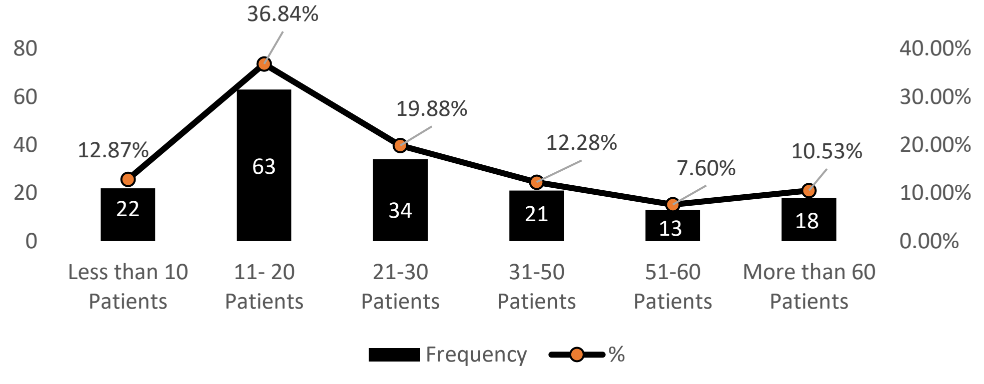
The demographic profile of the physician respondents is based on the current setup of respiratory physicians as represented in Figure 4.3.7 below.



Interpretation: The physician's frequency distribution based on their current set-up demonstrated that 66 Physicians corresponding to 38.6% of sample size practice through their own clinics, followed by 37 physicians corresponding to 21% of sample size practice through working for a government hospital and nearly 39.8% of physicians corresponding to 68 physicians conduct their practice through their affiliation either to private or a corporate hospital. This shows the current generation of physicians' inclination toward either corporate hospitals or government hospitals instead of establishing their own Clinic set-up, which can be attributed to the high installation cost of instruments to manpower and establishment.

The demographic profile of the physician respondents based on daily patient consultation with respiratory physicians is represented in below Figure 4.3.8.

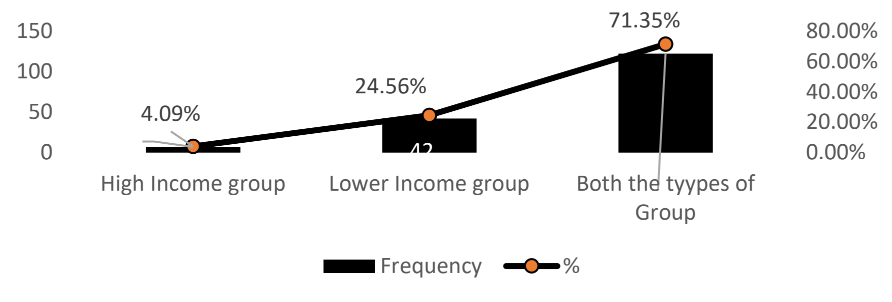
Figure 4.3.7- Frequency distribution of physicians based on Physicians based on their daily patient consultation %



Interpretation: The physician's frequency distribution based on their daily patient consultations indicated that 22 Physicians corresponding to 12.8% sample size see less than 10 patients per day, followed by 63 physicians seeing 11-20 patients per day, 34 physicians corresponding to 19.8% seeing up to 30 patients per day, followed by 21 physicians corresponding to 12.3% seeing up to 50 patients and finally 31 physicians forming 18% seeing per day more than 50 patients.

The demographic profile of the physician’s patient profile is represented in below Figure 4.3.8.

Figure 4.3.8- Frequency distribution of physicians based on their patients income %



Interpretation: The physician’s frequency distribution based on their patients’ income group has indicated that 122 Physicians corresponding to 71.358% sample size treat from both the income group namely high-income and low-income groups, followed by 24.5% of physicians see patients mainly from lower income groups and 7 physicians corresponding to 4% see only patients from the high-income group.

4.4.1 Analysis of physician’s professional factors affecting their prescribing behavior.

Under the physician’s professional factor, the following statements were part of the questionnaire for obtaining the responses for which analysis was performed.

Q-12) I usually get updated with the latest Knowledge about the drugs from publications in Medical Journals, medical textbooks, and CMEs organized by society or by pharmaceutical companies.

Q-14) I usually choose a drug based on my clinical experience with a drug treatment profile

Q-15) Sometimes, the knowledge & experience of my colleagues influence me in selecting a particular drug

Q-16) My level of education and experience play an important role in selecting a treatment strategy.

4.4.1.1Physicians Professional factors: Descriptive Analysis:

The above 4 components representing physicians promotional were subjected to descriptive statistics as shown in the below table 4.4.11.

Statement No	Mean	Std Deviation
28	4.45	0.762
12	4.1	0.797
14	4.27	0.76
15	3.73	0.915
16	4.43	0.752

(**Table: 4.4.1.1 Representing the Descriptive analysis)**

Interpretation: As shown above, in table 4.4.1.1, all the components forming the variable have shown a response with a mean of 4.3 which complies and fall in between agree to strongly agree. Below table 4.4.1.2 presents the coefficient determinant of R, $R2$, and R2 − Adj. In model 2, after entering all independent variables, R is equal to 0.621 which describes a relationship between independent variables and dependent variables. R square is equal to 0.385. This reflects that 38.5% percent of change the in dependent variable (as physicians' prescription) described by these independent variables physician's professional factors).

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
2	.621[b]	.385	.374	.603

Table 4.4.1.4 illustrates the ANOVA test for the independent variables that have a significant correlation to the physician's prescribing decision. As it can be observed, with P-value= 0.000 it can be concluded that the F is significant in 0.05. This is reflecting that at least one of the factors represent physician's Professional factors was found to influence the physician's prescribing decision.

ANOVA[f]						
Model		Sum of Squares	df	Mean Square	F	Sig.
2	Regression	37.783	3	12.594	34.648	.000[b]
	Residual	60.341	166	.363		
	Total	98.124	169			
b. Predictors: (Constant), 16, 15, 14, and c. Dependent Variable:28, Table 4.4.1.4						

Below table 4.4.1.5, shows the regression weights for unstandardized & standardized coefficients.

Coefficients[a]						
Model		Unstandardized Coefficients		Std. Coefficients		
		B	Std. Error	Beta	t	Sig.
2	(Constant)	1.306	.312		4.183	.000
	14	.227	.079	.226	2.863	.005
	15	.167	.055	.200	3.017	.003
	16	.351	.078	.347	4.516	.000

a. Dependent Variable: 28, table 4.4.1.5

Interpretation of physician professional Factors: Among Physician's Professional factors, physician's level of education & clinical experience with drug treatment profiles, knowledge and experience sharing from their colleagues, has been found to influence their prescribing decision.

To conclude, physician's Professional factors have an influence on the prescribing behaviour of the physician which is in line with the existing available literature (Ljungberg et al, 2007) (Oshikoya et al.,2011) and (Shamsi et al, 2019).

4.4.2 Analysis of product-related factors.

The factor consists of the following statements.

Q-17) given a choice I prescribe a drug that is safe and less expensive to my patients

Q-18) I believe in the superiority of drug dosage and delivery mode over the existing option towards better patient compliance leading to adherence and recovery

Q-19) cost of the drug is one of the most important factors for prescribing in my clinical practice as patients are self-paying

Q-21) Patient's expectations are considered from my end before I prescribe a branded generic drug brand

Q-22) In the management of Allergic Rhinitis and Asthma, the efficacy of the drug is taken into consideration regardless of patient choices.

4.4.4.2.1Pharmaceutical product related factor:

The above 5 statements representing physicians promotional were subjected to descriptive statistics as shown in the below table 4.4.4.2.1.

S.NO	Mean	Std. Deviation
28	4.45	.763
17	4.26	.971
18	4.16	.812
19	3.83	.992
21	3.80	1.019
22	3.56	1.005

Interpretation: As shown above, in table 4.4.4.2.1, all the components forming the variable have shown a response with a mean of 4.0 representing the "agree" option, and can be taken forward

The result showed a positive correlation between product-related factors affecting their prescribing behaviour at a 95% confidence level and a 0.05 significance level.

Table- 4.4.4.2.3 Regression Analysis for Product related factors

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
3	.522[c]	.273	.260	.657

According to table 4.4.4.2.3, the value of R square and R was found to be 0.273, that is 27.3% of, the variation in prescribing behaviour of physicians is being impacted by the product-related factor, which signifies the importance of product characteristics for taking into consideration before prescribing to the patient by the physician.

Cohen (1992) and Jacob Cohen, in his 1988 text, Statistical power analysis for the behavioral sciences (2nd ed.), offered guidelines for social/behavioral sciences in interpreting the magnitude of R-squared when an understanding of context was unavailable with R-squared = .02 (yes, 2% of variance). "Small" effect size followed by R-squared = .13. "Medium" effect size and R-squared = .26. "Large" effect size. Product-related factors in our research were found to have a large effect.

Table-4.4.4.2.4 ANOVA Test for Coefficient for Product-related factors ANOVA[f]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
3	Regression	26.697	3	8.899	20.644	.000[c]
	Residual	71.126	165	.431		
	Total	97.822	168			
c. Predictors: (Constant), 21, 17, 18 and d. Dependent Variable:28, Table 4.4.4.2.4						

As shown in the above analysis 4.4.4.2.4, Model-3 was found to be the most significant model, consisting of 3 statements 21,17, and 18 which best explained product-related factors influencing the physician's prescribing behaviour.

They were assessed at a 95% confidence interval or 5% level of the significance lever chosen for the study. Thus, the p-value should be less than 0.05. In the above table, it is .000. Therefore, the result is significant.

The below table 4.4.4.2.5, showed the regression weights for unstandardized and standardized coefficients, signifying model-3 comprising of product safety, price to the patient, and product's dosage superiority followed by patient's expectations and being informed about their concern before prescribing a generic drug, were found to be significantly influencing the physician's prescribing behaviour.

Model		**Unstandardized Coefficients**		**Standardized Coefficients**		
		B	**Std. Error**	**Beta**	**t**	**Sig.**
3	(Constant)	2.032	.316		6.431	.000
	17	.192	.054	.244	3.526	.001
	18	.220	.072	.234	3.054	.003
	21	.180	.056	.240	3.237	.001
a. Dependent Variable: 28						

Table-4. 4.4.2.5 ANOVA Test for Coefficient for Product related factors

Interpretation of Pharmaceutical Product-Related factors:

Among Pharmaceutical Product Related factors, drug safety, affordability, drug dosage superiority & delivery over other options for better patient compliance along with patients' expectations are considered from the physician's end before prescribing a branded generic drug brand. The outcome is in line with the previous research conducted by (Fremantle and Eastaugh, 2002), (Sayandhan T et al, 2013), and (Biswas et al, 2016).

4.4.4.3.1Pharmaceutical product promotional factor:

The factor consists of the following statements.

Q-13) Pharmaceutical sales representative is my most important information resource w.r.t drug/ disease management updates and new drug launches

Q-23) The medical representative's relationship and frequent visits affect my prescribing choices of the drugs

Q-24) Attending medical conferences and educational lectures for upgrading my knowledge on behalf of a company has a positive impact on choosing their drug in my clinical practice

Q-25) I give away free medical samples to patients to assess their efficacy before prescribing them in future

Q-26) providing me with compliments, stationary and in-clinic tools, etc., with the drug's name on it helps me remember it when prescribing to patients during my clinical practice.

Q-27) considering my efforts, it is ok, if I accept compliments/ commissions from the pharma company for prescribing their drug

Q-29) some doctors prescribe drugs based on the favors/ commissions received from the pharmaceutical companies

4.4.4.3.2 Pharmaceutical product Promotional related factor:

The above 5 statements representing product promotional factors, were subjected for descriptive statistics as shown in the below table 4.4.4.3.2.

Table 4.4.4.3.2, Descriptive Statistics for Product Promotional factors

Statement	Mean	Std Deviation
28	3.69	1.116
13	3.36	1.175
23	3.43	1.291
24	3.64	1.018
25	3.6	0.955
26	3.3	1.249
27	2.81	1.197
29	3.52	1.1

Interpretation: As shown in the above table 4.4.4.3.2, all the components forming the independent variable (i.e., product promotional factor) have shown a response with a mean in between 3-4 indicating the physician's agreement between " cant's say: to "agree" option and complies for taking forward.

A study of the correlation was performed which showed the relationship between the product promotional factor influencing the physician's prescribing behavior, the result of which is shown in below Table.4.4.4.3.3.

Table- 4.4.4.3.3 Correlation matrix for Product promotional factors

		28	13	23	24	25	26
Sig (1-tailed)	**28**		0.127	0.001	0.000	0.086	0.003
	13	0.127		0.000	0.001	0.107	0.00
	23	0.01	0.000	0.00	0.000	0.023	0.00
	24	0.00	0.01	0.023		0.010	0.803
	26	0.86	0,107	0.00	0.00		0.018
	27	0.328	0.000	0.00	0.00	0.046	0.00
	29	0.015	0.00	0.00	0.000	0.005	

The result showed a positive correlation between product promotional factors affecting their prescribing behaviour at a 95% confidence level and a 0.05 significance level.

Table- 4.4.4.3.4 Regression Analysis for Product promotional factors. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
6	.298[f]	.089	.078	.731

Table 4.4.4.3.4 presents the coefficient determinant of R, $R2$, and R2 − Adj. In model 6, after entering all independent variables, R is equal to 0.298 which describes a relationship between independent variables and dependent variables.

R square is equal to 0.089. that is 8.9% of, the variation in prescribing behaviour of physicians is being impacted by the product promotional factor, which signifies the importance of the product promotional factor for taking into consideration before prescribing to the patient by the physician. Cohen (1992) and Jacob Cohen, in his 1988 text, Statistical power analysis for the behavioral sciences (2nd ed.), offered guidelines for social/behavioral sciences in interpreting the magnitude of R-squared when an understanding of context was unavailable with R-squared = .02 (yes, 2% of variance). "Small" effect size followed by R-squared = .13. "Medium" effect size and R-squared = .26. "Large" effect size. Hence product promotional factors displayed an effect with a trend from small effect to medium effect, in our research study.

Test for Coefficient for Product Promotional factors, Table- 4.4.4.3.5 ANOVA [f]						
Model		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
6	(Constant)	3.582	.225		15.950	.000
	23	.099	.047	.167	2.108	.037
	24	.145	.059	.194	2.445	.016
f. Predictors: (Constant), 23,24 and g. Dependent Variable:28						

As shown in the above analysis 4.4.4.3.5, the significance of model-6 consisting of 2 statements 23,24 which best explains product promotional factor over other statements has related to have an influencing behaviour on the physicians, which were assessed at 95% confidence interval or 5% level of the significance level is chosen for the study.

Interpretation of Pharmaceutical Product- promotional factors:

- According to the above findings, regarding product promotional factors, physicians' relationship with the medical representatives, with frequent visits at a predetermined periodic interval has resulted in the development of a relationship based on trust over a period.
- In addition to this MR's efforts in ensuring the physicians in attending medical conferences, and educational lectures for upgrading their knowledge on behalf of a pharmaceutical organization, further augments the bonding which has led to a positive impact on choosing the promoted drug in their clinical practice.
- The findings of our research from the specialist respiratory physicians are consistent with the literature from India and that of the developing world (Wazana et al, 2000) (Bamoriya et al, 2012) (Mohsen Ali et al,2017) with respect to the non-inclination of physician's towards the marketing tools consisting of gifts, samples (Bamoriya H et al, 2012) (Fugh-Berman A et al.2018) over the relation developed based on mutual trust.

4.4.4 Analysis of Physician's Personality trait factors:

4.4.4.1.1 Aesthetics Personality Trait: Aesthetics Motives are associated with an interest in art, literature, music, the humanities, and a lifestyle guided by questions of culture, good taste, and attractive surroundings.

Kaiser-Meyer-Olkin (KMO) Test KMO is a standard test conducted to estimate the adequacy of each variable and to test the variance proportion among variables, whose values range from 0 to 1.

Table-4.4.4.1.2-KMO and Bartlett's Test (Aesthetics)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.815
Bartlett's Test of Sphericity	Approx. Chi-Square	1052.04
	df	190
	Sig.	.0000

Interpretation: As shown in the table the value of KMO is 0.815 and in Bartlett`s test of sphericity, the value of significance is less than 0.05, confirming that the variables under consideration are significantly correlated and could be treated as adequate to take forward with factor analysis could further be applied to the collected data.

Table-4.4.4.1.3- Total variance explained (Aesthetics)

Rescaled	Extraction Sum; of Squared Loadings		Rotation Sums of Squared	Loadings
Component	Cumulative %	Total	% Variance	Cumulative %
1	28.688	3.441	17.204	17.204
2	36.991	2.716	13.578	30.782
3	44.76	1.888	9.438	40.22
4	50.751	1.605	8.023	48.243
5	56.095	1.357	6.785	55.028
6	61.013	1.197	5.985	61.013

Extraction Method: PrincipleComponent Analysis

Interpretation: The above table showed clearly that 6 factors got extracted comprising aesthetic traits of physician personality, all together explaining 61% of the total characteristics related to aesthetic traits.

Table-4.4.4.1.4 Rotated Component Matrix [a] (Aesthetics)

1		**2**		**3**		**4**		**5**		**6**	
S	**L**	**S**	**L**	**S**	**L**	**S**	**L**	**S**	**L**	**S**	**L**
V177	.768	V227	.469	V34	.885	V98	.785	V90	.732	V46	.790
V218	.719	V86	.759	V58	.752	V128	.737	V149	.449	V197	-.429
V62	.659	V101	.739								
V176	.649	V144	.569								
V209	.565	V204	.529								
V227	.510	V163	.479								
V206	.453	V197	.405								
V204	.417										

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 6 iterations.

A study of the correlation was performed which showed the relationship between the Physician’s Aesthetic Personality trait component factors influencing the physician’s prescribing behavior, the result of which is shown in the below Table.4.4.4.1.5

Table- 4.4.4.1.5 Correlation matrix for Physician’s Aesthetic Personality trait factors

	28	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6
28	.	0.395	0.07	0.173	0.065	0.455	0.497
Factor1	0.395	.	0.5	0.5	0.5	0.5	0.5
Factor2	0.07	0.5	.	0.5	0.5	0.5	0.5
Factor3	0.173	0.5	0.5	.	0.5	0.5	0.5
Factor4	0.065	0.5	0.5	0.5	.	0.5	0.5
Factor5	0.455	0.5	0.5	0.5	0.5	.	0.5
Factor6	0.497	0.5	0.5	0.5	0.5	0.5	.

The result showed a positive correlation between Physician’s Aesthetic factors affecting their prescribing behaviour at a 95% confidence level and a 0.05 significance level.

Table- 4.4.4.1.6 Regression Analysis for
Physician’s Aesthetic Personality trait component factors

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
7	.000g	.000	.000	.761

According to table 4.4.4.1.7, the value of R square and R was found to be 0.00, that is, the variation in prescribing behavior of physicians is not being impacted by their Aesthetic personality traits. This can be attributed mainly due to their nature of working hard in their daily routine spanning long working hours, tight schedules lead to a paucity of time allocating to themselves for working towards improving or spending time on their interests like music, art and other traits constituting aesthetics, which often leads emotional, low on accomplishment and depersonalization as shown in previous research conducted by (Roger C et al, 2012).

Table- 4.4.4.7 ANOVA Test for Coefficient for
Physician’s Aesthetic Personality trait component factors

Model	Unstandardized coefficients		Unstandardized coefficients		
	B	Std Error	Beta	t	Sig
7 (Constant)	4.45	0.058		76.52	0

a. Dependent Variable 28

As shown in the above analysis 4.4.4.7, the significance and the model which best explains physicians’ Aesthetic Personality traits on their prescribing behaviour were assessed at a 95% confidence interval or 5% level of the significance level chosen for the study. Thus, the p-value should be less than 0.05. In the above table, it is .000. Therefore, the result is significant.

4.4.4.1.8 Impact of Physician's Aesthetic Personality Trait:

From the above analysis, though a physician's aesthetic personality trait exhibited a correlation that is weak in nature with a significant model consisting only of the dependent variable.

We conclude that the aesthetic trait of a Physician's personality is not influencing the prescribing behavior and will not be part of the aggregate analysis.

4.4.2 Personality Trait: Affiliation:

4.4.4.2.1 Affiliation: Affiliation personality traits and Motives are associated with a desire for and enjoyment of social interaction.

4.4.4.2.1.2 Kaiser-Meyer-Olkin (KMO) Test KMO is a standard test conducted to estimate the adequacy of each variable and to test the variance proportion among variables, whose values range from 0 to 1.

Table-4.4.4.2.1.2-KMO and Bartlett's Test (Affiliation)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.622
Bartlett's Test of Sphericity	Approx. Chi-Square	430.099
	df	190
	Sig.	.0000

Interpretation: (Kaiser HF et al, 1974) Indicated that a KMO of more than 0.5 can be considered for factor analysis. As shown in the table the value of KMO is 0.622 and in Bartlett`s test of sphericity, the value of significance is less than 0.05, confirming that the variables under consideration are significantly correlated and could be treated as adequate to take forward with factor analysis could further be applied to the collected data.

Table-4.4.4.2.1.3 - Total variance explained (Affiliation)

Component	Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	2.256	11.281	11.281
2	1.694	8.468	19.749
3	1.603	8.016	27.766
4	1.502	7.510	35.275
5	1.459	7.296	42.571
6	1.371	6.853	49.424
7	1.331	6.656	56.080

Extraction Method: Principal Component Analysis.

Interpretation – The above table showed clearly that 7 factors got extracted comprising of affiliation traits of human personality, have explained 56% of the total variance were considered for taking further analysis.

Table-4.4.4.2.1.4- Rotated Component Matrix [a] (Affiliation)

AF1		AF2		AF3		AF4		AF5		AF6		AF7	
S	**L**	**S**	**L**	**S**	**L**	**S**	**L**	**S**	**L**	**S**	**L**	**S**	**L**
Q78	0.698	Q70	0.719	Q116	0.786	Q66	0.689	Q136	0.709	Q81	0.825	Q89	0.728
Q183	0.686	Q124	0.547	Q192	0.620	Q108	0.677	Q226	0.531	Q71	0.483	Q188	0.659
Q110	0.603	Q216	0.527	Q103	0.473			Q92	-0.511				
Q102	0.452	Q92	0.409										
Q226	0.51												
Q92	0.492												

Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 6 iterations.

A study of the correlation was performed which showed the relationship between the Physician's Affiliation Personality trait component factors influencing the physician's prescribing behavior, the result of which is shown below in Table.4.4.4.2.1.5.

Table- 4.4.4.2.1.5 Correlation matrix for Physician's Affiliation Personality trait

		28	SF1	SF2	SF3	SF4	SF5	SF6	SF7
Sig. (1-tailed)	28	.	.285	.019	.025	.497	.008	.085	.061
	SF1	.285	.	.500	.500	.260	.000	.139	.000
	SF2	.019	.500	.	.500	.423	.000	.222	.003
	SF3	.025	.500	.500	.	.012	.086	.000	.000
	SF4	.497	.260	.423	.012	.	.500	.500	.500
	SF5	.008	.000	.000	.086	.500	.	.500	.500
	SF6	.085	.139	.222	.000	.500	.500	.	.500
	SF7	.061	.000	.003	.000	.500	.500	.500	.

The result in the table shows a significant positive correlation between Physician Affiliation personality trait factors affecting their prescribing behaviour at a 95% confidence level and a 0.05 significance level as shown the table 4.4.4.2.1.6.

Table- 4.4.4.2.1.6 Regression Analysis for Physician's Affiliation Personality trait component factors

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
4	.342[d]	.117	.096	.725

A backward stepwise regression analysis was performed to arrive at the model that best explains the influence of Physician's affiliation trait factors on their prescribing behaviour. As Shown in above table 4.4.4.2.1.6, in model 4, R-value was equal to 0.117 which demonstrates the presence of a relation between physician's affiliation personality trait factors with their prescription behaviour, explaining up to 11.7% of the variable indicating moderate effect.

As a physician's personality involves a detailed study of individual traits, leading to a specific human behaviour, has shown difficulty to be predicted accurately, thereby arriving with a low R square value. Cohen (1992) and Jacob Cohen, in his 1988 text, Statistical power analysis for the behavioral sciences (2nd ed.), offered guidelines for social/behavioral sciences in interpreting the magnitude of R-squared when an understanding of context was unavailable with R-squared = .02 (yes, 2% of variance). "Small" effect size followed by R-squared = .13. "Medium" effect size and R-squared = .26. "Large" effect size.

Generally, a 95% confidence interval or 5% level of significance level is chosen for the study. Thus, the p-value should be less than 0.05. As shown in the below table, 4.4.2.1.7.model-4 has been found to be significant.

Table-4. 4.4.2.1.7 ANOVA Test for Coefficient for Physician's Affiliation Personality Trait component factors

Model		Sum of Squares	Df	Mean Square	F	Sig.
4	Regression	11.502	4	2.876	5.478	.000[d]
	Residual	86.621	165	.525	0	0.00
	Total	98.124	169		0	0.00

d. Predictors: (Constant), SFactor7, SFactor5, SFactor6, SFactor1, and e Dependent variable :28

Further to this, the significant model which best explains physicians' affiliation personality traits on their prescribing behaviour was assessed.

As shown in Table 4.4.2.1.8, model-4 with three factors factor-1, factor-5, and factor-7 representing

- socializing, friendship nature, collaborating, relationship building, and
- working with others,

constituting affiliation trait of personality found to be influencing the prescribing decision made by a physician.

Factor-6 trait focusing on the physician's association mentality with introverts has been found to influence their Prescription behaviour, but it has failed to reach a significant level of influencing in the physician's prescribing decision as shown in the below table 4.4.4.2.1.8.

Table 4.4.2.1.8, Coefficients for Physician's Affiliation Personality Trait component factors

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	St. Error	Beta	t	Sig
4 (Constant)	4.453	0.056		80.131	0.000
SFactor1	-0.235	0.071	-0.309	-3.200	0.001
SFactor5	0.271	0.068	0.350	3.964	0.000
SFactor6	-0.100	0.056	-0.131	-1.780	0.076
SFactor7	0.155	0.059	0.203	2.622	0.010

a.Dependent Variable 28

4.4.4.2.9 Impact of Physician's Affiliation Personality Trait:

To conclude, the affiliation trait of a Physician's personality is influencing prescribing behaviour.

4.4.4.3 Altruistic Personality Trait:

4.4.4.3.1 Altruistic trait:

Altruistic motives involve concern about the welfare of others, especially the less fortunate, a desire to help them, and in some way, contribute to the development of a better society.

4.4.3.2 Kaiser-Meyer-Olkin (KMO) Test KMO is a standard test conducted to estimate the adequacy of each variable and to test the variance proportion among variables, whose values range from 0 to 1.

Table-4.4.4.3.2-KMO and Bartlett's Test (Altruistic)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.597
Bartlett's Test of Sphericity	Approx. Chi-Square	495.710
	df	190
	Sig.	.0000

Interpretation:

(Kaiser HF et al, 1974) Indicated that a KMO of more than 0.5 can be considered for factor analysis. As shown in the table the value of KMO is 0.597 and in Bartlett`s test of sphericity, the value of significance is less than 0.05, confirming that the variables under consideration are significantly correlated and could be treated as adequate to take forward with factor analysis could further be applied to the collected data.

Table-4.4.4.3.3 - Total variance explained (Altruistic) personality trait of physicians.

Component		**E**xtraction Sums of squared loadings	**R**otation Sums of Squared Loadings		
Rescaled		Cumulative %	Total	% of Variance	Cumulative %
	1	12.7	2.100	10.513	10.513
	2	22.550	1.980	9.901	20.414
	3	29.382	1.626	8.132	28.545
	4	36.353	1.415	7.075	35.620
	5	43.027	1.293	6.467	42.087
	6	48.670	1.242	6.211	48.290
	7	54.800	1.166	5.828	54.126
	8	59.720	1.110	5.593	59.720

Extraction Method: Principal Component Analysis

Interpretation – The above table showed clearly that 8 factors got extracted comprising of aesthetic traits of human personality, have explained 59.72% of the total variance were considered for taking further the analysis.

Table-4.4.4.3.4- Rotated Component Matrix [a] (Altruistic) personality trait of physicians.

Alt1		**Alt2**		**Alt3**		**Alt4**		**Alt5**		**Alt6**		**Alt7**		**Alt8**	
S	**L**	**S**	**L**	**S**	**L**	**S**	**L**	**S**	**L**	**S**	**L**	**S**	**L**	**S**	**L**
q141	.824	q75	.749	q39	.673	q67	.912	q56	.412	q231	.842	q56	.445	q229	.848
q139	.777	q95	.746	q84	.618	q63	532	q112	.768			q91	.899		
q145	.747	q94	.413	q179	.473			q97	-.449						
		q63	,446	q56	.454										
				q97	.407										

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 6 iterations. S= statement and L= Loading value.

A study of the correlation was performed which showed the relationship between the Physician's Altruistic Personality trait component factors influencing the physician's prescribing behavior, the result of which is shown below in Table.4.4.4.3.5.

Table-4.4.4.3.5 Correlation matrix for physician's Altruistic Personality trait of the physician's personality factor

		28	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7
Sig. (1-tailed)	**28**	.	.056	.370	.461	.092	.012	.043	.202
	Factor1	.056	.	.500	.500	.500	.500	.500	.500
	Factor2	.370	.500	.	.500	.500	.500	.500	.500
	Factor3	.461	.500	.500	.	.500	.500	.500	.500
	Factor4	.092	.500	.500	.500	.	.500	.500	.500
	Factor5	.012	.500	.500	.500	.500	.	.500	.500
	Factor6	.043	.500	.500	.500	.500	.500	.	.500
	Factor7	.202	.500	.500	.500	.500	.500	.500	.

The result showed a significant positive correlation between Physician's Altruistic factors affecting their prescribing behaviour at a 95% confidence level and a 0.05 significance level.

Table- 4.4.4.3.6 Regression Analysis for Physician's Altruistic personality trait component factors

	Model Summary f			
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
6	.217f	.047	.036	.747

f. Predictors: (Constant), Factor5, Factor6, g. Dependent Variable:28

A backward stepwise regression analysis was performed to arrive at the model that best explains the influence of Physician's altruistic trait factors on their prescribing behaviour. As Shown in above table 4.4.4.3.6, in model 6, R-value was equal to 0.047which demonstrates the presence of a relation between physician's altruistic personality trait factors with their prescription behaviour. As a physician's personality involves a detailed study of individual traits like the altruistic component, leading to a specific human behaviour, has shown difficult to be predicted accurately, thereby arriving at a low R square value.

Cohen (1992) and Jacob Cohen, in his 1988 text, Statistical power analysis for the behavioral sciences (2nd ed.), offered guidelines for social/behavioral sciences in interpreting the magnitude of R-squared when an understanding of context was unavailable with R-squared = .02 (yes, 2% of variance). "Small" effect size followed by R-squared = .13. "Medium" effect size and R-squared = .26. "Large" effect size.

Generally, a 95% confidence interval or 5% level of significance level is chosen for the study. Thus, the p-value should be less than 0.05. As shown in the below table, 4.4.4.3.7. It is found to be significant.

Table- 4.4.4.3.7 ANOVA[f] Test for Coefficient for Physician's Altruistic Personality trait component factors

Model		Sum of Squares	df	Mean Square	F	Sig.
6	Regression	4.649	2	2.324	4.169	.017[f]
	Residual	93.679	168	.558		
	Total	98.327	170			

f. Predictors: (Constant), Factor5, Factor6, g. Dependent Variable:28

According to the above table, altruistic Personality trait variables and constant value are significant in 0.05. Further to this, the significant model which best explains physicians' altruistic personality traits on their prescribing behaviour was assessed.

As shown in Table 4.4.4.3.8, model-6 with factor-5 represents helping nature with open and like-minded people with a pleasant mode influencing the prescribing decision of a physician. Factor No-6 of the altruistic trait, focusing on giving more importance to patient recovery over money has been found to influence but it failed to reach a significant level towards influencing the physician's prescribing decision. Table 4.4.4.3.8

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
6	**(Constant)**	4.450	.057		77.933	.000
	Factor5	-.132	.057	-.173	-2.300	.023
	Factor6	.100	.057	.131	1.746	.083

a. Dependent Variable: 28 Table 4.4.4.3.8

4.4.4.3.9 Impact of Physician's Altruistic Personality Trait:

To conclude, the Altruistic trait of a Physician's personality influences the prescribing behaviour of the physician.

4.5: Commerce Personality Trait of physician:

4.4.4.5.1 Commercial motives reflect an interest in business and business-related matters such as accounting, marketing, management, and finances.

4.4.4.5.2 Kaiser-Meyer-Olkin (KMO) Test KMO is a standard test conducted to estimate the adequacy of each variable and to test the variance proportion among variables, whose values range from 0 to 1.

Table-4.4.4.5.2-KMO and Bartlett's Test (Commerce)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.768
Bartlett's Test of Sphericity	Approx. Chi-Square	763.083
	df	190
	Sig.	.0000

Interpretation: As shown in the table the value of KMO is 0.768 and in Bartlett`s test of sphericity, the value of significance is less than 0.05, confirming that the variables under consideration are significantly correlated and could be treated as adequate to take forward with factor analysis could further be applied to the collected data.

	Extraction Sums of Squared Loadings	Rotation Sums of Squared Loadings		
Component	Cumulative %	Total	% of Variance	Cumulative %
1	21.487	2.507	12.535	12.535
2	31.512	2.212	11.059	23.594
3	38.907	2.018	10.092	33.686
4	45.633	1.895	9.476	43.162
5	51.557	1.679	8.395	51.557

Interpretation – The above table showed clearly that 5 factors got extracted comprising of commerce trait of physician’s personality, have explained 51.55% of the total variance were considered for taking further analysis.

Table-4.4.4.5.4- Rotated Component Matrix [a] (Commerce) personality trait of physicians

Commerce-1		**Commerce-2**		**Commerce-3**		**Commerce-4**		**Commerce-5**	
Statement	**Loading**	**Statement**	**Loading**	**Statement**	**Loading**	**Statement**	**Loading**	**Statement**	**Loading**
q61	.799	q126	.454	q73	.868	q199	.430	q199	.428
q69	.675	q230	.747	q93	.636	q117	.438	q118	-.652
q129	.508	q159	.729	q47	.470	q127	q127	q137	.636
q126	.479	q54	.525	q201	.424	q111	q111	q113	.563
q199	.451	q117	.498			q207	q207		
q54	.462								
q113	.401								

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 6 iterations. S= statement and L= Loading value.

A study of the correlation was performed which showed the relationship between the Physician’s Commerce Personality trait component factors influencing the physician’s prescribing behavior, the result of which is shown below in Table.4.4.4.5.5.

Table-4.4.4.5.5 Correlation matrix for physician's Commerce personality trait

		28	Factor1	Factor2	Factor3	Factor4	Factor5
Sig. (1-tailed)	28	.	.203	.000	.268	.245	.020
	Factor1	.203	.	.500	.500	.500	.500
	Factor2	.000	.500	.	.500	.500	.500
	Factor3	.268	.500	.500	.	.500	.500
	Factor4	.245	.500	.500	.500	.	.500
	Factor5	.020	.500	.500	.500	.500	.

The result showed a significant positive correlation between Physician's commerce factors affecting their prescribing behaviour at a 95% confidence level and a 0.05 significance level.

Table- 4.4.4.5.6 Regression Analysis for
Physician's commerce personality trait component factors

Model	Model Summary			
	R	R Square	Adjusted R Square	Std. Error of the Estimate
4	.311[d]	.097	.086	.728

d. Predictors: (Constant), Factor5, Factor2, e. Dependent Variable: 28

A backward stepwise regression analysis was performed to arrive at the model that best explains the influence of Physician's commerce trait factors on their prescribing behaviour.

As Shown in above table 4.4.4.5.6, in model 4, R-value was equal to 0.097which demonstrates the presence of a relationship moving from weak to moderate strength with respect to physician's commerce personality trait factors in their prescription behaviour.

As a physician's personality involves a detailed study of individual traits, leading to a specific human behaviour, has shown difficulty to be predicted accurately, thereby arriving at a low R square value.

Cohen (1992) and Jacob Cohen, in his 1988 text, Statistical power analysis for the behavioral sciences (2nd ed.), offered guidelines for social/behavioral sciences in interpreting the magnitude of R-squared when an understanding of context was unavailable with R-squared = .02 (yes, 2% of variance). "Small" effect size followed by R-squared = .13. "Medium" effect size and R-squared = .26. "Large" effect size.

Generally, a 95% confidence interval or 5% level of significance level is chosen for the study. Thus, the p-value should be less than 0.05. As shown in the below table, 4.4.4.5.7 is found to be significant.

Table- 4.4.4.5.7 ANOVA[f] Test for Coefficient for
Physician's Commerce Personality trait component factors

Model		Sum of Squares	df	Mean Square	F	Sig.
4	Regression	9.516	2	4.758	8.968	.000[d]
	Residual	88.607	167	.531		
	Total	98.124	169			

d. Predictors: (Constant), Factor5, Factor2, and dependent Variable:28,

According to the above table, altruistic Personality trait variables and constant value are significant at 0.05. Further to this, the significant model which best explains physicians' commerce personality traits on their prescribing behaviour was assessed.

As shown in Table 4.4.4.5.7, model-4 with factor-2 and factor-5 representing money as the source of motivation and identifying various sources of money traits of physicians have been found to influence their prescribing decision and are significant at 0.05.

Table 4.4.4.5.8 Physician's commerce Personality trait Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
4	(Constant)	4.453	.056		79.707	.000
	Factor2	-.205	.056	-.269	-3.653	.000
	Factor5	-.120	.056	-.158	-2.142	.034

a. Dependent Variable: 28

4.4.4.5.9 Impact of physician's commerce personality trait:

To conclude, the commerce trait of a Physician's personality is influencing the prescribing behaviour of the physician.

4.4.4.6: Hedonism personality trait:

4.4.4.6.1 Hedonistic motives produce an orientation toward fun, pleasure, and enjoyment.

4.4.4.6.2 Kaiser-Meyer-Olkin (KMO) Test KMO is a standard test conducted to estimate the adequacy of each variable and to test the variance proportion among variables, whose values range from 0 to 1.

Table-4.4.4.6.2-KMO and Bartlett's Test (Hedonism)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.585
Bartlett's Test of Sphericity	Approx. Chi-Square	471.683
	df	190
	Sig.	.0000

Interpretation:

(Kaiser HF et al, 1974) Indicated that a KMO of more than 0.5 can be considered for factor analysis. As shown in the table the value of KMO is 0.768 and in Bartlett`s test of sphericity, the value of significance is less than 0.05, confirming that the variables under consideration are significantly correlated and could be treated as adequate to take forward with factor analysis could further be applied to the collected data.

Table-4.4.4.6.3 - Total variance explained (Hedonism)

Component	Initial Eigenvalues			Extraction Sums of Squared Loading		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.977	14.886	14.880	2.977	14.880	-14.880
2	1.738	8.681	23.567	1.736	8.681	23.567
3	1.558	7.788	31.355	1.558	7.788	31.355
4	1.418	7.088	38.442	1.418	7.088	38.442
5	1.251	6.255	44.098	1.251	6.255	44.698
6	1.177	5.883	50.581	1.177	5.883	50.581
7	1.125	6.627	56.207	1.125	5.627	56.207
8	1.013	5.083	61.270	1.013	5.053	61.270

Interpretation – The above table showed clearly that factors got extracted comprising hedonism trait of human personality, have explained 61.27% of the total variance and were considered for taking further analysis.

Table-4.4.4.6.4- Rotated Component Matrix [a] (Hedonism)

Hedonism 1		Hedonism 2		Hedonism 3		Hedonism 4		Hedonism 5		Hedonism 6		Hedonism7		Hedonism 8	
S	**L**	**S**	**L**	**S**	**L**	**S**	**L**	**S**	**L**	**S**	**L**	**S**	**L**	**S**	**L**
Q96	0.727	Q157	0.460	Q198	0.697	Q214	0.774	Q76	0.866	Q79	0.751	Q131	0.708	Q173	0.773
Q115	0.585	Q41	0.763	Q49	0.653	Q142	0.546	Q212	0.682	Q147	0.664	Q77	0.664	Q191	0.530
Q157	0.497	Q37	0.736			Q171	0.534								
Q211	0.465	Q170	0.496												

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 6 iterations. S= statement and L= Loading value. S= Statement no and L= Loading.

A study of the correlation was performed which showed the relationship between the Physician's hedonism personality trait component factors influencing the physician's prescribing behavior, the result of which is shown below in Table.4.4.4.6.5.

Table-4.4.4.6.5 Correlation matrix for physician's hedonism personality trait

		28	**Factor1**	**Factor2**	**Factor3**	**Factor4**	**Factor5**	**Factor6**	**Factor7**	**Factor8**
Sig. (1-tailed)	28	.	.043	.042	.058	.047	.023	.000	.003	.024
	Factor1	.043	.	.500	.500	.500	.500	.500	.500	.500
	Factor2	.042	.500	.	.500	.500	.500	.500	.500	.500
	Factor3	.058	.500	.500	.	.500	.500	.500	.500	.500
	Factor4	.047	.500	.500	.500	.	.500	.500	.500	.500
	Factor5	.023	.500	.500	.500	.500	.	.500	.500	.500
	Factor6	.000	.500	.500	.500	.500	.500	.	.500	.500
	Factor7	.003	.500	.500	.500	.500	.500	.500	.	.500
	Factor8	.024	.500	.500	.500	.500	.500	.500	.500	.

The result showed a significant positive correlation between Physician's hedonism factors affecting their prescribing behaviour at a 95% confidence level and a 0.05 significance level.

Table- 4.4.4.6.6 Regression Analysis for Physician's hedonism personality trait component factors

Model	**Model Summary**			
	R	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.471[a]	.221	.183	.689

a. Predictors: (Constant), Factor8, Factor1, Factor7, Factor3, Factor2, Factor6, Factor5, Factor4 and b Dependent Variable:28

A backward stepwise regression analysis was performed to arrive at the model that best explains the influence of Physician's hedonism trait factors on their prescribing behaviour. As Shown in above table 4.4.4.6.6, in model 1, R-value was equal to 0.221which demonstrates the presence of a relation between physician's hedonistic personality trait factors with their prescription behaviour whose strength is in-between medium to large as per the guidelines stated by Cohen (1992) and Jacob Cohen, in his 1988 text, Statistical power analysis for the behavioral sciences (2nd ed.),

Generally, a 95% confidence interval or 5% level of significance level is chosen for the study. Thus, the p-value should be less than 0.05. As shown in the below table, 4.4.4.6.7 is found to be significant.

Table- 4.4.4.6.7 ANOVA[f] Test for Coefficient for Physician's Hedonism Personality trait component factors

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21.702	8	2.713	5.723	.000[a]
	Residual	76.321	161	.474		
	Total	98.024	169			

a. Predictors: (Constant), Factor8, Factor1, Factor7, Factor3, Factor2, Factor6, Factor5, Factor4, b. Dependent Variable:28, Table :4.4.6.6.2

According to the above table, hedonism Personality trait variables and constant value are significant at 0.05. Further to this, the significant model which best explains physicians' hedonistic personality traits on their prescribing behaviour was assessed.

As shown in Table 4.4.4.6.8, Among 8 factors, Factor-5,6,7and 8 of the hedonism personality traits of physicians with a mentality of keeping time for personal enjoyment with family (relaxation) in addition to professional assignments have been found to influence their prescribing decision and are significant at 0.05.

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	4.447	.053		84.215	.000
	Factor1	.100	.053	.132	1.894	.060
	Factor2	.101	.053	.133	1.908	.058
	Factor3	.092	.053	.121	1.744	.083
	Factor4	-.098	.053	-.129	-1.854	.066
	Factor5	-.117	.053	-.153	-2.201	.029
	Factor6	.194	.053	.255	3.670	.000
	Factor7	-.159	.053	-.209	-3.001	.003
	Factor8	-.116	.053	-.152	-2.181	.031

a. Dependent Variable: 28, Table 4,4.4.6.8 Coefficients pertaining to Physician's Hedonism Personality Trait

4.4.4.6.9 Impact of physician's hedonism personality trait:

To conclude, the hedonism trait of a Physician's personality is influencing the prescribing behaviour of the physician.

4.4.4.7 Physician’s Power Personality Trait:

4.4.4.7.1: Power motives are associated with a desire for success, accomplishment, status, competition, and control.

KMO and Bartlett's Test[a]

	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.554
Bartlett's Test of Sphericity	Approx. Chi-Square	505.377
	df	190
	Sig.	.000

a. Based on correlations, Table: 4.4.4.7.1

Interpretation: (Kaiser HF et al, 1974) Indicated that a KMO of more than 0.5 can be considered for factor analysis. As shown in the table the value of KMO is 0.554 and in Bartlett`s test of sphericity, the value of significance is less than 0.05, confirming that the variables under consideration are significantly correlated and could be treated as adequate to take forward with factor analysis could further be applied to the collected data.

Table-4.4.4.7.3 **- Total variance explained - Power personality trait of the physician.**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings	
	Total	% Of Variance	Cumulative %	Total	% of Variance
1	1.531	14.903	14.903	2.729	13.644
2	1.134	11.037	25.940	1.773	8.867
3	.838	8.155	34.095	1.426	7.132
4	.758	7.380	41.475	1.214	6.071
5	.721	7.016	48.491	1.534	7.669
6	.657	6.397	54.888	1.146	5.728
7	.541	5.265	60.153	1.122	5.611

Interpretation – The above table showed clearly that factors got extracted comprising power traits of human personality, have explained 60.15% of the total variance and were considered for taking further analysis.

Table-4.4.4.7.4- Rotated Component Matrix a for physician's Power personality trait

Power 1		Power 2		Power 3		Power 4		Power 5		Power 6		Power 7	
S	**L**	**S**	**L**	**S**	**L**	**S**	**L**	**S**	**L**	**S**	**L**	**S**	**L**
Q105	0.742	Q72	0.745	Q105	-0.400	Q135	-0.803	Q164	0.913	Q53	0.826	Q55	0.414
Q35	0.504	Q182	0.602	Q146	0.827	Q114	0.629	Q154	-0.448	Q48	0.441	Q87	0.902
Q162	0.500	Q219	0.436	Q203	0.427								
Q187	0.498			Q55	0.420								
Q106	0.496												
Q122	0.484												
Q154	0.403												

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 6 iterations. S= statement and L= Loading value.

A study of the correlation was performed which showed the relationship between the Physician's power personality trait component factors influencing the physician's prescribing behavior, the result of which is shown below in Table.4.4.4.7.5.

Table-4.4.4.7.5 Correlation matrix for physician's hedonism personality trait

		28	Factor1	Factor2	Factor 3	Factor4	Factor5	Factor6	Factor7
Sig. (1-tailed)	**28**	.	.377	.000	.297	.015	.327	.086	.165
	Factor1	.377	.	.500	.500	.500	.500	.500	.500
	Factor2	.000	.500	.	.500	.500	.500	.500	.500
	Factor3	.297	.500	.500	.	.500	.500	.500	.500
	Factor4	.015	.500	.500	.500	.	.500	.500	.500
	Factor5	.327	.500	.500	.500	.500	.	.500	.500
	Factor6	.086	.500	.500	.500	.500	.500	.	.500
	Factor7	.165	.500	.500	.500	.500	.500	.500	.

The result showed a significant positive correlation between Physician's power factors affecting their prescribing behaviour at a 95% confidence level and a 0.05 significance level.

Table- 4.4.4.7.6 Regression Analysis for Physician's Power personality trait component factors

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
6	.312f	.097	.087	.727

A backward stepwise regression analysis was performed to arrive at the model that best explains the influence of Physician's hedonism trait factors on their prescribing behaviour.

As shown in above table 4.4.4.7.6, in model 6, R-value was equal to 0.097, which demonstrates the presence of a relation between physician's power personality trait factors with their prescription behaviour, whose strength is towards medium impact per the guidelines stated by Cohen (1992) and Jacob Cohen, in his 1988 text, Statistical power analysis for the behavioral sciences (2nd ed.),

Generally, a 95% confidence interval or 5% level of significance level is chosen for the study. Thus, the p-value should be less than 0.05. As shown in the below table, 4.4.4.7.7 is found to be significant.

Table- 4.4.4.7.7 ANOVA[f] Test for Coefficient for Physician's Power Personality trait component factors

Model		Sum of Squares	df	Mean Square	F	Sig.
6	Regression	9.580	2	4.790	9.067	.000[f]
	Residual	88.748	168	.528		
	Total	98.327	170			

f. Predictors: (Constant), Factor2, Factor4, and g. Dependent Variable:28, Table:4.4.4.7.7

According to the above table, power Personality trait variables and constant value are significant at 0.05. Further to this, the significant model which best explains physicians' power personality traits on their prescribing behaviour was assessed.

As shown in Table 4.4.4.7.8, model no-6, consisting of factors 2 & 4, conveying the ability of physicians succeed vocally and holding the ability to compete and accept challenges from colleagues on important things where success matters have been found to influence prescription behavior.

Table : 4.4.4.7.8, Coefficients[a] of Physician's Power Personality trait.

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
6	(Constant)	4.450	.056		80.069	.000
	Factor2	.201	.056	.264	3.606	.000
	Factor4	.126	.056	.166	2.266	.025

a. Dependent Variable: 28

4.4.4.7.9 Impact of physician's Power personality trait:

To conclude, the power trait of a Physician's personality is influencing the prescribing behaviour of the physician.

4.4.4.8 Recognition Personality Trait of Physician:

4.4.4.8.1: Recognition motives reflect responsiveness to attention, approval, praise, a need to be recognized, and an appreciation for the role of recognition in human motivation.

KMO and Bartlett's Test[a]

	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.780
Bartlett's Test of Sphericity	Approx. Chi-Square	692.648
	df	190
	Sig.	.000

a. Based on correlations, Table: 4.4.4.8.1

Interpretation:

As shown in the table the value of KMO is 0.780 and in Bartlett`s test of sphericity, the value of significance is less than 0.05, confirming that the variables under consideration are significantly correlated and could be treated as adequate to take forward with factor analysis could further be applied to the collected data.

Table-4.4.4.8.3 - Total variance explained for physician's Recognition personality trait

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.550	22.751	22.751	4.550	22.751	22.751
2	1.767	8.837	31.588	1.767	8.837	31.588
3	1.324	6.619	38.207	1.324	6.619	38.207
4	1.212	6.062	44.270	1.212	6.962	44.270
5	1.110	5.549	49.819	1.110	5.549	49.819
6	1.072	5.359	55.178	1.072	5.359	55.178
7	1.025	5.123	60.301	1.025	5.123	60.301

Interpretation – The above table showed clearly that 7 factors got extracted comprising recognition traits of human personality, have explained 60.3% of the total variance, and were considered for taking further analysis.

Table-4.4.4.8.4- Rotated Component Matrix [a] for physician's Recognition personality trait

Statement	1	2	3	4	5	6	7
q40	.100	.229	.663	.175	.156	.166	-.045
q43	-.017	.083	.763	-.100	.072	.060	.108
q51	.289	.203	.388	.084	.384	.103	.170
q60	.059	.122	.330	.489	-.038	.011	.133
q65	.086	-.061	.095	.171	.141	-.052	.837
q104	.093	.572	.211	-.323	.474	.097	.068
q119	.203	.684	.142	.100	.079	-.111	.014
q121	-.021	.031	.086	-.007	.791	-.030	.121
q125	.267	.636	-.006	.417	-.047	.054	.220
q130	-.128	.210	-.033	.501	-.052	.202	.301
q132	-.033	.722	.210	.162	.062	.166	-.103
q133	.077	.072	.157	.271	-.025	.863	-.007
q143	.738	.104	.015	-.009	.111	-.015	.019
q156	.423	.339	.162	-.264	.132	.070	.466
q160	.441	.173	.127	.267	.474	.336	-.131
q175	.421	.085	-.074	.183	.451	-.148	.037
q181	.384	.148	.461	.032	-.202	-.289	.062
q185	.708	.126	.123	-.171	-.056	.254	.219
q190	-.011	.058	-.049	.596	.118	.128	-.057
q213	.523	-.012	.311	.404	.182	-.302	-.137
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. A. Rotation converged in 19 iterations. Table: 4.4.4.8.4							

A study of the correlation was performed which showed the relationship between the Physician's recognition of personality trait component factors influencing the physician's prescribing behavior, the result of which is shown below in Table.4.4.4.8.5.

Table-4.4.4.8.5 Correlation matrix for physician's Recognition personality trait

		28	**Factor1**	**Factor2**	**Factor3**	**Factor4**	**Factor5**	**Factor6**	**Factor7**
Sig. (1-tailed)	**28**	.	.307	.090	.110	.018	.075	.352	.208
	Factor1	.307	.	.500	.500	.500	.500	.500	.500
	Factor2	.090	.500	.	.500	.500	.500	.500	.500
	Factor3	.110	.500	.500	.	.500	.500	.500	.500
	Factor4	.018	.500	.500	.500	.	.500	.500	.500
	Factor5	.075	.500	.500	.500	.500	.	.500	.500
	Factor6	.352	.500	.500	.500	.500	.500	.	.500
	Factor7	.208	.500	.500	.500	.500	.500	.500	.

The result showed a significant positive correlation between Physician's recognition factors affecting their prescribing behaviour at a 95% confidence level and a 0.05 significance level.

Table- 4.4.4.8.6 Regression Analysis for Recognition trait by ANOVA.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
7	.160[g]	.026	.020	.754

A backward stepwise regression analysis was performed to arrive at the model that best explains the influence of Physician's recognition trait factors on their prescribing behaviour. As Shown in table 4.4.4.8.6 in model 7, R-value was equal to 0.02 which demonstrates the presence of a relation between physician's recognition of personality trait factors with their prescription behaviour, whose strength is weak as per the guidelines stated by Cohen (1992) and Jacob Cohen, in his 1988 text, Statistical power analysis for the behavioral sciences (2nd ed.). Generally, a 95% confidence interval or 5% level of the significance level is chosen for the study. Thus, the p-value should be less than 0.05. As shown in the below table, 4.4.4.8.8 is found to be significant.

Table- 4.4.4.8.8 ANOVA[f] Test for Coefficient for Physician's Power Personality trait component factors

Model		Sum of Squares	df	Mean Square	F	Sig.
7	Regression	2.516	1	2.516	4.426	.037[g]
	Residual	95.507	168	.568		
	Total	98.024	169			

g. Predictors: (Constant), Factor4, h. Dependable Variable: 28

According to the above table, recognition Personality trait variables and constant value are significant at 0.05. Further to this, the significant model which best explains physicians' recognition of personality traits in their prescribing behaviour was assessed.

As shown in Table 4.4.4.8.9 model no 7, consisting of factor 4 has been influencing prescription behavior and has been found to be significant.

Physician's Recognition Personality Trait Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
7	(Constant)	4.447	.058		76.901	.000
	Factor4	-.122	.058	-.160	-2.104	.037

a. Dependent Variable: 28, Table: 4.4.4.8.9

4.4.4.8.10: Impact of physician's recognition personality trait:

To conclude, the Recognition trait of a Physician's personality is influencing their prescribing behaviour.

4.4.4.9 Science Personality Trait for physician:

4.4.4.9.1: Science Scientific motives are associated with a desire for knowledge, enthusiasm for new and advanced technologies, and a curiosity about how things work.

KMO and Bartlett's Test[a]

	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.584
Bartlett's Test of Sphericity	Approx. Chi-Square	493.522
	df	190
	Sig.	.000

a. Based on correlations, Table: 4.4.4.9.1

Interpretation:

(Kaiser HF et al, 1974) Indicated that a KMO of more than 0.5 can be considered for factor analysis. As shown in the table the value of KMO is 0.584 and in Bartlett`s test of sphericity, the value of significance is less than 0.05, confirming that the variables under consideration are significantly correlated and could be treated as adequate to take forward with factor analysis could further be applied to the collected data.

Table-4.4.4.9.2 - Total variance explained (Science)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% Variance	Cumulative %	Total	% Variance	Cumulative %
1	3.050	15.249	15.249	3.050	15.249	15.249
2	1.681	8.405	23.654	1.681	8.405	23.654
3	1.429	7.144	30.798	1.429	7.144	30.798
4	1.383	6.914	37.712	1.383	6.914	37.712
5	1.348	6.742	44.454	1.348	6.742	44.454
6	1.227	6.136	50.590	1.227	6.136	50.590
7	1.143	5.715	56.305	1.143	5.715	56.305
8	1.044	5.218	61.523	1.044	5.218	61.523
Extraction Method: Principal Component Analysis. Table:4.4.9.3						

Interpretation – The above table showed clearly that 8 factors got extracted comprising science traits of human personality, which have explained 61.52% of the total variance, and were considered for taking further analysis.

Table-4.4.4.9.3- Rotated Component Matrix [a] (Science)

Q No	1	2	3	4	5	6	7	8
q33	.273	.040	.200	-.117	.580	.061	-.307	-.243
q38	.042	.265	.126	-.258	.194	-.403	.126	-.235
q50	-.031	.310	-.467	.377	.100	.307	.260	-.088
q74	.094	.158	.158	-.156	.083	.728	-.013	.022
q83	.156	-.019	-.008	-.032	.056	.003	.022	.811
q85	.027	.069	.724	.181	-.004	.029	.276	.026
q100	.301	.475	.000	-.050	.046	.241	-.029	-.085
q107	-.089	.099	.645	.026	.309	.167	-.096	-.077
q120	.501	-.009	.051	.190	-.045	.530	.099	-.336
q123	.191	.005	.092	.731	.171	-.168	.033	-.225
q138	.231	.199	.152	.093	.194	.153	.564	.110
q152	.713	.247	-.180	.076	-.048	.031	.004	.116
q174	.741	.055	.001	-.011	.166	.062	.065	.307
q194	.432	.350	.192	-.110	-.515	-.219	-.023	-.199
q195	.505	-.062	.342	.290	-.020	.108	.020	-.234
q205	.004	.110	.103	.014	.734	-.054	.087	.114
q217	.009	.726	.217	.116	-.082	.103	-.103	.149
q224	.001	.211	.111	.711	-.180	.081	-.154	.178
q225	.123	.646	-.180	.196	.244	-.180	.140	-.131
q228	.061	.156	-.010	.177	.139	.127	-.810	.067
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 16 iterations. Table:4.4.4.9.3								

A study of the correlation was performed which showed the relationship between the Physician's science of personality trait component factors influencing the physician's prescribing behavior, the result of which is shown below in Table.4.4.4.9.4.

Table-4.4.4.9.5 Correlation matrix for physician's science personality trait

		28	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7	Factor8
Sig. (1-tailed)	28	.	.132	.077	.421	.292	.311	.399	.379	.027
	Factor1	.132	.	.500	.500	.500	.500	.500	.500	.500
	Factor2	.077	.500	.	.500	.500	.500	.500	.500	.500
	Factor3	.421	.500	.500	.	.500	.500	.500	.500	.500
	Factor4	.292	.500	.500	.500	.	.500	.500	.500	.500
	Factor5	.311	.500	.500	.500	.500	.	.500	.500	.500
	Factor6	.399	.500	.500	.500	.500	.500	.	.500	.500
	Factor7	.379	.500	.500	.500	.500	.500	.500	.	.500
	Factor8	.027	.500	.500	.500	.500	.500	.500	.500	.

The result showed a significant positive correlation between Physician's recognition factors affecting their prescribing behaviour at a 95% confidence level and a 0.05 significance level.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
8	.148[h]	.022	.016	.754

A backward stepwise regression analysis was performed to arrive at the model that best explains the influence of Physician's hedonism trait factors on their prescribing behaviour. As Shown in above table 4.4.4.9.6, in model 8, R-value was equal to 0.022 which demonstrates the presence of a relation between physician's power personality trait factors with their prescription behaviour. whose strength is low as per the guidelines stated by Cohen (1992) and Jacob Cohen, in his 1988 text, Statistical power analysis for the behavioral sciences (2nd ed.), Generally, a 95% confidence interval or 5% level ofificance level is chosen for the study. Thus, the p-value should be less than 0.05. As shown in the below table, 4.4.4.9.7 is found to be significant.

ANOVA[f]						
Model		Sum of Squares	df	Mean Square	F	Sig.
8	Regression	2.141	1	2.141	3.762	.054[h]
	Residual	96.186	169	.569		
	Total	98.327	170			
h. Predictors: (Constant), Factor8, i – Dependent variable 28, Table 4.5.8.7.1						

According to the above table, science Personality trait variables and constant value are not significant at 0.05. Further to this, the significant model which best explains physicians' recognition of personality traits in their prescribing behaviour was assessed.

Coefficients. Science Personality Trait of the physician.Table 4.4.4.9.8

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
8	(Constant)	4.450	.058		77.139	.000
	Factor8	.112	.058	.148	1.940	.054
a. Dependent Variable: 20, Table 4.4.4.9.8						

4.4.4.9.9: Impact of physician's science personality trait:

To conclude, the science trait of a Physician's personality was found to influence marginal in their prescribing decision. According to the above table, Science trait variables and constant value are marginally significant at 0.05.

4.4.4.9.10 Science Personality Trait Conclusion:

To conclude, the Science trait of a Physician's personality is marginally influencing their prescribing behaviour.

4.4.4.10 Security Personality Trait:

4.4.4.10.1: Security motives reflect a desire for certainty, predictability, order, and control in one's life.

KMO and Bartlett's Test[a]

	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.645
Bartlett's Test of Sphericity	Approx. Chi-Square	536.727
	df	190
	Sig.	.000

a. Based on correlations, Table: 4.4.4.10.1

Interpretation:

As shown in the table the value of KMO is 0.645 and in Bartlett`s test of sphericity, the value of significance is less than 0.05, confirming that the variables under consideration are significantly correlated and could be treated as adequate to take forward with factor analysis could further be applied to the collected data.

Factors	Table-4.4.4.10.2 - Total variance explained (Security)				
	Total	% Variance	Cumulative %	Total	% Variance
1	1.968	16.376	16.376	3.111	15.553
2	1.138	9.373	25.749	1.600	8.000
3	1.010	8.322	30.798	1.650	8.249
4	0.895	7.372	41.443	1.458	7.292
5	0.852	7.016	48.480	1.343	6.715
6	0.851	6.766	55.220	1.281	6.405
7	0.640	5.274	60.500	1.095	5.477

Interpretation – The above table showed clearly that 7 factors got extracted comprising security traits of human personality, which have explained 60.5% of the total variance, and were considered for taking further analysis.

Table-4.4.4.10.3- Rotated Component Matrix [a] (Security)

	Rotated Component Matrix						
	1	2	3	4	5	6	7
q36	.023	.098	.494	.251	.373	-.128	-.120
q44	-.046	.099	.793	.017	.087	.067	-.160
q59	.404	-.094	-.111	.094	.194	.015	.720
q64	.078	.050	.044	.110	.880	-.158	-.004
q68	.119	-.091	.612	-.066	-.100	.085	.112
q80	.306	.078	.081	.422	.000	-.094	-.034
q109	-.020	-.023	.121	.831	.048	.094	.300
q150	.560	.040	-.039	.350	.068	.452	-.259
q151	.015	.530	-.193	.190	-.048	.555	-.053
q153	-.064	-.017	-.008	-.191	.668	.385	.124
q158	.684	.040	-.167	-.078	-.054	.011	.066
q180	.582	.137	.138	.182	-.001	-.141	-.008
q186	.155	.686	.086	-.071	-.080	-.033	-.102
q193	.025	-.058	.229	-.070	.005	.757	.209
q202	.628	.134	.259	-.235	.165	.236	.136
q210	.122	.166	.281	-.419	.028	-.012	.023
q220	-.110	.254	.020	.096	-.072	.141	.659
q221	.212	.612	-.054	.214	.130	.217	.277
q223	.486	.127	.396	.025	-.003	.057	.100
q232	.030	.709	.094	-.153	.103	-.087	.165

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Table: 4.4.4.10.3

A study of the correlation was performed which showed the relationship between the Physician's security personality trait component factors influencing the physician's prescribing behavior, the result of which is shown below in Table.4.4.4.10.4.

Table-4.4.4.10.4 Correlation matrix for physician's security personality trait

Correlations, Table:4.4.4.10.4									
		V_28	**FAC1_1**	**FAC2_1**	**FAC3_1**	**FAC4_1**	**FAC5_1**	**FAC6_1**	**FAC7_1**
Sig. (1-tailed)	**V_28**	.	.047	.430	.094	.186	.035	.210	.001
	FAC1_1	.047	.	.500	.500	.500	.500	.500	.500
	FAC2_1	.430	.500	.	.500	.500	.500	.500	.500
	FAC3_1	.094	.500	.500	.	.500	.500	.500	.500
	FAC4_1	.186	.500	.500	.500	.	.500	.500	.500
	FAC5_1	.035	.500	.500	.500	.500	.	.500	.500
	FAC6_1	.210	.500	.500	.500	.500	.500	.	.500
	FAC7_1	.001	.500	.500	.500	.500	.500	.500	.

The result showed a significant positive correlation between Physician's security factors affecting their prescribing behaviour at a 95% confidence level and a 0.05 significance level.

Table- 4.4.4.10.5 Regression Analysis for Physician's Security personality trait component factors

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
5	.308[e]	.095	.079	.730

A backward stepwise regression analysis was performed to arrive at the model that best explains the influence of Physician's security trait factors on their prescribing behaviour.

As Shown in table 4.4.4.10.5 in model 5, R-value was equal to 0.095 which demonstrates the presence of a relation between physician's power personality trait factors with their prescription behaviour whose strength is towards medium impact from weak, as per the guidelines stated by Cohen (1992) and Jacob Cohen, in his 1988 text, Statistical power analysis for the behavioral sciences (2nd ed.).

Generally, a 95% confidence interval or 5% level of significance level is chosen for the study. Thus, the p-value should be less than 0.05. As shown in the below table, 4.4.4.10.6 is found to be significant.

4.4.4.10.6 ANOVA security Personality trait of physicians						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
5	Regression	9.341	3	3.114	5.843	.001[e]
	Residual	88.986	167	.533		
	Total	98.327	170			
e. Predictors: (Constant), FAC7_1, FAC5_1, FAC1_1, and f. Dependent Variable V_28, **Table 4.4.4.10.6**						

According to the above table, security Personality trait variables and constant value are significant at 0.05. Further to this, the significant model which best explains physicians' factor No-7 focuses on occupational security and safety with model No-5 focusing on Predictability nature of the personality trait has been found to influence physicians in their prescribing decision.

4.4.4.10.7 Model Testing Physicians security Personality trait

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
5	(Constant)	4.450	.056		79.723	.000
	FAC1_1	.098	.056	.129	1.750	.082
	FAC5_1	-.106	.056	-.139	-1.893	.060
	FAC7_1	-.185	.056	-.243	-3.300	.001

a. Dependent Variable: V_28 **Table 4.4.4.10.7**

4.4.4.10.8: Impact of physician's security personality trait:

To conclude, the security trait of a Physician's personality was found to influence significantly, their prescribing decision.

4.4.4.11 Tradition Personality Trait:

4.4.4.11.1: Tradition motives are typically expressed in terms of a dedication to ritual, history, spirituality, and old-fashioned virtues.

KMO and Bartlett's Test[a]

	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.603
Bartlett's Test of Sphericity	Approx. Chi-Square	477.064
	df	190
	Sig.	.000

a. Based on correlations, Table: 4.4.4.11.2

Interpretation: As shown in the table the value of KMO is 0.603 and in Bartlett`s test of sphericity, the value of significance is less than 0.05, confirming that the variables under consideration are significantly correlated and could be treated as adequate to take forward with factor analysis could further be applied to the collected data.

Table-4.4.4.11.3 - Total variance explained for physician's Tradition personality trait

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %	Total	% of Variance
1	1.642	15.216	15.216	1.642	15.216
2	1.056	9.789	25.005	1.056	9.789
3	.933	8.652	33.656	.933	8.652
4	.850	7.878	41.534	.850	7.878
5	.752	6.973	48.508	.752	6.973
6	.657	6.088	54.596	.657	6.088
7	.601	5.568	60.163	.601	5.568
8	.575	5.330	65.493	.575	5.330

Interpretation – The above table showed clearly that 8 factors were extracted comprising traditional traits of the physician's personality, which have explained 65.49% of the total variance, and were considered for taking further analysis.

Table-4.4.4.11.4- Rotated Component Matrix [a] for Tradition personality trait

Stat	Rotated Component Matrix ·							
	1	2	3	4	s	6	7	8
q42	0.100	0.063	0.079	-0.119	-0.142	-0.181	0.006	-0.088
q45	0.105	0.129	0.027	-0.025	0.022	0.031	0.109	0.096
q52	0.149	0.034	-0.027	0.028	-0.062	0.038	0.052	0.849
q82	0.025	0.317	0.121	-0.013	-0.234	-0.260	0.174	-0.123
qSS	0.257	-0.039	0.007	-0.039	0.037	0.761	0.123	-0.008
q99	0.018	0.005	-0.032	-.04 1	0.190	0.046	0.001	-.o30
ql34	0.471	-0.503	0.096	0.001	0.155	-0.049	0.180	0.092
ql40	-078	0.035	-0.001	0.057	0.007	.Q70	0.772	0.050
ql48	-0.027	-0.136	0.027	0.110	0.712	-0.063	0.066	-0.007
ql55	0.005	-0.081	0.314	0.200	-0.156	0.052	0.079	0.057
ql65	-0.031	-0.004	0.729	-0.046	0.066	-0.015	-0.023	-0.069
ql66	.IOI	0.397	0.034	0.261	0.124	-0.013	0.032	-0.004
ql67	-0.007	0.374	-0.017	-0.021	-0.073	·.119	0.008	-0.038
ql69	0.623	0.103	·.252	0.046	0.157	-0.027	·0.013	.0.015
ql78	0.491	0.020	-0.004	0.077	-0.058	0.107	-0.068	.-0.05
ql84	-0.052	-0.096	·.120	0.000	-0.170	-.Q30	0.115	-0.062
ql89	0.319	-0.111	-0.465	0.240	0.029	-0.159	0.039	0.006
ql96	0.056	-0.038	-0.038	0.812	-0.021	0.007	0.027	0.006
q200	0.068	0.363	-0.009	-0.084	0.014	0.041	0.005	0.086
q20S	0.331	0.235	.04 1	-0.116	-0.055	.14 1	-0.033	0.093
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. A Rotation converged in 17 iterations.								

A study of the correlation was performed which showed the relationship between the Physician's traditional personality trait component factors influencing the physician's prescribing behavior, the result of which is shown below in Table.4.4.4.11.5.

Correlation matrix for physician's Tradition Personality Trait, Table:4.5.11.5										
		V_28	FAC1_1	FAC2_1	FAC3_1	FAC4_1	FAC5_1	FAC6_1	FAC7_1	FAC8_1
Sig. (1-tailed)	V_28	.	.247	.235	.006	.173	.195	.190	.198	.206
	FAC1_1	.247	.	.500	.500	.500	.500	.500	.500	.500
	FAC2_1	.235	.500	.	.500	.500	.500	.500	.500	.500
	FAC3_1	.006	.500	.500	.	.500	.500	.500	.500	.500
	FAC4_1	.173	.500	.500	.500	.	.500	.500	.500	.500
	FAC5_1	.195	.500	.500	.500	.500	.	.500	.500	.500
	FAC6_1	.190	.500	.500	.500	.500	.500	.	.500	.500
	FAC7_1	.198	.500	.500	.500	.500	.500	.500	.	.500
	FAC8_1	.206	.500	.500	.500	.500	.500	.500	.500	.

The result showed a significant positive correlation between Physician's tradition factors affecting their prescribing behaviour at a 95% confidence level and a 0.05 significance level.

Table- 4.4.4.11.6 Regression Analysis for Physician's Tradition trait y of personality trait component factor, Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
8	.191[h]	.037	.031	.749	1.556

h. Predictors: (Constant), FAC3_1 and i. Dependent Variable: V_28

A backward stepwise regression analysis was performed to arrive at the model that best explains the influence of Physician's traditional trait factors on their prescribing behaviour. As Shown in above table 4.4.4.11.6, in model 8, R-value was equal to 0.037 which demonstrates the presence of a relation between physician's tradition personality trait factors with their prescription behaviour whose strength is towards medium impact from weak, as per the guidelines stated by Cohen (1992) and Jacob Cohen, in his 1988 text, Statistical power analysis for the behavioral sciences (2nd ed.),

Generally, a 95% confidence interval or 5% level of significance level is chosen for the study. Thus, the p-value should be less than 0.05. As shown in the below table, 4.4.4.11.7 is found to be significant.

4.4.4.11.7 Physician's tradition personality trait ANOVA[f]						
		Sum of Squares	df	Mean Square	F	Sig.
8	Regression	3.601	1	3.601	6.424	.012[h]
	Residual	94.727	169	.561		
	Total	98.327	170			
h. Predictors: (Constant), FAC3_1 and i. Dependent Variable: V_28,						

4.4.4.11.8.Model summary. Physician's tradition personality factor

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
8	(Constant)	4.450	.057		77.731	.000
	FAC3_1	-.146	.057	-.191	-2.535	.012
a. Dependent Variable: V_28, 4.4.4.11.8						

According to the above table, tradition Personality trait variables and constant value are significant at 0.05. Further to this, the significant model which best explains physicians' factor No-3 focusing on following culture, tradition & willingness to adapt to changing times has been found to influence physicians in their prescribing decision.

4.4.4.11.9 Tradition Personality Conclusion: To conclude, the Tradition traits of Physician's personality is influencing their prescribing behaviour.

4.5 Implications of Individual Factors Analysis: From the above analysis the impact of individual factors on the physician's prescribing behaviour has been assessed. It has been shown that the following factors are influencing the prescription behaviour of the respiratory physicians who participated in this study, as shown in below table 4.5.1and the statement details are given in the Annexure-3

Factors Under Investigation along with the No of components	**Influencing Significantly**	**Not-Influencing Significantly**
Physician's Professional factors	**YES (3)**	
Pharmaceutical Promotion factors	**YES (2)**	
Pharmaceutical Product related factors	**YES (3)**	
Physician's Personality	Affiliation-9, Altruistic-3, Commerce-9, Hedonism-8, Power-5, Recognition-5, science-2, Security-5, Tradition-2.	Aesthetics

4.6 Analysis with aggregate factors for Hypothesis and Model Testing: For analyzing with aggregate factors for Hypothesis and model testing, the following steps were followed,

- Conversion of Individual influencing factor components to form aggregate factors.
- Performing Descriptive statistics.
- Employing multiple regression (ANOVA) for hypothesis and Model testing.

4.7 Independent Variable details:

4.7.1 Variable-1: Physician's Professional factors (Mean of Question No's: Q14, Q15, Q16):

- Q14- I usually choose a drug based on my clinical experience with a drug treatment profile
- Q15- Sometimes, the knowledge and experience of my colleagues influence me in selecting a particular drug
- Q16- My level of education and experience play an important role in selecting a treatment strategy.

4.7.2 Variable-2: Product Promotion factors (Mean of Question No's: Q23, Q24):

- Q23-The medical representative's relationship and frequent visits affect my prescribing choices of the drugs
- Q24-Attending medical conferences and educational lectures for upgrading my knowledge on behalf of a company has a positive impact on choosing their drug in my clinical practice

4.7.3 Variable-3: Product-related factors (Mean of Question No's: Q17, Q18, Q22):

- Q17- Given a choice I prescribe a drug that is safe and less expensive to my patients
- Q18- I believe in superiority of drug dosage and delivery mode over the existing option towards better patient compliance leading to adherence and recovery
- Q21- Patient's expectations are considered from my end before I prescribe a branded generic drug brand

4.7.4 Variable-4: Physician's Personality Factor:

- Affiliation factor: Mean of 9 prominent questions.
- Altruistic factor: Mean of 3 Prominent questions.
- commerce factor: Mean of 9 Prominent questions.
- Hedonism factor: Mean of 8 Prominent questions.
- Power factor: Mean of 5 Prominent questions.
- Recognition factor: Mean of 5 Prominent questions.
- Science factor: Mean of 2 Prominent questions.
- Security factor: Mean of 5 Prominent questions.
- Tradition factor: Mean of 5 Prominent questions.

4.7.5 QDV28: The goal of prescribing a drug is to help the patient with faster and early recovery thereby maximizing the efficacy of the treatment strategy.

4.8 Performing Descriptive Statistics:

Table 4.8.1, shows the descriptive data of all the aggregate variables, the mean of each question and the mean of all questions (2.90) in other words frequency of the answers is more towards agree and strongly agree.

Factors	Mean	Std. Deviation
DV28	4.4503	.76052
P Professional Factors (3)	4.1365	.64034
Product Promotion Factors (2)	3.5292	.95595
Product Related Factors (3)	4.050682	.7103561
9Affiliation	2.5802	.34485
3Altruistic	2.4191	.45638
9Commerce	1.9805	.45115
8Hedonism	2.2010	.36591
5Power	2.5322	.33337
5Recognition	2.35789	.476858
2Science	2.70468	.462323
5Security	2.3579	.47289
2Tradition	2.4737	.58977

4.8.2: Regression Analysis: Table 4.8.2, presents coefficient determinant of R, $R2$ and R2 − Adj. In model 1, after entering all independent variables, R is equal to 0.701 which describes a relationship between independent variables and dependent variables. R square is equal to 0.491, this is reflecting that 49.1% percent of changes in the dependent variable (as Physicians Prescription) is being described by these independent variables namely physician's professional factors, Pharmaceutical Product related factors, pharmaceutical product Promotion factors, and Physician's personality.

Regression analysis : Model Summary 4.8.2 Physician's Traditional Trait

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.701	.49	.452	.56288

The model has demonstrated a large effect size, which is in line with guidelines for social/behavioral sciences in interpreting by Cohen (1992) and Jacob Cohen, in his 1988 text, Statistical power analysis for the behavioral sciences (2nd ed.).

The above table 4.8.3.1, illustrates the standardized and unstandardized factors corresponding to the dependable variable.

Model		Sum of Squares	df
1	Regression	48.268	12
	Residual	50.060	158
	Total	98.327	170

4.8.4: Residual Statistics:

Below table 4.8.4 presents the residuals statistics from regression equation. In this section,

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.195	.622		1.922	.056
	professional Factors (3)	.427	.089	.360	4.793	.000
	Product Promotion Factors (2)	.092	.053	.116	1.736	.085
	Product Related Factors (3)	.254	.078	.238	3.250	.001
	9Affiliation	.228	.150	.104	1.523	.130
	3Altruistic	-.222	.108	-.133	-2.048	.042
	9Commerce	-.254	.115	-.151	-2.206	.029
	8Hedonism	-.037	.146	-.018	-.254	.800
	5Power	.244	.140	.107	1.746	.083
	5Recognition	.113	.109	.071	1.035	.302
	2Science	.117	.105	.071	1.114	.267
	5Security	-.257	.113	-.160	-2.270	.025
	2Tradition	.028	.079	.022	.354	.724

residual statistics indicates that all the components are normal with variance which is standard.

Residual Statistics : 4.8.5

	Minimum	Maximum	Mean	Std. Deviation
Predicted Value	1.9662	5.3603	4.4503	.53285
Std. Predicted Value	-4.662	1.708	.000	1.000
Residual	-1.66896	2.24291	.00000	.54265
Std. Residual	-2.965	3.985	.000	.964

The following charts and histogram show that these conditions are confirmed on residuals. As indicated from the above charts (figure 4.8.5.1 and 4.8.5.2) residual values are demonstrating normal distribution.

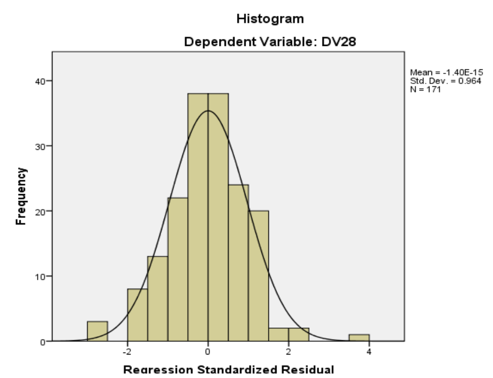
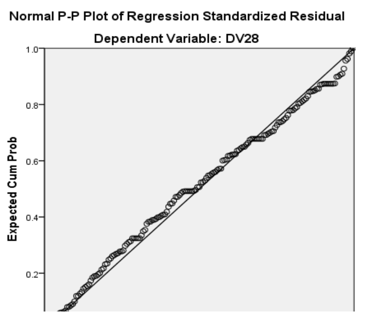


Figure 4.8.5.2



4.9 Hypothesis Testing:

The above table 4.8, shows the regression weights for unstandardized and standardized coefficients.

4.9.1 Hypothesis-1 (Physicians Professional Factors):

$H1.1_0$ = There is no influence of Physician's Professional factors on physicians prescribing behaviour.

H1.1a = There is influence of Physician's Professional factors on physicians prescribing behaviour.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.195	.622		1.922	.056
	PProfessional Factors (3)	.427	.089	.360	4.793	.000

P (Significance Value) =0.000 less than 0.05

Rejected the Null Hypothesis to accept the Alternative Hypothesis

4.9.2 Hypothesis-2 (Pharmaceutical Product Promotional Factors):

$H2.1_0$ = There is no influence of Pharmaceutical Product Promotional factors on Physician prescribing behaviour.
H2.1a = There is an influence of Pharmaceutical Product Promotional factors on physician's prescribing behaviour.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.195	.622		1.922	.056
	Product Promotion Factors (2)	.092	.053	.116	1.736	.085

P (Significance Value) =0.085 more than 0.05

Failed to reject the Null Hypothesis

4.9.3 Hypothesis-3 (Pharmaceutical Product Related Factors):

$H3.1_0$ = There is no influence of Pharmaceutical Product related factors on Physician's prescribing behaviour.
H3.1a = There is influence of Pharmaceutical Product related factors on physician's prescribing behaviour.

Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	1.195	.622		1.922	.056
	Product-Related Factors (3)	.254	.078	.238	3.250	.001

P (Significance Value) =0.001 is less than 0.05
Rejected the Null Hypothesis to accept Alternative Hypothesis

4.9.4 Hypothesis-4 (Physician's Personality Factor- Affiliation):

$H4.1.1_0$ = There is no influence of Physician's Personality trait called Affiliation on Physician's prescribing behaviour.
H4.1.1a = There is an influence of Physician's Personality trait called Affiliation on Physician's prescribing behaviour

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.195	.622		1.922	.056
	9Affiliation	.228	.150	.104	1.523	.130

P (Significance Value) =0.130 is more than 0.05
Failed to reject the Null Hypothesis to accept the same

4.9.5 Hypothesis-5 (Physician's Personality Factor- Altruistic):

$H4.2.1_0$ = There is no influence of the Physician's Personality trait called Altruistic on the Physician's prescribing behaviour.

H4.2.1a = There is an influence of the physician's Personality trait called the Altruistic trait on the Physician's prescribing behaviour

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.195	.622		1.922	.056
	3Altruistic	-.222	.108	-.133	-2.048	.042

P (Significance Value) =0.042 is less than 0.05
Rejected the Null Hypothesis to accept Alternative Hypothesis

4.9.6 Hypothesis-6 (Physician's Personality Factor- Commerce):

$H4.3.1_0$ = There is no influence of the Physician's Personality trait called commerce on the Physician's prescribing behaviour.
H4.3.1a = There is influence of Physician's Personality trait called Commerce on Physician's prescribing behaviour

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.195	.622		1.922	.056
	9Commerce	-.254	.115	-.151	-2.206	.029

P (Significance Value) =0.083 is more than 0.05
Failed to reject the Null Hypothesis to accept the same

4.9.7 Hypothesis-7 (Physician's Personality Factor- Hedonism):

H4.4.1_0 = There is no influence of Physician's Personality trait called Hedonism on Physician's prescribing behaviour.
H4.4.1a = There is an influence of Physician's Personality trait called Hedonism on Physician's prescribing behaviour

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.195	.622		1.922	.056
	8Hedonism	-.037	.146	-.018	-.254	.800

P (Significance Value) =0.800 is more than 0.05
Failed to reject the Null Hypothesis to accept the same

4.9.8 Hypothesis- 8 (Physician's Personality Factor- Power):

H4.5.1_0 = There is no influence of the Physician's Personality trait called Power on the Physician'sprescribing behaviour.
H4.5.1a = There is an influence of Physician's Personality trait called Power on the physician's prescribing behaviour.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.195	.622		1.922	.056
	5Power	.244	.140	.107	1.746	.083

P (Significance Value) =0.083 is more than 0.05
Failed to reject the Null Hypothesis

4.9.9 Hypothesis-9 (Physician's Personality Factor- Recognition):

H4.6.1_0 = There is no influence of a Physician's Personality trait called Recognition on physician prescribing behaviour.
H4.6.1a = There is an influence of the Physician's Personality trait called Recognition on physicians prescribing behaviour

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.195	.622		1.922	.056
	5Recognition	.113	.109	.071	1.035	.302

P (Significance Value) =0.302 is more than 0.05
Failed to reject the Null Hypothesis

4.9.10 Hypothesis-10 (Physician's Personality Factor- Science):

H4.7.1_0 = There is no influence of the Physician's Personality trait called Science on physicians prescribing behaviour.

H4.7.1a = There is an influence of a Physician's Personality trait called Science on Physician's on physicians prescribing behaviour.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.195	.622		1.922	.056
	2Science	.117	.105	.071	1.114	.267

P (Significance Value) =0.267 is more than 0.05

Failed to reject the Null Hypothesis

4.9.11 Hypothesis-11 (Physician's Personality Factor- Security):

$H4.8.1_0$ = There is no influence of the Physician's Personality trait called Security on Physician's prescribing behaviour.

H4.8.1a = There is an influence of the Physician's Personality trait called Security on Physician's prescribing behaviour

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.195	.622		1.922	.056
	5Security	-.257	.113	-.160	-2.270	.025

P (Significance Value) =0.025 is less than 0.05

Rejected the Null Hypothesis to accept Alternative Hypothesis

4.9.12 Hypothesis-12 (Physician's Personality Factor- Tradition):

$H4.9.1_0$ = There is no influence of the Physician's Personality trait called Tradition on Physician's prescribing behaviour.

H4.9.1a = There is an influence of the Physician's Personality trait called Tradition on physicians prescribing behaviour

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.195	.622		1.922	.056
	2Tradition	.028	.079	.022	.354	.724

P (Significance Value) =0.724 is more than 0.05

Failed to reject the Null Hypothesis.

4.9.13 Impact of Demographic Factors:

		Sum of Squares	df	Mean Square	F	Sig.
PProfessional Factors (3)	Between Groups	2.047	1	2.047	5.113	0.025
	Within the Groups	67.658	169	0.4		
	Total	69.705	170			
Product Promotion Factors (2)	Between Groups	1.412	1	1.412	1.551	0.215
	Within the Groups	153.941	169	0.911		
	Total	155.354	170			
Product Related Factors(3)	Between Groups	1.84	1	1.84	3.705	0.056
	Within the Groups	83.943	169	0.497		
	Total	85.783	170			
9Affiliation	Between Groups	0.199	1	0.199	1.683	0.196

	Within Groups	20.017	169	0.118		
	Total	20.217	170			
3Altruistic	Between Groups	0.801	1	0.801	3.911	0.05
	Within Groups	34.608	169	0.205		
	Total	35.409	170			
9Commerce	Between Groups	0.415	1	0.415	2.051	0.154
	Within Groups	34.187	169	0.202		
	Total	34.602	170			
8Hedonism	Between Groups	0.933	1	0.933	7.227	0.008
	Within Groups	21.828	169	0.129		
	Total	22.762	170			
5Power	Between Groups	0.017	1	0.017	0.151	0.698
	Within Groups	18.876	169	0.112		
	Total	18.893	170			
5Recognition	Between Groups	0.095	1	0.095	0.415	0.52
	Within Groups	38.562	169	0.228		
	Total	38.657	170			
2Science	Between Groups	0.731	1	0.731	3.47	0.064
	Within Groups	35.605	169	0.211		
	Total	36.336	170			
5Security	Between Groups	0.024	1	0.024	0.105	0.746
	Within Groups	37.993	169	0.225		
	Total	38.017	170			
2Tradition	Between Groups	1.918	1	1.918	5.667	0.018
	Within Groups	57.213	169	0.339		
	Total	59.132	170			

For respiratory physicians comprising of both ENT and Chest physicians, their behaviour has emerged to be similar with influencing factors affecting their prescription behaviour namely, professional factors followed by product-related factors, personality traits comprising altruistic nature, hedonism, tradition, and product Promotional factors being insignificant.

Both ENT & Pulmonologists Choose a Branded generic drug for a prescription based on their education, clinical experience, colleagues' recommendation, and safe/efficacious/ Economical/ meets Patient expectations. Being specialists, they have a helping nature to their patients for their early recovery keeping a balance between their professional & Personal commitment with great respect to our tradition.

4.9.14 Impact of Demographic Factors:

Dependent Variable	(I) Location	(J) Location	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
PProfessional Factors (3)	1	2	0.1	0.102	0.978	-0.15	0.35
		3	.711*	0.16	0.000	0.32	1.1
	2	1	-0.1	0.102	0.978	-0.35	0.15
		3	.611*	0.168	0.001	0.2	1.02
	3	1	-.711*	0.16	0.000	-1.1	-0.32
		2	-.611*	0.168	0.001	-1.02	-0.2
Product Promotion Factors (2)	1	2	.504*	0.155	0.004	0.13	0.88
		3	0.35	0.245	0.466	-0.24	0.94
	2	1	-.504*	0.155	0.004	-0.88	-0.13
		3	-0.154	0.257	1	-0.78	0.47

	3	1	-0.35	0.245	0.466	-0.94	0.24
		2	0.154	0.257	1	-0.47	0.78
Product Related Factors(3)	1	2	0.087	0.114	1	-0.19	0.36
		3	.719*	0.179	0	0.29	1.15
	2	1	-0.087	0.114	1	-0.36	0.19
		3	.633*	0.189	0.003	0.18	1.09
	3	1	-0.720	0.179	0	-1.15	-0.29
		2	-0.633	0.189	0.003	-1.09	-0.18
9Commerce	1	2	.352*	0.070	0	0.18	0.52
		3	0.246	0.111	0.083	-0.02	0.52
	2	1	-0.352	0.070	0	-0.52	-0.18
		3	-0.106	0.117	1	-0.39	0.18
	3	1	-0.247	0.111	0.083	-0.52	0.02
		2	0.106	0.117	1	-0.18	0.39
8Hedonism	1	2	.23589*	0.059	0	0.09	0.38
		3	0.1554	0.092	0.282	-0.07	0.38
	2	1	-.23589*	0.059	0	-0.38	-0.09
		3	-0.081	0.097	1	-0.32	0.15
	3	1	-0.155	0.092	0.282	-0.38	0.07
		2	0.081	0.097	1	-0.15	0.32
5Power	1	2	.1430*	0.054	0.026	0.01	0.27
		3	.2650*	0.085	0.006	0.06	0.47
	2	1	-.1430*	0.054	0.026	-0.27	-0.01
		3	0.122	0.089	0.519	-0.09	0.34
	3	1	-.2650*	0.085	0.006	-0.47	-0.06
		2	-0.122	0.089	0.519	-0.34	0.09

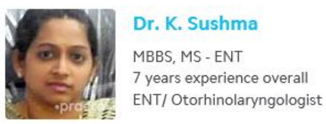
*. The mean difference is significant at the 0.05 level., 1= Urban, 2= Extra urban, 3=Rural.

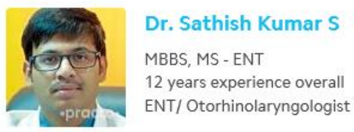
With respect to Location (Metro/Urban/Rural) Physicians Professional factors, Product related factors, Product Promotion, and Physicians Personality traits like : Commerce, Hedonism, Power traits, found to be significantly influencing Prescription behavior

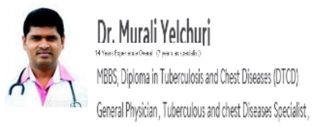
4.10 Focused Group Discussion:

Using the results obtained from the statistical analysis, focused group discussion among experienced physician's has been carried out to authenticate the data generated from the Qualitative Survey questionnaire with newer insights w.r.t their prescription behavior.

Focused group discussion members comprised of 4 Physician 2 each from ENT's and Pulmonologists with an average experience 10 years.







Question	HCP's Response/Recommendation	Relation to our Research
Level of Education and clinical experience play role in selecting a drug for prescribing decision.	Physicians decide to prescribe the brand, based on the nature of the practice, experience, safety, and efficacy of the drug along with the type of patient coming for consultation.	HCP's view is in line with our Physician's Professional factors that are influencing physicians to take a Prescribing decision.
Educational-lectures (ISP/RTM) for upgrading knowledge by the company has no effect on the physicians prescribing behavior?	It Will not influence the prescribing decision. The molecule will enter HCP's brain. These initiatives are basically for academic purposes to get updated with molecule information but not a brand which HCP's, later, validate with quality, studies, facts, and rationality claimed from our clinical experience for gaining the confidence before considering that molecule & brand to prescribe.	HCP's view agrees with our research finding with a clear recommendation for a shift from current marketing standards to a new horizon of Medico marketing initiatives either w.r.t a disease/ molecule/ brand, as per the needs of individual physicians enabling them to offer better patient care and focusing on improving Physician-Patient centric management.
New drug with improved dosage form & delivery for compliance/recovery vs existing option has no effect on physicians prescribing behavior.	Physicians from their clinical experience felt that this is mainly seen in tablet form. However, In chronic conditions & when it comes to devices, etc., usual innovation with differentiation, rational, logical, and scientifically proven benefits to patients based on convenience and compliance will influence physician prescriber first come first serve.	HCP's view is in line with our Physician's Professional factors where the Patient's expectations, safety, efficacy, and Price of the promoted molecule/brand are considered as important factor by s physician in making a prescribing decision.
Physician Samples which PSR colleagues give has no effect on prescribing decision of that drug / brand?	Physician samples never influence them in prescribing decisions. They usually give them to their colleagues and support staff who ask them. All Physician Samples are for that purpose. They don't use them in patients, even to the poor patients. They keep them aside and most of the time they forget in many cases.	HCP's view agrees with our research finding of Brand Physician samples, Gifts will not influence physicians in changing the prescribing decision. Since Physician sample cost is huge, this resource can be effectively redeployed with a concentration on scientific aspects of disease management for better patient care, Physician-Patient way of managing the disease.
	Effective CME deliberations w.r.t disease management/role of the promoted drug or	HCP's view is in agreement with our research finding, of the inability of current ways of

Getting updated with knowledge about drugs from Publications / Journals/CMEs by society or company doesn't influence the physician prescribing behavior?	brand should be carried out to the physicians at their practicing point by the meeting PSR colleague for their knowledge resulting in prescribing decision which is the main concept behind representation with PSR's. PSR to come and update us with both the old information and new information either from local or other CME's	scientific engagement in bringing a change in perception and on physician's prescribing behaviour. Sufficient research should be done in advance on the content as it can bridge the GAP w.r.t physicians practice, benefit to the patient, free from content bias and then accordingly the mode of communication should be selected thereby meeting the objective of effectively enhancing physician's scientific knowledge and thereby implementing the learnings in their clinical practice, for better patient care.

4.11 Summary : The chapter analyzed the data collected from 171 sample of respiratory physician's (ENT+ Chest Physician's) from Hyderabad region, Telangana. Data analysis enabled to confirm the factors influencing physician's personality on their prescribing behaviour with a validated model for its validity. Testing of hypotheses was performed, a summary of the results of the hypotheses are presented below.

Table 4.12

Table showing summary of results of testing of hypotheses by Bootstrapping & Regression Analysis.

S. N	Hypothesis	Result	Interpretation
1	There is no influence of Physician's Professional factors on physicians prescribing behaviour	Significant	Physician's professional factors are influencing the prescription behaviour
2	There is no influence of Pharmaceutical Product Promotion factors on Physician's prescribing behaviour.	Not Significant	Pharmaceutical product Promotion tools are not influencing physician's prescription behaviour
3	There is no influence of Pharmaceutical Product related factors on Physician's on physicians prescribing behaviour.	Significant	Physicians select medicine preparations for their patients after evaluating product characteristics on various parameters for their prescription decision.
4.1	There is no influence of Physician's Personality trait called Affiliation on Physician's prescribing behaviour	Not Significant	Physicians tend to be independent of their association either for visibility or for fame and go by their clinical experience of the drug for prescribing to their patients.
4.2	There is no influence of Physician's Personality trait called Altruistic on Physician's prescribing behaviour.	Significant	Physicians always tend to be patient centric with empathy, caring and help, when needed, w.r.t drug procurement to dosage adherence leading to better clinical outcome, towards their prescribing decision.

4.3	There is no influence of Physician's Personality trait called commerce on Physician's prescribing behaviour.	Significant	Physicians in their clinical Practice, ensure to make their services to patients viable commercially for running their operations and meeting their expenditure.
4.4	There is no influence of Physician's Personality trait called Hedonism on Physician's prescribing behaviour	Not Significant	Patients' wellbeing is the topmost priority for physicians even by sacrificing their family time/ personal engagements.
4.5	There is no influence of Physician's Personality trait called Power on Physician's prescribing behaviour	Not Significant	Physicians in their clinical Practice, ensure to prescribe medicines based on their clinical practice, independently and they maintain neutral with respect to gaining power over their peers.
4.6	There is no influence of Physician's Personality trait called Recognition, on physicians prescribing behaviour.	Not Significant	Physicians in their clinical Practice, ensure to maintain natural profile without being too much aiming for recognition.
4.7	There is no influence of Physician's Personality trait called Science on physicians prescribing behaviour.	Not Significant	As, physicians are experts in science either w.r.t molecule or a brand. They choose a brand based on their individual clinical experience and other factors as indicated above from the alternative options available for their prescription.
4.8	There is no influence of Physician's Personality trait called Security on Physician's prescribing behaviour.	Significant	Physicians in their clinical Practice, ensure to prescribe medicines based on their clinical practice, independently and they maintain neutral with Security being worked out for today and future plan.
4.9	There is no influence of following tradition Physician's Personality trait on physicians prescribing behaviour.	Not Significant	Physicians in their clinical Practice, prefer to adopt to the latest technologies /updates, for implementing in their clinical practice, benefiting to their patients and also simple to perform from their end in a specific shortest possible time.

CHAPTER – V

RESULTS, DISCUSSION AND CONCLUSIONS

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RESULTS, DISCUSSION AND CONCLUSIONS

5.1 Introduction

This chapter presents a discussion of the results and findings of the analyzed data that was discussed in the previous chapter. The results of the data analysis were viewed in the context of what was already known about factors influencing the prescription behaviour of physicians and how they were impacted by various factors. The findings were analyzed to enable the researcher to offer solutions and insights for the problem under investigation and to add to our understanding on the topic of the physician's prescribing decision.

The chapter further presents the physician’s implications of the findings with a note on how other factors, like product-related factors, professional factors, and personality traits as a factor, can create a more positive and conducive atmosphere for their prescription decision.

The study included a validated personality measurement tool, whose measurement can share relevant information towards determining a physician’s personality for a productive physician-patient interaction leading to physician prescribing decisions. The limitations and scope of the study are also presented at the end of the chapter.

5.2 Summary of Research Findings: On the basis, of the research undertaken and the data analysis performed in the previous chapter, the following findings have been recorded.

- ✓ Our conceptual model has described 49.1% changes in the dependent variable (a physician's prescription) as being described by these independent variables, namely the physician’s professional factors, pharmaceutical product-related factors, pharmaceutical product promotion factors, and the physician’s personality. The model has demonstrated a large effect size, which is in line with guidelines for social and behavioral sciences interpreted by Cohen (1992) and Jacob Cohen, in his 1988 text, Statistical power analysis for the behavioral sciences (2nd ed.).
- ✓ There was a significant impact of the physician’s professional factors on their prescribing decision. The components comprising the factor include
- ✓ physician’s level of education, clinical experience, and colleague's experience in choosing the ideal evidence-based therapeutic solution, that best meets the patient’s requirements.

- This is possible with a physician's desire for continuous improvement and know-how from his qualification, followed by their clinical experience using either the brand containing the active ingredient in an ideal dosage form or interaction with colleagues as a part of knowledge or clinical experience sharing.
  - ✓ There was a significant impact of product-related factors on their prescribing decision. The components comprising the factor include,
  - ✓ Safety, efficacy, and dosage superiority of the drug, followed by the cost of the drug to the patient, along with the patient's expectations, were found to influence the physician's prescribing behaviour.
  - ✓ A physician prescribes branded drugs as they offer the promise of safety, and affordability over existing alternative brands that guarantee patient adherence and compliance leading to patient recovery.
  - ✓ There was no impact of product promotion factors, although there was a trend that could not reach a significant level. Product promotional factors included are,
- The medical representative's relationship and frequency of visits with the physician are important for promoting the branded drug.
- Brand promotion, represented by the organization's literature and brochures, aims to increase the share of voice for the brand, followed by engagement through conference sponsorship for gaining knowledge in the field, towards implementing in their clinical practice for their patient benefit with aim of increase in prescriptions support for the sponsored company brands.
- Product promotional tools like Brand Samples and gifts with the brand name printed on them being presented to the physician showed a trend but could not reach to a Statistically significant level.

- Hence, to conclude, product promotional factors are not influencing physicians' prescribing decisions.
  - This can be attributed to the fact that, most of the therapeutic options available in the form of branded drugs are being promoted by various organizations, that either lack innovation in the dosage form or fail to create a different perception, which is the outcome of marketing efforts led by a dedicated sales team. As a result, physicians tend to assume "that the marketed branded drugs are similar.".
  -

    - Hence, the pharmaceutical organization should aim with consistent medico-marketing efforts, at regular intervals, towards creating a strong brand perception, with a year-long medico-marketing initiatives in place which revolve around the disease, for whose management, the lead brand is created for.

There was a significant impact of three personality traits of a physician which influence them taking a prescribing decision of a brand over the available alternative brands. The traits include,

- Altruistic trait, commerce trait, and security trait.
- Physicians' altruistic nature is owing to their patient care, helping nature towards building trust among each other for better disease management. Also, because of the physician's friendly nature with the patient, the patient even opts for word-of-mouth publicity for the physician among relatives/colleagues/community, and society at large, leading to an increase in footfall for the physician's consultations and an improvement in practice.
- Physicians' business nature is found to influence their prescribing decisions in their clinical practice.
    - This is because life is full of uncertainties. As a result, most physicians wish to be secure with respect to their monthly remuneration, either earned through private practice or through consultation charges from a corporate hospital, within the limits of the law.
    - This will ensure physicians maintain their self-esteem, and secure lifestyle with dignity, respect, and honour in society.
- As physicians learn more about self-awareness, they are found to be more serious about their profession and tend to spend more time delivering services to their patients meeting their expectations. As a result, physicians spend a limited amount of time with family and avoid going on vacation as it may affect their clinical practice.
- The above findings are important because most of the brands in this segment are assumed to be similar by physicians, thereby, physicians have ample options to choose from based on their professional requirements and patients' status along with their expectations.
- Physician’s helping nature of recommending the best available treatment, based on patients’ expectations for their recovery reflects their inherent values and ethics, which are being followed towards exercising their professional duties in their clinical practice either from their own clinic or working for a hospital.

The service rendered by the physician comes at a price to the patient as the former needs to take care of personal needs with respect to security purpose and financial needs in the case of running an establishment, which falls under commerce purpose.

Although the human element is involved while performing the service, there is a presence of a financial element that acts as a source of motivation in the form of gain, which is expected in terms of profit either from patient's service charges or from the dispensed medicine charges, apart from the extra financial incentives offered by pharmaceutical organizations towards prescribing and dispensing of their brand to meet their operational expenses in their clinical practice and personal expenditure, in leading a standard and respectful life in the society.

The presence of these three traits in physicians. reflects the pseudo-altruistic theory. Though gain/profit is essential for a physician's survival, there should be a balance between the gains obtained from services vs external gains. Efforts should be made by all the stakeholders involved in the entire value chain including the pharmaceutical organizations towards promoting trust, thereby laying a strong foundation for physician-patient-centric disease management and improving the standards of the healthcare ecosystem.

5.3 Discussion: The findings of this study are compared with the results of previous studies and existing literature. The present study confirms the role, and the extent of certain factors' influence on the physician's prescribing behavior.

FACTORS	Description of the Question	Previous Studies Finding	Our Study Finding
NO-1	Impact of Physician's Professional factors on the prescribing behaviour	YES	YES
NO-2	Impact of Pharmaceutical Product Related factors on the prescribing behaviour	YES	YES
No-3	Impact of Pharmaceutical Product Promotion factors on the prescribing behaviour	No (2018 Systemic review)	NO (Less Impact)
Physicians Personality	Impact of Physicians Personality on the prescribing behaviour – Using an authorized Instrument.	YES Personality Overall studied	YES Personality Components determined

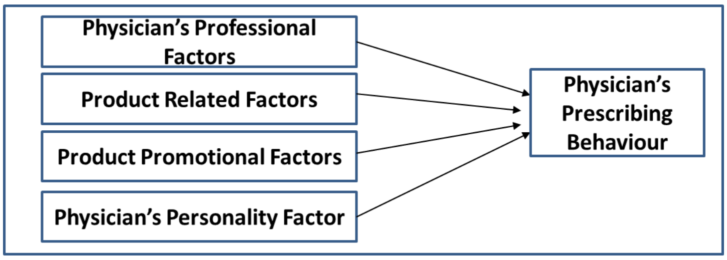
To the best of the researcher's knowledge, previous studies have assessed the impact of various factors that are external to physicians and their impact on the prescribing decision, across specialties mostly focusing on general physicians as an example.

5.4 Conclusions:

This research study has several important implications. From a theoretical perspective, the present study provides an important empirical step toward understanding the factors influencing a physician's prescribing decision.

As previously stated, the literature in this area has mainly focused on the impact of external factors on physicians' prescribing decisions. As everyone is not created the same, the same applies to physicians, as each of them created unique. This makes understanding the role and impact of a physician's personality traits around the entire dynamics of a physician's prescribing decision not a simple one as perceived earlier thereby leaving the GAP around these complexities unanswered, although attempts are being made.

- The study shows an empirical analysis of the integral factors that are important determinants of a physician's prescribing decision. The analysis consists of a comprehensive mix of all the factors, including the components of a physician's personality traits, that are influencing physicians to make a prescribing decision for a particular brand among the available options in the presence of both external and internal environmental factors, as shown in our research model 5.1.



- The validated model includes both internal and external factors of physician's prescribing decisions (see fig 5.1). The findings of our research can be adopted among specialist physicians, managing a chronic condition.

- The findings of this research bring out the significance of various factors especially components of a physician's personality whose effect on a physician's prescribing decision was not tested before.
- The model used in this study could be used as a starting point for models to include various other factors that have not been tested or evaluated before. Hence, the present study adds to the domain of physicians' prescribing behaviour research.

5.5 Implications of the research study:

In the present study, however, based on the literature review, relevant factors were identified and subjected to their assessment among respiratory specialist physicians, comprising ENTs and chest physicians, in and around Hyderabad, India.

The reason for selecting specialists is due to their inclination towards adopting newer / modified branded dosage forms, thereby setting a trend for other specialists like consultant physicians (CP) and general practitioners (GP) to follow, in their prescription protocol while managing a chronic patient with a similar clinical condition in their practice.

At the same time, in addition to the impact of external factors on their prescription decision, factors internal to the physician were also assessed on their prescription decision as every physician is unique by their nature. Some of the findings of the present study showed newer insights/deviations from the proven impacts of earlier studies. New aspects that were not tested and studied previously have also been identified in this study as shown below in table 5.1

Factor	Description of the statement	Previous studies finding	Our study findings	Contribution to literature
No-1	Influence of physician's professional factors on the physician's Prescribing behaviour	Yes	Yes	Collaboration with the team, learning from own clinical experience or from experts for improving precision in practicing medicine.
No-2	Influence of pharmaceutical product related factors the physician's Prescribing behaviour	Yes	Yes	Emphasized the importance of Product related factors, considered for prescribing behaviour.
No-3	Influence of pharmaceutical product Promotional factors on the physician's Prescribing behaviour	Developed world -Yes	No	Although previous Indian studies shown the positive impact of product Promotional factors , however our study clearly emphasized the important elements constituting the product promotional factor and confirmed although a trend was seen

		Developing world- NO		towards influencing but could not reach out to a significant level. This shows compliance of finding to that of the findings from the other developing countries.

(Mamas Theodorou et al.,2009) (Fickweiler F et al., 2017) Previous studies and systematic reviews confirmed that in addition to physicians' attitudes, product-related factors (like the clinical effectiveness of drug forms) product promotional factors led by a PSR from an pharmaceutical company discussing on product promotional material related to the promoted brand, invitations for CMEs, Dinners, access to Journals for enhancing physician's knowledge and physician samples for assessing efficacy in some of the patients as a part of conviction building for the brand leading to its prescription constitute some of the important factors that are affecting physician's prescribing behaviour. However in a recent systematic review conducted in 2017 in assessing the factors for a physician's prescribing decision with respect to developed Vs developing countries and studied the influence of medical representatives and promotional tools on physicians prescribing decisions has found that the influence of promotion tools on prescribing varied in developed countries demonstrated varied effect with five studies found a positive influence of Promotion tools on drug prescribing behavior, five studies found a negligible or small effect, and one study found no association.

The marked differences that were observed between developed countries and developing countries concerning the effectiveness of medical representatives. In developed countries, they are valued as a reliable source of information by physicians, whereas they are found to be less reliable in developing countries. Sample drugs are more generally seen as an important promotional tool for prescribing in developed countries than in developing countries.

(Sharifnia SHA et al.,2018) constituting Iranian physicians found that environmental factors and pharmaceutical advertising have no effects on physicians' prescription behavior, while the product characteristics, patient's condition, and insurance coverage majorly affect the prescription. However, most studies have shown that physicians don't believe that PSR interactions impact their prescribing behavior. The review further confirmed that there was a strong correlation between the number of gifts and the belief that PSR interactions did not influence their prescribing behavior.

Concerning the impact of various types of gifts like conferences and symposiums, physician's samples, anatomical models, studies, and sponsorship to conference travel confirmed that physicians considered themselves immune to the influence of gifts and insisted there was no impact on their prescribing behavior.

5.5.1 Implications for Researchers: The findings of this research bring out the significance of various factors, especially components of a physician's personality, whose effect on a physician's prescribing decision has not been tested before. The model used in this study could be used as a starting point for models that include various other factors that have not been tested or evaluated before.

Components of a physician's personality traits that are influencing physicians in their prescribing decision for a particular brand among the available options, in the presence of both external and internal environmental factors. The findings are employable among specialist physicians treating chronic conditions and contribute to a better understanding of physician prescribing dynamics in the studied segment.

Hence, the present study adds to the ongoing research on physicians' prescribing behavior. It would be possible to apply this model to a greater number of specialist physicians, for a clear-cut understanding of the dynamics explaining the physician's prescribing behavior.

This present study contributes to the study of the factors affecting the physician's prescription behaviour belonging to a similar specialty.

5.5.2 Implications for regulatory bodies: The model developed in this study can be used for assessing the impact of both external and internal factors on physicians' prescription of medicines thereby promoting better healthcare practices that are in line with policies governing the healthcare ecosystem. The model contributes vital inputs to be included towards formulating guidelines for their strict adherence by all the stakeholders, namely physicians, and pharmaceutical organizations for developing a pharmaceutical code of conduct toward deployment of better promotional tools aiming for the best patient care and healthcare practices aiming better standard of care to the patients. Some of the suggestions include,

- Although every drug is being analyzed internally for its quality standards Vs the specifications and released by regulatory authorities, the same either should be validated at regional drug Research and analysis labs, for ensuring quality standards or getting the internal analysis done by the organization being endorsed for the drug release in to the market. This will make the system vibrant and will curb the circulation of sub-standard drugs and spurious drugs getting introduced in to the market.

- The organizations should undergo audits yearly by the expert committee (members from DCGI / CDSCO/ Regional drug research lab) towards validation and validity of process or procedures adherence internally by the organization.
- DCGI in co-ordination with NIPERs, should initiate courses in all the domains constituting the drug manufacturing process, validation, and analysis, for all the fresh employees of the organizations with certification, valid for a definite time frame (Approximately 3 years) which needs to be renewed by clearing the examination which focuses on the required knowledge. This will enable the organization to retain skilled employees, which will be in line with the current industry practices.
- This will bring the industry working professionals to further work on their identified areas of expertise and areas of improvement, which calls for attention, which can be acquired by enrolling through the developmental programs conducted by NIPER'S across the nation in a phygitel mode (combination of both physical and digital mode) and getting certified for the same after completion with a validity period of min 2-3 years, post which renewal should be undertaken, as a continuous improvement process.
- This will bring consistency in the practices across all the organizations and will help in developing a system that will be vibrant with an assurance of quality standards being adhered towards delivering value to the patient.

5.5.3 Implications for academic institutions, Physicians and Pharmaceutical Organizations: The theoretical aspects and literature review covered in this research facilitated the construction of this framework model comprising factors impacting physicians' prescribing decisions. This model incorporated both internal and external factors that a prospective marketer deals with, at the time of the physician's prescription choice of a brand, promoted by the marketer over other existing brand options (see fig 5.1). Towards achieving this, we propose the creation of an apex body, bringing all the functions together, right from drug manufacturing to all stakeholders involved in the value chain(sales, marketing) and finally physicians.

Implications for Physicians:

- The model can be used to assess physicians' motivation and confidence levels, right at the time the beginning of their carrier and can yield a useful result, for initiating a successful clinical journey by adopting practices like their own clinic, joining a corporate hospital, and Joining government services.

- Through personality assessment, physicians can identify the extent of their preparedness, and interventions along with the action plan, for adoption, which coincides with their area of interest, offering better and distinguished care for patient and prosperity for all.
- As physicians come under the purview of medical council present nationally with their affiliates across all the states, MCI can play an important role towards developing, and conducting physician centric training initiatives or certification courses led by experts in their domains, which are practically led by evidence and clinically relevant interventions based, comprising of latest updates/ techniques, for implementing in their clinical practice for patients recovery and benefit. The same can be concluded with a certification along with a validity period, post which, physicians irrespective of specialities should appear for their renewal exam towards continuing their clinical practice.
- This process will enable in setting-up a unified and a standard clinical practice protocol among physicians leading to the better collaboration of patient management with improvement in QoL.

Implications for pharmaceutical organizations:

For pharmaceutical marketers, the model can unleash the factors that are affecting physicians' prescribing decisions based on which the Physicians can be segmented, targeted with appropriate positioning of the brand vs competition, and improve the precision of employing the right marketing mix.

This will lead to optimal utilization of the available resources and will lead to the development of an efficient marketing mix for a greater influence on physicians prescribing the promoted brand over the other available brands in this competitive environment.

To realize the marketer's potential, we propose for setting-up an apex body comprising of experts in this field, towards standardizing marketing practices across the industry, with the help of conducting various initiatives in collaboration with experts from the industry, institutes or agencies.

The proposed apex body of marketing excellence can calendarize various types of marketing development programs based on experience. This will enable the marketers from various organizations to enroll and attend to apply the learnings (which are also a part of their improvement key performance indicators) towards brand building.

We propose marketing licencing/ Renewing examination for all pharmaceutical marketers based on their experience once in 3 years towards reaffirming their standards, and working on areas of identified improvement areas, as discussed above. This will motivate the marketer to deliver their best for creating assets towards building an organization.

Finally, we propose, that the above certification should be made mandatory for all individuals aspiring to undertake marketing as their career. The time of eligibility can be either during the final year of B. Pharmacy, Pharm D, and MBA final year students, for their proactive planning.

5.5.4 **Physician's expectation from the pharmaceutical organizations and an MR:** Looking at the analysis followed by the FGD, we propose for the industry adopt Medico Marketing initiatives, which will serve the purpose of a physician towards better disease management & improvement in QoL of patients. This in turn will help the pharmaceutical companies towards bridging the gap and working together for better disease management from physicians' point of view, which in turn increases the possibilities of the promoted drug being prescribed by the physician to the patients.

In this regard, the Marketing Management department plays a vital role and acts as a bridge between brand promotion (by MMRS and prescription (Physician) towards patients' early recovery. We propose the following steps to be taken at consistent intervals.

Marketing Management department

- Marketing team to work for improving the knowledge, efficiency, and effectiveness of MR while, demonstrating or promoting the product to physicians.
- Marketing team to focus on branded drug promotion based on evidence-based medicine, w.r.t patients benefit and improving on disease awareness for early screening followed by treatment, with adherence for early recovery, avoiding complications, thereby restoring the QoL.
- Marketing teams to ensure balanced marketing mix elements ensuring product promotion and engagement initiatives across all segments of HCPs like KOLs / KBLs/ Emerging based on medico marketing initiatives.

- Marketing teams to ensure balanced marketing mix elements ensuring product promotion and engagement initiatives across all segments of HCPs like KOLs / KBLs/ Emerging based on medico marketing initiatives.
- Marketing teams to undertake brand perception and pharmaco-economic studies. This will enable the analysis of the economic benefits to the patients with recovery. and at the same time, assess the brand perception in comparison to the alternative brands, towards the improvement of brand perception leading to the prescription of the promoted branded drug.
- Marketing team to work in sync with top KOL physicians towards understanding a clinician's needs and devising evidence-based medico marketing initiatives keeping patients' benefits/recovery at the heart of communication.

Physician's expectation from an MR:

- MR to have basic knowledge and outcome of the drug which is based on evidence, leading to patient benefit.
- MR to brief about the product clearly to physicians.
- MR to provide the appropriate information about the drug from an authenticated source for physician's reliability
- MR to promote branded drugs based on efficacy and safety But not by mere pressure tactics to prescribe.
- MR to avoid physicians getting sponsorships and instead focus on physician's engagements based on brand communication.
- MR to avoid presenting Physician samples, until otherwise asked by the physician.
- MR to avoid distributing gifts especially big gifts and commissions or incentives.
- MR to focus on utilizing digital tools to reach out to the Physicians, for communicating the disease/product benefits and updates to physicians, who can go through them during their leisure time.

5.6 Limitations of Research:

- The study has been conducted with physicians responding to self-reporting questionnaires for the survey. The respondents' replies might have included some biases.
- The study involved a specialist respiratory physician in and around Hyderabad who manages asthma / allergy – a chronic condition with oral antiallergic drugs like fexofenadine or levocetirizine in combination montelukast used as a part of the treatment for a longer duration. Hence, the application of the model to acute conditions may demonstrate different results.
- Physicians of the study involved physicians of both genders, practicing in their own clinics or a hospital, working in the government hospital/medical college, working in the corporate hospital or in a private medical college, in and around Hyderabad was part of the study.
- Our research is the collection of responses from 171 respiratory physicians.

5.7 Scope of Future Research:

The scope of research has always been the guiding force in establishing the boundaries within which the process of meeting the objectives of the research is to be exercised. Though the research has been taken among specialists treating a chronic condition, the findings can be generalized to other super specialists operating in the chronic segment. Following some of the important points describing the scope of the research undertaken

- The present research was conducted to assess the impact of various external factors and factors internal to the physician, on prescribing behaviour. The factors were the result of a literature review.

However, there is scope for further research. Some of the related segments, in which future research could be conducted are mentioned below.

- The study has involved respiratory specialist physicians, whose treatment will be for a longer duration of time owing to the chronicity of the condition. A similar study can be undertaken with physicians who manage acute illness with the goal of validating our proposed model and arriving at a comprehensive model, explaining the physician's prescribing behaviour across the geographies.

- The study was undertaken involving respiratory physicians in and around Hyderabad. Similar studies across geographies, like across state capitals or Tier 1 cities can further enhance or identify the factors influencing the physician's prescribing behaviour. This could be a welcome addition to the literature towards arriving at the comprehensive model, that best explains the factors influencing physician's prescribing behaviour.
- As Human decisions are subconscious in nature and even develop over a period, the same holds true for physicians for selecting a drug over the existing alternatives, as promoted by MRS of various organizations, with an aim to get prescription for their product. However, physician's prescribing decision often tends to be involuntary which are conditioned into a specific form, right from their graduating days, leading to the formation of a behaviour which indicates the presence of cognitive element in the entire dynamics of their decisions. Hence we propose to conduct research by the pharmaceutical organizations or agencies, on the elements corresponding to neuroeconomics and its implications for a prescription generation from the physicians.

5.8 Summary of the Chapter:

The study was the first sincere attempt to study the factors affecting a physician's prescribing behaviour among respiratory physicians in a branded generic market like India.

The findings of the study proved conclusively that the physician's professional factors, product-related factors, and personality traits influence the physician's prescribing decision. The model is unique and highly relevant to markets, that are dominated by branded generics.

From the findings, the impact and influence of each factor constituted by various stakeholders demonstrate for formulating the has been described towards improving the standards across the healthcare value chain composed of all stakeholders constituting the entire ecosystem, with an aim of increasing the efficiency and effectiveness of various important factors affecting the physician's prescribing decision.

The scope for further research, which has not been covered in our research, has been described for further strengthening the current framework.

From the findings, the impact and influence of each factor constituted by various stakeholders demonstrate for formulating the has been described towards improving the standards across the

healthcare value chain composed of all stakeholders constituting the entire ecosystem, with an aim of increasing the efficiency and effectiveness of various important factors affecting the physician's prescribing decision.

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APPENDICES

Appendix – A
Survey Questionnaire
Following is the Survey Questionnaire

Appendix – A

Survey Questionnaire

Section-1

1. Name of the Doctor:___________________________ Place _________

2. Location of the Clinic / Hospital :

☐ Metro City ☐ Urban ☐ Rural

3. Gender: ☐ Male ☐ Female

4. Age in Years :

☐ 30-40 ☐ 41-50 ☐ 51-60 ☐ >60 years

5. Please indicate your valuable clinical experience ?

☐ 1-5 ☐ 6-10 ☐ 11-20 ☐ >20 years

6. Please indicate your highest education degree details from the given options.

☐ MBBS ☐ MD ☐ DM ☐ DNB

☐ DTDC ☐ MS

7. Please indicate your specialty of practice**.**

☐ ENT ☐ Pulmonology / Chest Physician

8. Please indicate your nature of practice from the 3 options given below

☐ Primary ☐ Secondary ☐ Both Primary+ Secondary Practice

9. Please indicate your current clinical practice set-up?

☐ Own clinic ☐ Govt Hospital ☐ Corporate/ Private Hospital

10. No of patients seen in a day?

☐ 1-5 ☐ 6-10 ☐ 11-20 ☐ >20

11. On a scale of 100%, Please indicate your patients % split among the 3 categories of patients given below?

☐ High Income Group. ☐ Lower Income group. ☐ Both groups

Section-2	Statement	Strongly disagree	Disagree	Undecided	Agree	Strongly agree
12	I usually get updated with the latest Knowledge about the drugs from publications in Medical Journals, medical textbooks, and CMEs organized by society or by pharmaceutical companies.					
13	The pharmaceutical sales representative is my most important information resource w.r.t drug/ disease management updates and new drug launches					
14	I usually choose a drug based on my clinical experience with a drug treatment profile					
15	Sometimes, the knowledge & experience of my colleagues influence me in selecting a particular drug					
16	My level of education and experience play an important role in selecting a treatment strategy.					
17	given a choice I prescribe a drug that is safe and less expensive to my patients					
18	I believe in the superiority of drug dosage and delivery mode over the existing option towards better patient compliance leading to adherence and recovery					
19	cost of the drug is one of the most important factors for prescribing in my clinical practice as patients are self-paying					
20	I choose the drug based on the brand image of the drug and the company including the years of experience at the market place					
21	Patient's expectations are considered from my end before I prescribe a branded generic drug brand					
22	In the management of Allergic Rhinitis and Asthma, the efficacy of the drug is taken into consideration regardless of patient choices.					
23	The medical representative's relationship and frequent visits affect my prescribing choices of the drugs					
24	Attending medical conferences and educational lectures for upgrading my knowledge on behalf of a company has a positive impact on choosing their drug in my clinical practice					
25	I give away free medical samples to patients to assess their efficacy before prescribing them in future					
26	providing me with compliments, stationary and in-clinic tools, etc., with the drug's name on it helps me remember it when prescribing to patients during my clinical practice.					
27	considering my efforts, it is ok, if I accept compliments/ commissions from the pharma company for prescribing their drug					

28	The goal of prescribing a drug is to help the patient with faster and early recovery , thereby maximizing the efficacy of the treatment strategy					
29	some doctors prescribe drugs based on the favors/ commissions received from the pharmaceutical companies					
30	Rank the top 6 factors, that you consider while prescribing drugs of comparable efficacy. (1 most important, 6= least important)					
	Cost( ), Availability ( ), Reputation of the company ( ), My Past Experience ( ),	My relationship with MR( ), Latest Drug ( )				
31	What do you suggest should be done to ensure that doctors do not prescribe drugs under the influence of MRs/ Companies?					
32	Any other Comments____ __	____________________________________				

Section-3	Statement	Agree	Disagree	Undecided
33	My friends keep up recent advances on science			
34	In my spare time, I like to go to art museums or listen to classical music			
35	I would like a job with considerable responsibility and the potential to exercise the leadership			
36	I don't like unpredictable people			
37	The principle goal of life is enjoyment			
38	I enjoy reading a good mystery or solving an interesting puzzle			
39	I am annoyed when people don't treat me with the respect I deserve			
40	I would like to associate with famous people			
41	I am known for having a good time			
42	My friends share my moral and ethical values			
43	If you don't promote yourself, no one else will			
44	I don't like people who can't live within their means			
45	I have a firm set of values which guide my decisions about what is right and wrong			
46	I prefer to work alone			
47	Most of my friends are (have been and will be) financially successful			
48	I am not shy about achievements			
49	I hate being around the people who don't know how to relax			
50	Research is the key to human progress			
51	I would rather be famous than almost anything			
52	Even if something better comes along, I don't like changing the way I do things			

S.No	Question Details	**Agree**	**Disagree**	**Undecided**
53	The goal of life is to compete at something important and succeed			
54	The primary goal of government is to aid business			
55	I dislike lazy, unambitious people			
56	I don't understand people who think of themselves and their own interests			
57	I like to work in 'wide-open' situations where success depends on my ability			
58	I like to spend my free time reading novels and listening to classical music			
59	I want a job with a steady and dependable income			
60	Sometimes you have to speak proudly about your own achievements			
61	I enjoy planning business ventures			
62	I would like to be a writer			
63	I think a lot about the problems of disadvantaged children			
64	I am not a thrill seeker			
65	I like having influential friends			
66	My relations with others are very important to me			
67	I dislike people who think that because something is expensive it must be tasteful			
68	I don't like people who are reckless			
69	I would like to be in business of myself			
70	The world would be a lot better place if everyone tried to help his or her neighbor			
71	Most of my friends tend to keep to themselves			
72	I believe in competition, so the best person can win			
73	When I get together with my friends we usually talk about business problems and opportunities			
74	I enjoy solving technical and/or scientific problems			
75	I like to spend my spare time helping others			
76	In certain circumstances, there is almost nothing I wouldn't do			
77	My idea of a great job is a travel guide			
78	I am a social person			
79	I would like to visit the great vacation spots of the world			
80	I am very safety conscious			

81	I don't like people who ignore the problems of developing countries			
82	I know immediately when I have done something morally wrong			
83	I don't like people who ignore facts when trying to solve problems			
84	I don't like people who won't help others who are in need			
85	I have taken things apart to see how they work			
S.No	**Statement**	**Agree**	**Disagree**	**Undecided**
86	I am devoted to art			
87	Even in my spare time, I like challenges and competition			
88	Children should not argue with their parents			
89	The lack of understanding of science in our society annoys me			
90	I show off a little now and then			
91	I am tolerant of other people's shortcoming even when they are lazy, irresponsible or dishonest			
92	It is important to have lots of good friends			
93	Most of my friends are interested in business			
94	Helping others is one of the most important things one can do			
95	I could spend my life helping others			
96	I dislike people who try to restrict other people’s enjoyment			
97	I go out of my way to help others when I can			
98	I enjoy spending time alone			
99	There are many things I would never do because I believe they are wrong			
100	The secrets of the universe are objective and knowledgeable			
101	Art is my hobby			
102	I enjoy group projects and working with others			
103	Many of my friends’ volunteer for organizations that help the disadvantaged			
104	I often fantasize about being famous			
105	Most of my friends are ambitious			
106	Many of my friends are competitive			
107	Many of my friends are scientists			
108	I usually get my way with other people			
109	I don't like unpredictable situations			
110	I would like a job where I can work with others			
111	I pay close attention to my finances, taxes and budget			
112	I don't like serious, up tight people			

113	I often read the business news			
114	Most of my friends are successful at what they do			
115	The goal of life is to enjoy yourself while you can			
116	I am a better manager than most of the people I have worked for			
117	The most important aspect of a job is the opportunity to make money			
118	It bothers me to pay high fees and taxes			
119	I like others to notice my accomplishments			
120	I enjoy discussing scientific programmes with my friends			
121	I am usually thinking about how to get ahead, even when I am not working			
122	I dislike people who have no desire to imporve their status in life			
123	I believe progress is only possible through scientific research			
124	It is important to stay in close contacts with your friends			
125	It annoys me when others ignore my accomplishments			
126	I would enjoy working as a financial analyst or consultant			
127	I think a lot about my financial future			
128	I tend to be a loner			
129	Free enterprise is the key to a prosperous nation			
130	It irritates me when people don't treat me with proper respect			
131	I don't like people who are workholics			
132	I like being the center of attention			
133	I would not mind being a celebrity			
134	In my view a person who doesn't drink can't be trusted			
135	I dislike people who are always predictable			
136	I believe that everyone is entitled to a descent standard of living			
137	People are primarily motivated by money			
138	I would like to work with computers			
139	Many of my friends work at helping others			
140	I believe you can never be too careful			
141	Most of my friends go out of their way to help someone who needed it			
142	If it feels good, do it			
143	I am often invited to parties with influential & important people			

144	I dislike being with people who have no interest in the arts			
145	Most of my friends help others who are in need			
146	I don't like people who see everything 'black & white'			
147	I would enjoy touring the great museum of Europe			
148	Most of my friends are 'old fashioned types of people			
149	I prefer creative, free-spirited people as my friends			
150	I prefer to work with people who follow established methods			
151	Job security is more important than job satisfaction			
152	I enjoy reading about science			
153	Most of my friends are dependable and predictable			
154	I want to be the best at everything I do			
155	I like many kinds of people			
156	My best friends go to lot of parties			
157	I dislike being with people who don't know how to have a good time			
158	I would rather have a secure job with a normal salary than a high paying job that might not last			
159	A good job is one that pays well but requires little work			
160	I want to be famous			
161	It is important to plan your financial goals			
162	I enjoy being in-charge			
163	I would rather spend time with artists & writers than with scientists or engineers			
164	I would like a new job every couple of years just for the challenge			
165	Traditions should change with the times			
166	I am a devoted person			
167	I am deeply concerned about moral matters			
168	I would like to have a career in which I am able to help other people			
169	I dislike it when others break established customs			
170	My idea of living is good food, good drink and fun times			
171	I try not to let work interfere with my pleasure			
172	I don't like people who won't help the homeless			
173	I dislike neighbourhoods in which all the houses look alike			
174	I would like to create new scientific knowledge			

175	I rarely worry about moral issues			
176	Art may contain greater truths than science			
177	I would like to be an artist or musician			
178	I am pretty strict about right and wrong			
179	I believe in people			
180	I live by the old rule ' better to be sae than sorry'			
181	My best know how to party			
182	My parents praised me for my achievements			
183	I am a people person			
184	What is right or wrong depends on the situation			
185	I go to a lot of parties with my friends			
186	I plan my future as are fully as possible			
187	It is better to be a leader than a follower			
188	I dislike going to parties where I don't know the other people			
189	Times may change, but our traditions should not			
190	It bothers me when my good work is not recognized			
191	The most important part of a job is the vacation benefits			
192	Most of my friends are pretty gregarious and outgoing			
193	I don't care for people who are afraid to take risks in order to get ahead			
194	In school I liked science			
195	Many of my friends were science majors in the school			
196	I prefer the old fashioned ways of things getting done			
197	The most wonderful part of life is the beauty of art and literature			
198	People who are all work and no play are boring			
199	I enjoy business & finance programmes on TV			
200	I organize my life on the basis of my moral convictions			
201	I enjoy meeting people who are successful in business			
202	I don't like taking chances with my money			
203	I am annoyed by the people who don't work hard to get what they want			
204	Most of my friends are interested in the art			
205	I like puzzles and mental games			
206	The arts are the highest purpose in the life			
207	I get annoyed when I pay more for something that I need to buy			
208	True happiness is possible only by living accordingly to ethical principles			

209	I would like to be an art collector			
210	I am extremely careful in choosing the people with whom I associate			
211	I prefer good natured people who know how to enjoy themselves			
212	I don't understand people who can stay home all the time			
213	I would like a job that puts me in the public eyes			
214	If I could afford it, I would spend my life vacationing			
215	I worry about how my friends' reputations will reflect on me			
216	I believe in making and keeping friends			
217	I don't like people who ignore science			
218	I like to be around artist and writers			
219	Although I like to relax from time to time, after a short time, I am ready to get back to work			
220	I prefer people who take calculated risks to those who always 'play it safe'			
221	I am careful to run my affairs by the book			
222	I enjoy helping others			
223	I try to live by the motto 'look before you leap'			
224	Science and mathematics are more beneficial to humanity than art and literature			
225	I would enjoy a career in social and scientific research			
226	I would like a job in which relationships can be developed			
227	Art and literature are the highest forms of expression in life			
228	I don't understand people who ignore facts and data			
229	I love having people who recognize me when I walk in to a room			
230	I would rather work with numbers or equipment than with people			
231	Relieving the misery of others is more important than making money			
232	I save as much money for the future as I can			

MVPI	PERSONALITY TRAITS Variable factor									
	Aesthetics	**Affliation**	**Altruistic**	**Commerce**	**Hedonism**	**Power**	**Recognition**	**Science**	**Security**	**Tradition**
QUESTIONS BREAK-UP	34	66	39	47	37	35	40	33	36	42
	46	70	56	54	41	48	43	38	44	45
	58	71	63	61	49	53	51	50	59	52
	62	78	67	69	76	55	60	74	64	82
	86	81	75	73	77	57	65	83	68	88
	90	89	84	93	79	72	104	85	80	99
	98	92	91	111	96	87	119	100	109	134
	101	102	94	113	115	105	121	107	150	140
	128	103	95	117	131	106	125	120	151	148
	144	108	97	118	142	114	130	123	153	155
	149	110	112	126	147	122	132	138	158	165
	163	116	139	127	157	135	133	152	180	166
	176	124	141	129	170	146	143	174	186	167
	177	136	145	137	171	154	156	194	193	169
	197	183	168	159	173	162	160	195	202	178
	204	188	172	161	191	164	175	205	210	184
	206	192	179	199	198	182	181	217	220	189
	209	215	222	201	211	187	185	224	221	196
	218	216	229	207	212	203	190	225	223	200
	227	226	231	230	214	219	213	228	232	208

Appendix - B

List of Publications

Following is the list of publications by scholars in the research area.

- Bandi, V., Dey, S. K., & Rao, O. (2022). Factors Influencing the Prescribing Behavior of Medicines by Physician's: A Study on Anti-Allergic Drugs in and around Hyderabad, India. Asia Proceedings of Social Sciences, 10(1), 27-31. DOI: https://doi.org/10.31580/apss.v10i1.2590.

- Subrato Kr Dey, Viswanath bandi, Dr. Amarjeet Wagh. How to write a review article? Indian Journal of Pediatric Neurology, Vol 15, June 2022.

- Viswanath Bandi, Rao ORS. Role of Physician's Personality on their Drug PrescriptionBehavior. Int.J.Res.Pharm.Sci. 2020, 11(4), 6954-6961. DOI: https://doi.org/10.26452/ijrps.v11i4.3700.

- Viswanath Bandi. Rao ORS. Factors influencing drug prescription behavior of physicians in India. THE PHARMA REVIEW, JULY - AUGUST 2019, 57-62.

- A Proposed study on the analysis of factors affecting the prescription behavior of physicians in and around Hyderabad, India: A study of Anti-allergic drugs. IUJ Journalof Management. May 2017 edition. Page-39-43. IISSN2347-5080.

- Application of IoT in Marketing and New Brand Launch of Pharmaceutical Products.Internet of Things- ICFAI University Press Publications, October 2016, pages 21-31

Appendix - C

List of Conferences attended & Presented.

Following is the list of conferences attended by the scholar and the presentations made on the research work.

- 6th ASIA International Multidisciplinary Conference 2022, Kulalampur, Malaysia from 1^{st} and 2^{nd} June 2022. Participated in and presented the research work (online).
- National Doctoral Conference 2017 on" Trends in Management Research" Presented a paper titled " Analysis of factors affecting the prescription behaviour of physicians in and around Hyderabad, India: A study on Anti-allergic drugs as an example. 9^{th} March 2017, ICFAI University Campus, Ranchi.

Appendix - D
Questionnaire adaptation Permission

On Thu, Apr 30, 2020 at 6:53 PM IBRAHIM ABBADI <ibrahimalabbadi@yahoo.com> wrote:

Dear Bandi
I have no problem to use the questionnaire.
All the best

Ibrahim Alabbadi, PhD, MBA, BPharm
Professor of PharmacoEconomics & Pharmaceutical Marketing
Faculty of Pharmacy
The University of Jordan
Amman-Jordan

On Thursday, April 30, 2020, 02:21:41 PM GMT+3, Viswanath Bandi <viswanathbandi1391977@gmail.com> wrote:

Dear Sir,

Good afternoon.
Myself Viswanath from India, a Pharmaceutical Science Graduate with MBA , currently working as Marketing Manager for Dr.Reddy -one of the reputed Indian Pharmaceutical organization. Simultaneously, I am pursuing Ph.D. in management on a topic focussing on understanding the factors influencing the physician's prescribing behaviour with respect to Indian context.

From the available works in this segment, your work was found to be most appropriate in taking forward with respect to Indian context. Hence I have adopted the same.
I need your kind guidance and the help with respect to the Questionnaire which is there at the end of your publication, published in European Journal of Social Sciences, Vol. 38 No 3 May, 2013, pp.380 - 391.

Need your kind Permission for your kind guidance and help, which will help me to clarify my doubts and to go forward in the proposed work.

Thanks and Regards,
Viswanath,
Hyderabad, India.