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Examining Prescribing Behavior: Sociodemographic Profiles, Drug Efficacy, and Marketing Dynamics

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Abstract. *This study examines prescribing behaviour by focusing on sociodemographic profiles, drug efficacy, and marketing dynamics within the healthcare sector. We surveyed 267 healthcare professionals in Rabat, Morocco, using a 33-item questionnaire. Statistical analyses, including Cronbach's Alpha for reliability and ANOVA, chi-square, Cramer's V, and Pearson correlation for significance, revealed notable findings related to profession, experience, speciality, and interactions with medical representatives. Sociodemographic profiles illustrate how factors such as age, gender, education, and socioeconomic status impact prescribing decisions. Drug efficacy evaluation highlights the comprehensive assessment professionals undertake, considering clinical effectiveness, potential side effects, and adherence to guidelines. The study also underscores the significant influence of pharmaceutical promotional strategies, especially interactions with medical representatives, on prescribing behavior. The reliability and statistical tests validate the robustness of our findings. Significant variations in prescribing behaviour were observed based on profession, experience, speciality, and contact frequency with representatives. This research deepens our understanding of prescribing behaviour by illuminating the interplay between sociodemographic factors, drug efficacy, and marketing dynamics, with implications for optimizing healthcare policy, medical education, and pharmaceutical marketing strategies.*

Keywords: Prescribing Behavior, Sociodemographic Profile, Marketing Dynamics.

JEL Codes: M31, M37

1. Introduction

In the realm of healthcare, medication prescription by healthcare professionals holds paramount importance, relying on a myriad of factors influencing prescription decisions. Among these factors lie patients' sociodemographic characteristics, the evaluation of clinical efficacy and drug safety, as well as interactions with medical delegates and other representatives of the pharmaceutical industry. Understanding these elements is crucial for apprehending prescription patterns and clinical decisions made by physicians, pharmacists, and other healthcare providers.

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Certain sociodemographic factors, such as age, gender, education level, and socioeconomic status of patients, may influence treatment and prescription choices due to differences in the perception of medication risks and benefits, as well as personal health preferences. Regarding the clinical efficacy and safety of medications, healthcare professionals meticulously assess available clinical evidence and potential risks for each patient, considering factors such as effectiveness compared to therapeutic alternatives, expected side effects, drug interactions, and compliance with clinical practice guidelines.

In the current context, pharmaceutical marketing mix strategies play a predominant role in physicians' prescription decisions. Studies have highlighted the significant influence of promotional tools on prescription behaviours (Ahmed, 2014). Similarly, the importance of pricing strategy in these decisions has been underscored (Al Thabbah et al., 2022).

The marketing activities of pharmaceutical companies also influence physicians' prescription processes, with a demonstrated role in prescription decisions (Al-Areefi & Hassali, 2013). Physicians' attitudes toward medical promotional tools and their impact on prescription decisions have been examined (Ali et al., 2022).

The interaction between healthcare professionals and pharmaceutical representatives is crucial, with research evaluating the influence of pharmaceutical promotion on prescribers (Altawalbeh et al., 2020). Furthermore, the importance of pharmaceutical representatives in disseminating information about new drugs has been highlighted (Altowayan & Alshubaili, 2022). Understanding the impact of ethical guidelines and directives on healthcare professionals' prescription decisions is essential (Balhara, Mathur & Anand, 2012). Similarly, the predominant role of direct promotion by pharmaceutical representatives in this process has been emphasized (Campo et al., 2005).

Furthermore, studies such as the one conducted by Tuncay et al. (2020), which analyzed the prescription of generic drugs by general practitioners in Italy over a period of 15 years, revealed a general trend towards increasing prescriptions of generic drugs over time, with differences in prescription behaviour based on physicians' age, gender, and experience. This longitudinal retrospective analysis sheds light on the evolution of prescription practices and underscores the importance of understanding trends in medical practice.

Reviews of factors influencing physicians' prescription decisions also provide valuable insights into pharmaceutical market dynamics (Davari, Khorasani & Tigabu, 2018). Likewise, differences in behaviour among physicians in different practice contexts have been analyzed (Anderson et al., 2009). The evaluation of the clinical efficacy and safety of medications remains crucial, with studies highlighting the impact of activities by medical representatives and medication samples on prescription decisions (Kasliwal, 2013). Similarly, the importance of product cost and the reputation of pharmaceutical companies in this process has been emphasized (Khajuria & Khajuria, 2013).

Gender differences in physicians' decisions regarding the adoption of new medications are also an increasingly significant area of interest (Méndez, Scott, & Zhang, 2021). Similarly, the impact of health policies and directives on physicians' prescription decisions has been studied (Howard et al., 2018).

Moreover, the study by Vancelik et al. (2007) examines the self-reported impact of pharmaceutical promotion on the decision-making process of general practitioners in Turkey. The results indicate that, for the majority of general practitioners, the primary reference source regarding prescription was the commercial information provided by pharmaceutical company representatives, which had a significant impact on their decision-making process. This research highlights the significant influence of

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pharmaceutical promotion activities on physicians' prescription decisions, thus emphasizing the importance of considering these external influences in the analysis of prescription practices.

Finally, the influence of medical representatives on physicians' prescription practices remains an important subject. Studies have assessed the impact of medical representatives on physicians' prescription practices, showing that nearly half of the physicians report that their prescription decisions have been influenced by medical representatives (Workneh et al., 2016). Research has also examined factors influencing general practitioners' decisions to adopt new prescription medications, highlighting the importance of gender, prescription volume, and physician employment status (Zhang et al., 2019). In Saudi Arabia, researchers have examined the factors influencing physicians' medication selection decisions, highlighting the significant role of pharmaceutical representatives in providing information about new medications (Ibrahim & Bélanger, 2015).

Subsequently, studies have explored the effect of pharmaceutical companies' promotional strategies on physicians' prescription patterns, noting that marketing strategies influence physicians' prescriptions (Ijoma & Onwuekwe, 2009; Albarq & Suleiman, 2021). Research has identified significant differences between practitioners in the public and private sectors regarding factors such as sources of prescription information (Kamuhabwa & Kisoma, 2015). One study examined the influence of pharmaceutical promotions targeting healthcare professionals on prescription decisions, showing that exposure and attention to pharmaceutical promotions were associated with an increased influence of the pharmaceutical industry on prescription decisions (Price et al., 2021). Lastly, a study examined the relationship between exposure to information provided by pharmaceutical companies and the quality, quantity, and cost of physicians' prescriptions, revealing an association between exposure to information provided by pharmaceutical companies and an increase in prescription frequency, higher costs, or lower quality of prescriptions (Spurling et al., 2010).

2. Literature Review

Medical prescription is an act by which healthcare professionals provide medical treatment for the conditions faced by their patients. At first glance, the prescription process is similar among most healthcare professionals, but the difference lies in the nature of the prescribed medications. Indeed, some healthcare professionals prioritize molecules from large pharmaceutical companies, while others prefer the use of generics. Therefore, scientific research has focused on the prescription behaviours of healthcare professionals, attempting to analyze and understand the act of medical prescription.

2.1. Sociodemographic Factors

The first aspect studied by researchers relates to sociodemographic factors influencing prescription practices. Klau et al. (2023) investigate antipsychotic prescribing patterns in children and adolescents within Australian general practices, with a focus on sociodemographic factors such as age, gender, and geographic location. Their study reveals that antipsychotic prescriptions increased from 2.0% in 2011 to 2.9% in 2017. Significant sociodemographic influences include a higher rate of off-label prescribing among older adolescents, females, and patients from outer regional or remote areas. The study also highlights that a substantial proportion of antipsychotic prescriptions were off-label (69.8% in 2011 and 79.7% in 2017) and often accompanied by other psychotropic medications. These findings underscore the

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importance of sociodemographic characteristics in shaping prescribing patterns and managing mental health conditions in young patients.

The research conducted by Islam and Awal (2020) examines the sociodemographic factors influencing physicians' clinical decision-making at Upazila Health Complexes (UHCs) in Bangladesh. Their cross-sectional descriptive study, involving 85 physicians from the Rajshahi Division, identifies several sociodemographic factors that affect clinical decisions. The study highlights how factors such as physicians' level of education and the distance between their homes and workplaces impact their decision-making. Additionally, sociodemographic factors of patients, such as their purchasing capacity, influence prescription practices. The research provides valuable insights into how these sociodemographic elements shape clinical practices in this setting and may be of interest to public health researchers and policymakers.

The study by Lam et al. (2003) examines the non-biomedical reasons that lead family physicians to overprescribe antibiotics for upper respiratory tract infections (URTI) in a mixed private/public Asian context. The survey, conducted among members of the Hong Kong College of Family Physicians between August and December 2001, received responses from 801 family physicians, yielding an overall response rate of 65.0%. The results reveal that a significant number of respondents (21.8%) believe they may prescribe antibiotics too often for URTIs, but the majority feel they use antibiotics just slightly too often. Older, more experienced physicians or those in private practice are more likely to feel they may prescribe antibiotics too often. Over 50% of respondents believe that satisfying the patient or caregiver, as well as the fear of medical and legal issues in case of patient deterioration, could prompt them to overprescribe antibiotics for URTIs. Physicians in the public sector may overprescribe to save time, while those in the private sector may do so to retain patients in their practice. In conclusion, the study highlights that certain physicians are more prone to overprescribing antibiotics, and non-biomedical factors may play a significant role in antibiotic prescription for URTIs.

The survey by Sharifnia et al. (2018) examines the key factors influencing physicians' prescription decisions in Iran. Through exploratory research, 460 physicians were surveyed using a questionnaire as a quantitative research instrument, with a response rate of 84%. The results revealed that Iranian physicians primarily paid attention to payment type, individual patient factors, and product characteristics when prescribing medication. Additionally, it was found that marketing expenditures did not have a significant influence on physicians' demand for pharmaceutical products in Iran. These findings could be valuable to marketing strategy planners of Iranian pharmaceutical companies as well as patients, the ultimate consumers of prescribed medications.

In a recent study conducted by Price et al. (2021), researchers delved into the factors influencing prescription decisions of healthcare providers (HCPs) in the United States. Unlike previous surveys by the U.S. Food and Drug Administration (FDA) that focused on attitudes towards direct-to-consumer advertising, this study specifically examines professionally targeted prescription drug promotion. The results reveal that exposure to pharmaceutical product promotion and interactions with the industry was significantly associated with a reported increase in the influence of the pharmaceutical industry on prescription drug decisions. Additionally, specialists were significantly more likely to prescribe off-label and to serve as opinion leaders for the pharmaceutical industry compared to other provider groups. These findings highlight the ubiquity of pharmaceutical promotions aimed at HCPs and underscore their impact

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on prescription decisions. These results could inform the FDA about HCPs' responses to prescription drug promotion and its impacts.

In the same vein, Carter et al. (2021) examine the key determinants of general practice prescribing in the UK, as well as the potential role of pharmacist practitioners in general practice (PBPs) in promoting evidence-based prescribing. Through semi-structured telephone interviews and focus groups, participants, including general practitioners, PBPs, nurses, and key informants from the NHS, discussed current influences on prescribing and perspectives on PBPs' involvement in promoting evidence-based prescribing. The results highlighted determinants operating at different levels (individual, practice, societal) influencing prescribing and guideline utilization. Participants expressed divergent opinions on the potential of PBPs to promote evidence-based prescribing. This study thus underscores the importance of targeting modifiable influences at different levels to promote evidence-based prescribing in general practice.

The findings of the study conducted by Kamuhabwa and Kisoma (2015) revealed significant differences in prescription practices between practitioners working in public and private healthcare facilities in Dar es Salaam, Tanzania. The main sources of prescription information were manuals (64%) and the Internet (63%) for practitioners, while proven drug efficacy was a major concern for those working in private healthcare facilities (97%) compared to those in public facilities (74.2%, p-value = 0.001). The cost of medications for patients was also a more significant factor for practitioners in public healthcare facilities (48.4%) than for those in private facilities (24.3%, p-value = 0.010). Additionally, medication accessibility within the healthcare facility had a greater influence on prescription decisions for practitioners in public healthcare facilities (53.5%) than for those in private facilities (18.9%, p-value = 0.000). These results highlight the importance of considering these differences in formulating health policies and allocating resources to promote rational drug use.

2.2. Clinical Effectiveness and Drug Safety

The second aspect highlighted in the literature is the assessment of clinical effectiveness and the absence of negative effects. In addition to the factors influencing the prescription of biological treatments, Wallace et al. (2020) investigated glucocorticoid prescribing patterns among newly diagnosed rheumatoid arthritis patients in the United States. This retrospective cohort study utilized the national Optum administrative database and revealed that glucocorticoids are frequently prescribed to new patients, often at high doses and for extended durations. The study found considerable variability in prescribing practices among rheumatologists, with many patients continuing glucocorticoid therapy for up to a year post-diagnosis. The variability in prescribing was linked to provider-related factors, emphasizing the influence of individual physician decisions on treatment patterns. These results highlight not only the ongoing use of glucocorticoids despite their associated risks but also the need to examine the factors driving prescribing practices to enhance clinical guidelines and patient care.

Murshid, Mohaidin, and Zayed (2019) addressed a gap by presenting a new self-administered tool for measuring factors influencing physicians' prescription decisions, whose validation was previously insufficient. Their study aimed to develop and validate this instrument through a rigorous process, including a literature review, expert assessment, and pilot testing with 705 physicians. Using partial least squares structural equation modelling (PLS-SEM) analyses, they confirmed the content validity and convergent validity of the instrument, which consisted of 44 items grouped into categories such as

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marketing efforts, patient characteristics, pharmacist variables, and contextual factors with 13 reflective constructs. The results indicate a relationship between independent variables and medical prescription.

The studies conducted by Molina et al. (2022) and Hogan et al. (2023) provide complementary insights into the impact of pharmaceutical industry interactions on medical students' and residents' knowledge and attitudes. Molina et al. (2022) conducted a national survey in France, revealing that 96.3% of medical students had been exposed to pharmaceutical product promotion, with 78.1% exposed in the past six months. This exposure raised concerns about industry incentives influencing prescriptions, as 53.6% of students believed that receiving gifts could affect their colleagues' prescribing habits. These findings underscore the need to improve education on promotional strategies and institutional policies to ensure more ethical and evidence-based medical practices. On the other hand, Hogan et al. (2023) examined industry payments received by residents, finding that 12% of residents had received payments totalling $6.4 million. Residents affiliated with for-profit institutions were 3.5 times more likely to accept payments compared to those in federal institutions. Specialities such as orthopaedics and urology also showed higher rates of payment acceptance. These results highlight the significant influence of industry payments on residents' practices and call for greater transparency and stringent policies to minimize conflicts of interest and promote evidence-based prescribing.

Rahbi et al. (2023) conducted a study to evaluate physicians' attitudes, knowledge, and practices regarding antibiotic prescriptions at a teaching hospital in Oman. Their research identified several key contributors to antimicrobial resistance (AMR), including inadequate hand hygiene (51.6%), the widespread use of antibiotics (49%), and the frequent prescription of broad-spectrum antibiotics (47.3%). The study also highlighted additional issues, such as the lack of effective narrow-spectrum antibiotics (47.3%), inappropriate duration of antibiotic therapy (46.2%), and inappropriate empirical choice of antibiotics (45.1%). Furthermore, poor access to local antibiotic resistance information (40.8%) and inadequate restrictions on antibiotic prescribing (34.4%) were noted as significant factors. The study also revealed that 33.3% of physicians considered the absence of local hospital guidelines on antibiotic use as a contributing factor, while 26.8% cited random mutations in microbes and 22.5% pointed to patient demands and pharmaceutical advertising. Rahbi et al. (2023) concluded that addressing these gaps through targeted antimicrobial stewardship programs and improved guidelines is crucial to promoting more rational use of antibiotics and mitigating the spread of resistant pathogens. This study underscores the global health threat posed by AMR and emphasizes the need for comprehensive interventions to combat antibiotic misuse and resistance.

2.3. Marketing Practices of the Pharmaceutical Industry: Contact With Medical Representatives

Aside from the influence of sociodemographic factors and medical efficacy, the parameters related to the indispensable participants in the medical prescription process are studied, particularly the relationship between healthcare professionals and pharmaceutical companies. In this context, the study conducted by Al Thabbah et al. (2022) explores the effect of pharmaceutical companies' marketing mix strategies on physicians' prescribing practices in Jordan. This research utilized a quantitative survey to assess how different elements of the marketing mix—product, price, place, and promotion—affect physicians' prescribing decisions. The study found that physicians' prescribing practices are notably influenced by these marketing strategies, with price strategies exerting the most significant impact. The analysis

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revealed that price had the highest median score of 83.3%, indicating a strong effect on prescribing decisions. In contrast, promotional tools had the lowest median score at 69.3%, suggesting a comparatively lesser impact. Additionally, the study highlighted that physicians working in the private sector were more likely to be influenced by these marketing elements. These findings emphasize the crucial role of marketing mix strategies in shaping prescribing behaviours. The study underscores the need for a balanced approach in pharmaceutical marketing practices. Policymakers are encouraged to ensure that marketing practices do not negatively affect patient health and to consider measures such as reducing medication taxes to make treatments more affordable for patients. This balanced approach will help in promoting fair and ethical marketing practices while ensuring the well-being of patients.

This observation is reinforced by Khazzaka (2019), who examines the influence of pharmaceutical marketing strategies on physicians' prescription patterns in Lebanon, focusing on ethics, gifts, and samples. Through a cross-sectional online study conducted on WhatsApp, the author analyzes physicians' prescription behaviours in relation to demographic variables. The results indicate a correlation between pharmaceutical marketing strategies and physicians' prescription behavior, showing that most promotional tools tested motivate physicians to prescribe the promoted medications, especially visits from medical representatives and drug samples. Regarding the acceptance of gifts, physicians consider it an unethical practice. Complementing this, Ali et al. (2022) further elucidate the influence of medical promotional tools on prescribing practices in Jordan and Iraq. Their study, which surveyed 801 physicians, highlights that face-to-face visits by medical representatives and drug samples are commonly accepted promotional methods, with 48% of physicians accepting these tools and 69.9% reporting changes in their practices after participating in conferences. The study underscores the need for clear, country-specific ethical guidelines to regulate medical promotions effectively.

A similar analysis conducted by Albarq and Suleiman (2021) explores the impact of pharmaceutical marketing practices on physicians' medication recommendations in Jordan. Using convenience sampling, the study was conducted from August 2019 to February 2020, with a survey response rate of 80.9%. Results, assessed on a seven-point Likert scale, indicate that pharmaceutical marketing practices have a considerable influence on physicians' prescription behavior. The analysis highlights the effectiveness of various promotional tools, emphasizing that the "public relations" strategy is the most effective, while advertisements in print media attract less attention. These findings offer valuable insights for pharmaceutical marketing managers to design more effective strategies to influence Jordanian physicians and improve their prescription practices.

Similarly to the aforementioned studies, Atia et al. (2022) explored the influence of medical representatives on prescribing practices in Tripoli, Libya. This cross-sectional study, conducted from January to April 2021, surveyed 122 physicians across various public hospitals and private clinics. The study found that medical representatives were a significant source of drug information, with 60.6% of physicians acknowledging their influence. Product samples were identified as the most effective promotional tool, and 73.8% of physicians indicated that their prescribing practices were affected by these interactions. These findings align with those of Workneh et al. (2016), who examined the impact of medical representatives on prescribing practices in healthcare facilities in Mekelle, northern Ethiopia. Their cross-sectional study included all physicians working in public and private healthcare facilities and revealed that 48.2% of the surveyed physicians felt their prescription decisions were influenced by visits from medical representatives. Accepting gifts from these representatives, including stationery supplies and drug samples, significantly increased the likelihood of prescribing the promoted products. The study

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also found that face-to-face interactions were the most common promotional method and that working in a private healthcare facility was a predictive factor for influencing prescription decisions. However, most medical representatives did not provide adequate and accurate information about their products and had a negative attitude towards competing products. Both studies highlight the substantial impact of medical representatives on physicians' prescribing practices and underscore the need for more effective regulation of these interactions within pharmaceutical practices.

The study by Al-Areefi and Hassali (2013) explores the factors influencing physicians' prescription decisions and the role of pharmaceutical companies' marketing activities in this decision-making process, focusing on the Yemeni experience. Using semi-structured interviews based on the critical incident technique method, researchers collected information from doctors on specific situations of prescribing newly marketed drugs. The results revealed that several factors influence the prescription of the studied drugs, including drug characteristics, pharmaceutical company activities, indications, patient context, environmental factors such as available information and evidence, and the personal characteristics of the physician. These conclusions underline the complexity of the prescription process and the diversity of factors considered by physicians, including their own experiences, information sources provided by pharmaceutical companies, and their marketing activities.

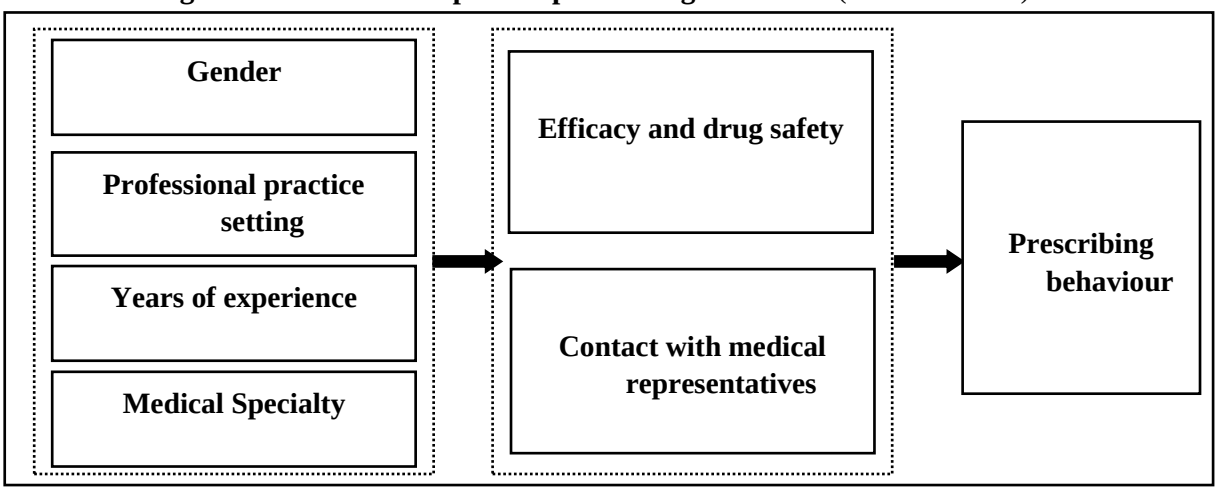
3. Research Methodology

Based on the literature review and the conceptualization of the survey's framework, the adopted methodology naturally relies on a positivist epistemological stance, emphasizing a quantitative approach. The study takes place in the context of Moroccan healthcare professionals, particularly those based in Rabat, the capital of the Kingdom. A questionnaire survey was conducted to collect data, and this data was subsequently subjected to statistical analysis using SPSS Statistics 25 software.

3.1. Conceptual Model

Referring to the literature data, it is evident that medical prescription is a complex process influenced by a multitude of factors. Among these factors are the characteristics specific to healthcare professionals, such as gender, workplace setting, professional experience, and medical speciality. Additionally, the effectiveness and safety of medications play a crucial role in this process, as do interactions with medical representatives.

Figure 1: Sources of impact on prescribing behaviour (Source: Authors)



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Figure 1 illustrates the conceptual framework of the conducted survey, wherein sociodemographic criteria (gender, professional workplace, years of experience, and medical specialty), medication effectiveness and safety, as well as contact with medical representatives, represent the independent variables influencing the medical prescription of healthcare professionals.

Drawing on the literature review and the conceptualization of the survey's framework, the adopted methodology naturally relies on a positivist epistemological stance, emphasizing a quantitative approach. The study takes place within the context of Moroccan healthcare professionals, particularly those based in Rabat, the capital of the Kingdom. A questionnaire survey was conducted to gather data, and these data were subsequently subjected to statistical analysis using SPSS Statistics 25 software.

3.2. Survey and Data Collection

The objective of this survey is to identify the sources of influence on the behaviour of healthcare professionals regarding medical prescriptions. This research takes place within the hospital network of the Moroccan capital, Rabat. We compiled a list of healthcare professionals practicing in the city and sent them a questionnaire via email. The survey was conducted from November 16, 2023, to February 26, 2024. In total, 953 healthcare professionals (both public and private sector) were contacted during this period, representing those for whom information was available. The response rate was 30% (288 out of 953 respondents); however, 21 questionnaires were incomplete, thus reducing the response rate to 28%. The questionnaire consists of four main sections: sociodemographic data comprising five items (gender, position, place of practice, seniority, and speciality); five items focusing on prescription behavior with an emphasis on choosing between the molecule and the generic; ten items concerning the efficacy and safety of medications; and ten items related to contact with medical representatives.

Table 1: Questionnaire's items configuration

Variable	Number of items	Description
Sociodemographic	5	-Gender (GEN) -Profession (PRO) -Service (SER) -Experience (EXP) -Specialty (SPE)
Prescribing behaviour (PRE)	5	1. Frequency of prioritizing brand-name (molecule) medications over generics in prescribing. 2. Perception of superior efficacy of brand-name (molecule) medications compared to generics. 3. Consideration of patient preference in prescribing brand-name (molecule) medications over generics. 4. Encounter frequency of challenges in convincing patients of equivalence between brand-name and generic medications.

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		5. Consideration of cost-effectiveness when prescribing brand-name (molecule) medications over generics.
Clinical effectiveness and drug safety (EFF)	10	1. Frequency of side effect variations with brand-name to generic switches. 2. Perception of higher side effect risk with generic medications. 3. Incidence of new or intensified side effects with generic medication use. 4. Confidence in attributing side effects to specific generic medications. 5. Patient concerns about potential side effect variations with generics. 6. Cases of side effects with generics but not brand-name counterparts. 7. Consideration of side effect variations when prescribing generics. 8. Confidence in the safety profile of generics compared to brand names. 9. Reliance on patient feedback for monitoring generic medication side effects. 10. Encounter frequency of varying side effect intensities with different generic versions.
Contact with medical representatives **(CON)**	10	1. Frequency of discussing efficacy and safety profiles of specific molecules with medical representatives. 2. The extent of detailed information provided by medical representatives about newly introduced molecules. 3. Frequency of inquiring about clinical studies or trials supporting the efficacy of specific molecules during interactions with medical representatives. 4. Frequency of requesting comparative data between different molecules within the same therapeutic class from medical representatives. 5. Influence of discussions about new molecules with medical representatives on prescribing decisions. 6. Frequency of following up with medical representatives for additional information or updates on specific molecules. 7. The extent to which medical representatives understand the practice's needs and preferences regarding specific molecules. 8. Satisfaction with the level of information provided by medical representatives regarding specific molecules.

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		9. Likelihood of considering prescribing a newly introduced molecule based on recommendations or information provided by medical representatives. 10. Value found in discussions with medical representatives regarding the benefits and considerations of prescribing specific molecules.

(Source: Authors)

The elements related to prescription (PRE), efficacy (EFF), and contact (CON), as indicated in Table 1, are assessed using a 5-point Likert scale, where 1 represents the minimum level and 5 represents the maximum level. However, sociodemographic characteristics such as gender (GEN), position (PRO), department (SERV), experience (EXP), and speciality (SPE) are nominal variables.

3.3. Statistical Tests Used

The collected data underwent a series of statistical tests to assess various aspects. Cronbach's alpha was calculated to evaluate the internal consistency of the questionnaire, while analysis of variance (ANOVA) was used to explore the relationships between sociodemographic variables and medical prescription by assessing mean differences. The chi-square test was then employed to examine the presence of significant associations between variables, with Cramer's V coefficient used to quantify the strength of these relationships. Additionally, for the 20 items concerning clinical efficacy (EFF) and contact with medical representatives (CON), an arithmetic mean was computed, and their impact was analyzed using Pearson's correlation coefficient. All these statistical analyses were conducted using SPSS Statistics 25 software.

4. Results

Table 2 shows the descriptive statistics of the healthcare professionals studied in this survey. We observe a predominance of women (n = 187, 70%) compared to men (n = 80, 30%). Table 2 also indicates that the respondents include physicians (n = 127, 47.57%), dentists (n = 82, 30.71%), and 58 pharmacists (21.72%). Among the 267 healthcare professionals, 118 work in a regional hospital (44.19%), and 59 work in a health center (22.10%). Furthermore, the majority of respondents (n = 122, 45.69%) have 10 to 19 years of experience, 62 professionals have more than 20 years of experience, and 83 have less than 10 years of experience (31.09%). Regarding speciality, the number of specialists (n = 104, 38.95%) is lower than the number of non-specialists (n = 163, 61.05%).

Table 2: Descriptive statistics of HCPs

Variable	Indicator	Frequency	Percentage (%)
Gender	Male	80	30.0
	Female	187	70.0
Function	Dentist	82	30.71
	Doctor	127	47.57
	Pharmacist	58	21.72
Location	Hemodialysis center	5	1.87

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	Diagnostic center	8	3.00
	Health center	59	22.10
	Dental center	16	5.99
	Regional hospital center	118	44.19
	Day clinic	37	13.86
	Local medical center	24	8.99
Experience	1 - 9 years	83	31.09
	10 - 19 years	122	45.69
	More than 20 years	62	23.22
	General		
Specialty	practitioner	163	61.05
	Specialist	104	38.95

(Source: Authors, by SPSS)

The reliability of the questionnaire as a whole and its specific components is remarkably high, as illustrated in Table 3. The overall Cronbach's alpha of the questionnaire is 0.842, indicating high internal reliability. Regarding the items related to clinical efficacy and drug safety, the alpha reaches 0.916, demonstrating high internal reliability as well. Similarly, the internal reliability of items related to the CON variable is estimated at 0.954, well exceeding the acceptable threshold. As for the dependent variable its alpha shows very high reliability of 0.913.

Table 3: Internal consistency of the items

Variable	Cronbach's Alpha	Number of items
Prescribing behavior	0.913	5
Clinical effectiveness and drug safety	0.916	10
Contact with medical representatives	0.954	10
Questionnaire	**0.842**	**28**

(Source: Authors, by SPSS)

Table 4 presents the results of the ANOVA test comparing the means of different variables with respect to prescription behaviour. For the gender variable, the test shows no significant difference, with a Fisher's F score of 1.999 and a p-value of 0.159, indicating that gender has no significant effect on prescription behaviour. The same observation applies to clinical efficacy (F = 0.027, p-value = 0.869). However, for the profession (F = 28.789, p-value < 1%), workplace (F = 6.909, p-value < 1%), professional experience (F = 10.428, p-value < 1%), speciality (F = 24.402, p-value < 1%), and contact with medical representatives (F = 9.678, p-value < 1%), the ANOVA tests reveal significant differences with p-values less than 0.05. This suggests that these variables have a significant impact on the prescription behaviour of healthcare professionals. Specifically, workplace, professional experience, speciality, and contact with medical representatives appear to be important factors influencing prescription behaviour.

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Table 4: Mean comparison – ANOVA's test

Variable	Prescribing behavior	
	Fisher's F	p-value
Gender	1.999	0.159
Profession	28.789	<1%
Place	6.909	<1%
Years of experience	10.428	<1%
Specialty	24.402	<1%
Clinical effectiveness and drug safety	0.027	0.869
Contact with medical representatives	9.678	<1%

(Source: Authors, by SPSS)

The Fisher's F score of 1.999 and a p-value of 0.159 indicate that gender has no significant effect on prescription behavior. The same observation applies to clinical efficacy (F = 0.027, p-value = 0.869). However, for the profession (F = 28.789, p-value < 1%), workplace (F = 6.909, p-value < 1%), and professional experience. These results are similar to studies conducted on the influence of demographic factors (Lam et al., 2003; Price et al., 2021; Sharifnia et al., 2018) and support from medical representatives (Albarq & Suleiman, 2021; Khazzaka, 2019; Workneh et al., 2016).

Table 5: Degree of association between sociodemographic factors and prescribing behaviour

Variable	Prescribing behavior		
	Chi-square	Cramer's V	p-value
Gender	15.553	0.241	0.485
Profession	84.950	0.399	<1%
Place	112.582	0.265	0.119
Years of experience	64.700	0.348	<1%
Specialty	37.564	0.375	<1%

(Source: Authors, by SPSS)

Table 5 indicates that the gender variable does not seem to have a significant impact on prescription behaviour (Chi-square = 15.553, Cramer's V = 0.241, p-value = 0.485), indicating that this sociodemographic element of healthcare professionals does not appear to be a determining factor in their prescription choices. In contrast, the profession variable shows a significant association with prescription behaviour (Chi-square = 84.950, Cramer's V = 0.399, p-value <1%). This suggests that individuals' professions, whether they are dentists, physicians, or pharmacists, can influence their decisions regarding medical prescriptions. The workplace variable has no significant impact on prescription behaviour (Chi-square = 112.582, Cramer's V = 0.265, p-value = 0.119), indicating that the establishment where healthcare professionals practice does not seem to play a major role in their prescription choices. This result contradicts the conclusions raised by Kamuhabwa and Kisoma (2015). Regarding years of experience, there is a significant association with prescription behaviour (Chi-square = 64.700, Cramer's V = 0.348, p-value <1%), suggesting that professional experience can influence individuals' prescription decisions. Similarly, the speciality variable shows a significant association with prescription behaviour

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(Chi-square = 37.564, Cramer's V = 0.375, p-value <1%), suggesting that the speciality of healthcare professionals can also influence their choices regarding medical prescription. These results highlight the importance of considering various sociodemographic and professional factors when analyzing the prescription behaviour of healthcare professionals.

Table 6: Pearson's correlation with prescribing behavior

Variable	Pearson's coefficient	p-value
Clinical effectiveness and drug safety	0.010	0.869
Contact with medical representatives	-.190	<1%

(Source: Authors, by SPSS)

Furthermore, the analysis of the EFF and CON variables, corresponding to the average of the 20 items in the questionnaire regarding the aspects, demonstrates that clinical efficacy and drug safety do not have a significant influence on prescription behaviour (r = 0.010, p-value = 0.869), as illustrated in Table 6. However, contact with medical representatives leads to a significant relationship (r = -0.190, p-value < 1%), which corresponds to the conclusions drawn by Al-Areefi and Hassali (2013), Albarq and Suleiman (2021), Khazzaka (2019), and Workneh et al. (2016). However, the negative sign of the coefficient informs us about the nature of the relationship. This negative correlation suggests that the more frequent the contact with medical representatives is, the less favourable the prescription behaviour is towards prescribing certain medications.

5. Conclusion

Medical prescription, a crucial act of healthcare professionals, varies according to individual drug preferences. Research has thus focused on prescription behaviours to better understand this process. Sociodemographic factors, such as age, gender, scope of practice, and speciality, have been scrutinized (Lublóy, 2014; Lam et al., 2003; Klau et al., 2023; Horwood et al., 2016). For example, physicians may overprescribe antibiotics for various reasons, including patient satisfaction and medicolegal concerns (Lam et al., 2003). Clinical efficacy and drug safety are also determining factors (Rezal et al., 2015; Murshid et al., 2019; Wallace et al., 2020; Molina et al., 2022; Hogan et al., 2023).

The marketing practices of the pharmaceutical industry, particularly interactions with medical representatives, also influence prescription decisions (Wazana, 2000; Al-Areefi & Hassali, 2013; Khazzaka, 2019; Albarq & Suleiman, 2021; Workneh et al., 2016). This dynamic between healthcare professionals and pharmaceutical companies raises questions of ethics and professional independence (Solomon et al., 2012; Carter et al., 2021; Sharifnia et al., 2018; Price et al., 2021). By analyzing these various aspects, researchers have shed light on the multiple determinants underlying medical prescription practices, thereby offering valuable insights to improve rational drug use and guide health policies (Atia et al., 2022; Al Thabbah et al., 2022; Kamuhabwa & Kisoma, 2015; Meenakshi et al., 2022; Sharma et al., 2023; Mohanty et al., 2010).

Our study, while contributory, also has limitations. We did not integrate all relevant variables in our analysis, such as the influence of drug costs or the availability of therapeutic alternatives. For instance, financial accessibility may play a major role in prescription decisions, especially in contexts where patients have limited resources. Additionally, we did not deeply explore patients' perceptions of prescribed medications, which could have provided additional insights into prescription practices. Finally,

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the geographical scope of our study is limited to Rabat, which restricts the generalization of our results to other medical contexts.

Despite these limitations, our research paves the way for future investigations aimed at deepening our understanding of the determinants of medical prescription practices. By integrating more variables and expanding the geographical scope of the study, we could better grasp the complexities of this process and propose more targeted interventions to promote more informed and rational prescriptions. Furthermore, by considering patients' perspectives, we could develop more effective communication strategies between healthcare professionals and their patients, thereby fostering more collaborative and patient-centred prescription decisions. In summary, our research represents an important step in understanding medical prescription behaviours, but it calls for continuous and thorough exploration to address the complex challenges of modern clinical practice.

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