

Evaluation of Pharmaceutical Marketing Tools and Their Influence on Prescribing Behavior of Physicians in Brazil: A Mixed-Method Study

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Abstract

This study aimed to evaluate the importance of promotional tools in pharmaceutical marketing and their consequent impact on medical prescriptions, focusing on the perspectives of psychiatrists, cardiologists, and dermatologists. A sequential exploratory mixed-method approach was used, beginning with a qualitative phase to map the tools and followed by a quantitative phase to determine their influence on medical decision-making. For the quantitative analyses, the statistical software SPSS was used. In the qualitative phase, nine doctors were interviewed using a semi-structured script. From this investigation, five tools stood out: frequency of visits, technical knowledge of the medical representative, patient support, provision of free samples, and sponsorship of medical education events. Subsequently, a survey was conducted with 645 physicians, of whom 416 were considered for analysis after qualification, with 296 of these belonging to the specialties focused on in the study. Using the Conjoint Analysis (CA) technique, the quantitative phase of the research established the following hierarchy of influence on medical prescription: technical knowledge of the representative, patient support, sponsorship of medical education events, free samples, and frequency of visits. Finally, through the application of the Analysis of Variance (ANOVA) technique, it was determined that the perception of these tools does not vary significantly among the specialties.

Keywords: pharmaceutical marketing, physicians, medical prescriptions, promotional tools

1. Introduction

In recent years, the pharmaceutical industry has been responsible for significant advances in the therapeutic field, such as immunotherapy, cell therapy, and gene therapy, which have captured society's attention. The continuous increase in demand for medical treatments has encouraged pharmaceutical companies worldwide to focus on providing essential medications to the population through the development of relevant innovations that play a crucial role in promoting human health.

In Brazil, in 2023, while the Gross Domestic Product (GDP) recorded a growth of 2.9% compared to the previous year (IBGE, 2024), according to a report published by IQVIA (2024) on the dynamics and trends of the Brazilian pharmaceutical market (BPM), the BPM revenue reached R\$ 191.9 billion in sales, representing a growth of 13.1% compared to the previous year. This report revealed that the pharmaceutical retail sector was responsible for 61% of the total revenue, while the institutional channel, which includes government and hospital sales, accounted for 39% of the revenue in the analyzed period.

Notably, the institutional channel demonstrated a growth of 18.1%, significantly surpassing the 7.4% rate recorded in 2022. This growth was driven by diverse factors, with emphasis on oncology, immunological, and central nervous system therapies (IQVIA, 2024).

Demand in the pharmaceutical retail sector grew by 10.1% compared to 2022 and maintained this growth rate in the first quarter of 2024. The latest projection from IQVIA, presented in the same report, estimated a 13% increase in pharmaceutical retail revenue in 2024, with a projection of 7.1% for 2028. In terms of units, a growth of 3.6% is expected in 2024, reaching 2.8% in 2028.

The main growth drivers are expected to be: aging population; unhealthy lifestyle, increasing the incidence of chronic conditions; moderate economic growth; increased public investment in healthcare; faster

decision-making by the National Health Surveillance Agency (ANVISA); growth in formal employment, boosting the number of lives covered by private health insurance plans; recovery of over-the-counter medication and supplement categories impacted in 2023; and recovery of the speed of adoption of new technologies post-pandemic.

However, some factors may act as detractors from this growth: initiatives by public and private payers to control costs, including the vertical integration of payers and providers; employers limiting coverage in health plans or passing costs on to employees; expiration of patents followed by the entry of generics, similar products, or biosimilars; and expectations of reduced inflation and price increases (IQVIA, 2024; White Ink House LLC, 2022).

In turn, it is possible to identify a growth opportunity by comparing per capita drug consumption in Brazil with the United States. According to data published by the Conselho Federal de Farmácia (CFF, 2020), the annual per capita consumption of prescription drugs in the United States is twelve times higher than in Brazil, which indicates a growth opportunity as the population gains more income.

In addition to the points mentioned, it is possible to suggest that the National Health Plan (Ministry of Health, 2020) could contribute to the market's growth. According to data published in the plan, Brazil currently produces only 5% of the inputs for the Unified Health System (SUS), and according to the information disclosed, the objectives include incentives to ensure autonomy or, at least, domestic production within ten years of 70% of medications, vaccines, active pharmaceutical ingredients, biotechnological products, among others. The goals cited in the plan include the growth of the national pharmaceutical industry, job creation, valuing the education profile of professionals in the technology field, redefining the role of public laboratories, reducing prices, and expanding access to strategic products for SUS.

The pharmaceutical retail sector consists of over 92,000 pharmacies in Brazil, which are classified into three different categories according to their business profile: chain pharmacies, independent pharmacies, and cooperative pharmacies. Chains account for 57.7% of retail revenue, independent pharmacies represent 18.8% of the market, and cooperatives are responsible for 23.5% (IQVIA, 2024).

Febrafar (2019) classifies cooperative pharmacies as a business methodology that involves the grouping of companies to share the costs of implementing and maintaining a central business, marketing, and services hub, thereby presenting itself as an innovative solution to address the most pressing problems faced by small and medium-sized enterprises. This category has been responsible for driving the growth of pharmaceutical retail, as it has shown higher growth rates than the total pharmaceutical retail sector in the last two years. This cooperative trend can be seen in all regions of the country, especially in the Midwest and North, where the expansion of this category is even greater (Febrafar, 2019; IQVIA, 2022a, 2022b).

Evaluating the dynamics of the different product categories in retail, according to IQVIA (2024), prescription drugs (RX) generated R\$ 76 billion in revenue in 2023, accounting for 65% of revenue in the pharmaceutical retail sector, while over-the-counter drugs (OTC) and other consumer products sold in pharmacies, such as food, hygiene and beauty items, personal care, among others, were responsible for 35%.

According to IQVIA (2024), when analyzing the prescription drug market, it is possible to observe that the category with the highest revenue is non-exclusive medications, representing 56% of sales in value and 30% in volume during the period. Generics occupy the second position in terms of value, contributing 21% of revenue and 52% of the volume demanded from April 2023 to March 2024 in pharmacies. In turn, exclusive medications represent 18% of revenue, but due to the significantly higher average price, they account for only 3% of the volume consumed. Additionally, products classified as "trade" (similar to brand-name drugs, without medical promotion) account for 5.4% of revenue and 15% of the volume of medications in retail, according to the consultancy IQVIA (2024).

Also, according to this report, sales of prescription drugs in the pharmaceutical retail sector recorded a growth of 9.4% in the last 12 months, up to March 2024, compared to the previous period. Specifically, this growth was driven by a 2.8% increase in consumption volume, a 4.2% increase due to price rises, 1% due to product launches, and 1.4% due to changes in the product mix. In terms of value, the category of exclusive medications showed a significant growth of 15.9% in this period, followed by generics, with an increase of 12.4%. Non-exclusive drugs and similar products (trade) experienced more moderate growth, with increases of 6.6% and 8.1%, respectively (2024).

Given this scenario and considering the regulatory restrictions on drug promotion in Brazil, marketing investments for drug promotion play a fundamental role in the sales success of these products.

According to IQVIA (2024), the pharmaceutical sector in Brazil invested USD 2.1 billion in promotional initiatives, recording a growth of 14% in the twelve-month period up to February 2024, returning to pre-pandemic levels.

Nonetheless, it is worth noting that the share of digital initiatives within this investment, which was only 1% until 2020, grew to 16% in 2021, primarily due to the limited in-person access to physicians. However, the market has not confirmed this trend, so in the period from April 2022 to March 2023, digital initiatives accounted for only 3% of the investment (IQVIA, 2023).

Overall, this dynamic reflects the global behavior of the pharmaceutical market, except in Japan, where online promotional activities account for 51% of the investment. However, the number of medical contacts made by pharmaceutical companies in Brazil remains below pre-pandemic levels, and these contacts are now taking place through a wider variety of channels, with 17% of them currently happening via digital channels (IQVIA, 2023).

In turn, multinational laboratories make greater use of digital channels, mainly due to the mix of their portfolios and global directions. That is, multinationals conduct 36% of their contacts with physicians through digital channels, while local laboratories make only 10% of their contacts through this channel. Therefore, it is worth noting that due to the lack of an innovative portfolio, national laboratories direct large investments towards the promotional activities of their products to the medical audience and have been responsible for more than 60% of promotional investment in the Brazilian pharmaceutical market (BPM) since 2019 (IQVIA, 2023f).

A previous report published by IQVIA (2022a) indicates that 95% of the promotional investment in Brazil is directed toward medical advertising (72%) and the distribution of free samples (23%). Furthermore, the percentage of promotional investment allocated to medical advertising has not shown significant variations in the past four years (IQVIA, 2022a, 2022b, 2023).

Thus, it is possible to conclude that the combination of elements involved in the Brazilian pharmaceutical context, especially for nationally owned laboratories, indicates a growing need for the effectiveness of promotional investments.

Therefore, considering that physicians play a fundamental role in the journey of drug sales and that various factors can influence their decision-making process regarding the brand of the product to be prescribed, the study aims to identify the relative importance of the main promotional tools of pharmaceutical marketing for prescriptions in the prescribing behavior of physicians in Brazil.

A deeper understanding of the variables involved in a physician's decision-making process when prescribing medication and the potential influence of each of these variables across three different medical specialties can guide pharmaceutical industry marketing professionals in the more appropriate and effective allocation of promotional resources. Furthermore, it is important to highlight the novelty of the proposed study. Although Brazilian studies have been identified that address the decision-making process of physicians regarding drug prescriptions (Hekis et al., 2014; Lopes et al., 2013; Pastre, 2020; Ramos Neto, Troccoli & Vieira, 2017; Reis et al., 2018; Silva, 2013), no studies have been found that assess the relative importance of the variables involved and relate them to the perspective of three different medical specialties.

2. Theoretical Framework

Indeed, different definitions of pharmaceutical marketing can be found in specialized articles and books. For example, Levy (1994) proposes that pharmaceutical marketing is the final link in a chain of information, where research results are transformed into practical therapeutic tools and where information is progressively refined and made more useful to the healthcare system. The author further adds that pharmaceutical marketing is a well-organized and comprehensive information system to update physicians on the safety, efficacy, availability, side effects, risks, and methods of drug use.

On the other hand, according to Pokharel (2017), pharmaceutical marketing is responsible for propagating and promoting drugs and pharmaceutical products to increase the sales levels of laboratories. In this sense, according to the author, pharmaceutical marketing fulfills the important function of influencing and directing various activities, from production to the patient's use of the product, since it is the patient's demand that will trigger the production process.

Meanwhile, Chiplunkar, Gowda, and Shivakumar (2020) propose that pharmaceutical marketing is an essential activity for society by ensuring the availability of medications at the right times and places.

The World Health Organization (WHO), in turn, characterizes pharmaceutical marketing as all informational and persuasive actions carried out by manufacturers and distributors, aiming to stimulate the prescription, provision,

acquisition, and consumption of medications (WHO, 1988).

Azeem et al. (2022) point out that a peculiarity of prescription pharmaceutical marketing is that physicians are the actual decision-makers, while patients are the final recipients of the medications. In this context, the authors argue that physicians play a central role in the selection and prescription of medications and are thus considered the primary clients in the pharmaceutical industry.

Pitt and Nel (1988) understand that physicians play a unique and often multiple role in the decision-making process for purchasing pharmaceutical products. According to the authors, physicians can be users, such as in the case of syringes and other medical practice auxiliary equipment. They can also act as influencers, for example, advising mothers on the use of nutritional supplements for babies. Additionally, they act as decision-makers and take on the responsibility of guiding which medication should be purchased by the patient, who plays a relevant yet passive role as the user.

Parallels between the role of physicians and other professionals in the purchasing process of pharmaceutical products are abundant. For example, architects and IT consultants perform similar roles of prescription and advocacy within their industries. Thus, it is extremely important for a company in these types of markets to identify and understand these roles (Pitt & Nel, 1988). The journey of drug prescription by physicians comprises several distinct stages. According to Lidstone and MacLennan (2017), the objective of pharmaceutical marketing is to move a physician from a non-prescriber of a product to an occasional prescriber or, preferably, to a constant prescriber. At each stage of the journey, pharmaceutical companies need to make their products known through different promotional tools. According to the authors, from the first stage, when the product is still unknown to the physician, to the final stage, when the physician becomes a constant prescriber, companies seek ways to influence them to advance in the prescription journey.

Table 1. Physician's Prescription Journey

Stage	Transition	Phase characteristics
1	Unawareness for awareness	The medication goes from being unknown to a situation where the healthcare professional is aware of it
2	Awareness to Interest	The physician's curiosity will be piqued by the novelty, appearance, or concept of the product.
3	Interest to Evaluation	The physician will analyze, rationalize, and seek the advantages offered by the product based on their needs, such as greater efficacy, cost savings, uniqueness of the medication, and safety.
4	Evaluation to Judgment	A stage in which the physician is still considering whether to actually use the product. The company's marketing at this stage should identify opportunities for use and suggest its use when these opportunities arise.
5	Judgment to Occasional Prescription	At this stage, the physician will begin prescribing the product. The pharmaceutical company, at this point, needs to provide reminders of key elements such as brand, therapeutic area, and the advantages of use.
6	Occasional to Constant Prescription	This is the ultimate goal of marketing. When a physician transitions from occasional use to consistent use, they move into a stage of automatic selection of the prescribed medication. At this stage, the company should maintain the environment that led to satisfaction, sustain a positive image, and continue informing and reminding the physician about the product's key qualities.

Source: Adapted from Lidstone and MacLennan (2017).

Nonetheless, various authors indicate that there are several factors responsible for influencing physicians' prescribing behavior (Cockburn & Pit, 1997; Kissan & Mantrala, 2009; Lim, Melewar & Sorensen, 2010; Nair, Manchanda & Bhatia, 2010; Tan et al., 2009; Theodorou et al., 2009; Van Der Geer & Kangis, 2000).

In this sense, for example, according to the "social exchange theory" (Blau, 2017), a reciprocal exchange occurs in which salespeople use promotional tools in their work with their clients (Cropanzano & Mitchell, 2005). Specifically, in the pharmaceutical sector, after being exposed to these tools, physicians are encouraged to prescribe the promoted brand (Harindranath & Jacob, 2017).

In this context, Srivastava, Fahey and Christensen (2001) explain that promotional tools can contribute to the development of brand value, resulting in an intangible and valuable asset for the company.

Consequently, two articles published by Moss (2007, 2016) argue that branding plays a crucial role in differentiating a given product in the pharmaceutical sector.

In agreement, Harindranath and Sivakumaran (2021) state that brand building is essential for a company's success, given the wide variety of medications available on the market. In other words, by creating and strengthening brand awareness, branding contributes to gaining a significant competitive advantage. The authors also indicate that branding, along with the Integrated Marketing Communication (IMC) process, can provide product information that helps create a distinction for the brand among competitors in that product category.

Osinga et al. (2011) argue that the promotional efforts of pharmaceutical marketing play a prominent role in helping to build brand value, which, according to Moss (2016), can establish itself as a key factor of differentiation and, therefore, a competitive advantage.

Rizzo (1999), on the other hand, states that the promotional efforts of pharmaceutical marketing can help differentiate products by increasing customer loyalty and protecting the brand from predatory price competition.

Kremer et al. (2008), in turn, state that promotional investments stimulate drug sales, but their effectiveness depends on several factors, including the promotional tools used, the disease category being treated, and the price.

Finally, it is worth noting that Stros and Lee (2015) assert that, in the context of the pharmaceutical industry, the "P" for promotion is very important, perhaps more so than the others (price, place, and product), and they add that personal selling is a relevant facet of pharmaceutical product promotion.

It should be noted that physicians can be targeted by a variety of marketing tools and initiatives. A quantitative study conducted by Campbell et al. (2007), with 3,167 doctors from six different specialties, indicated that 94% of doctors reported having some type of relationship with the pharmaceutical industry. According to this study, 83% reported receiving food and beverages at the workplace, 78% said they received free samples, 35% were reimbursed for expenses related to participation in scientific or continuing medical education meetings, and 28% were paid to provide consulting services or give lectures.

Thus, it is possible to observe a significant connection between marketing communication and the strategies used for prescription medications. These strategies include advertising, personal selling, relationship marketing, sales promotion (especially sampling), events (primarily for continuing medical education), and sponsorships (mainly medical and scientific congresses).

For example, it is possible to assess that a sales representative's visit to a physician typically involves the use of advertising tools (through a personal approach), personal selling, relationship marketing, and sampling as a sales promotion tool. (Gönül et al., 2001; Harindranath & Sivakumaran, 2021; Khazzaka, 2019; Kremer et al., 2008; Sanyal, Datta & Banerjee, 2017).

3. Method

To achieve the established objectives, this dissertation adopts applied research with an exploratory-descriptive focus and a mixed approach, following an exploratory sequential design. Thus, the study includes a qualitative phase aimed at identifying the marketing tools that influence the selected sample. Subsequently, a quantitative phase was employed to rank these tools based on the findings obtained in the qualitative phase, analyzing their potential impact on the prescribing behavior of physicians.

Nielsen, Olivo, and Morilhas (2018) highlight that applied research aims to generate knowledge that can be immediately applied in a practical manner. In accordance with this understanding, Fleury and Werlang (2017) explain that the nature of applied research involves diagnosing, identifying problems, and seeking solutions. Another aspect mentioned by the authors is the ability of applied research to generate impact. This type of research involves using prior knowledge to collect, select, and process facts and data to obtain and confirm relevant results.

Exploratory research primarily aims to provide greater familiarity with a particular problem, making it more explicit and aiding in the formulation of hypotheses. This strategy helps to explore and investigate the research problem more broadly, providing data that can support the development of more in-depth studies (Gil, 2021). Complementarily, Gil (2021) highlights that descriptive research encompasses studies aimed at discovering the existence of associations between variables, such as electoral surveys that indicate the relationship between political party preference and levels of income or education.

According to Gil (2021), mixed-methods research can adopt different designs depending on the order in which results are presented. One possible design is the sequential exploratory design, characterized by the initial use of

qualitative methods followed by a quantitative phase. In this design, the qualitative phase is used to explore the phenomenon of interest, gather information, and generate hypotheses. Subsequently, the quantitative phase is employed to test and confirm the hypotheses developed in the previous phase, allowing for a broader and more robust analysis of the research problem. This combined approach aims to leverage the advantages of both qualitative and quantitative research, enhancing understanding and providing a more comprehensive view of the study topic.

3.1 Qualitative Stage

Considering the literature reviewed, the semi-structured interview technique was adopted. The interviews were primarily conducted remotely via video communication service, Microsoft Teams, with the aid of a semi-structured guide. The semi-structured interview, also known as a guided interview, allows for greater flexibility and interaction between the interviewer and the interviewee. Despite having a predefined guide, new questions may arise during the conversation, enabling a deeper exploration of the research focus (Glesne, 2016).

The guide begins with a personal introduction and contextualization of the research, ensuring the interviewee of confidentiality and requesting permission to record the conversation. After collecting detailed information from the interviewee, the guide is divided into three main thematic blocks. The first block of questions focuses on the interactions between doctors and pharmaceutical representatives, aiming to understand the nature of these encounters, the content discussed, the materials used, and the characteristics valued in a pharmaceutical representative. The second block focuses on the relationship between physicians and pharmaceutical companies, exploring topics such as the scientific backing of products, the credibility of the pharmaceutical company, methods of scientific updating, and criteria for selecting laboratories for visits. The third thematic block explores medical prescribing decisions, considering factors that influence the choice of a medication when equivalent options are available, and questioning whether these criteria vary based on the type of treatment (chronic versus acute). Finally, the script concludes by inquiring about the impact of the COVID-19 pandemic on the relationship between doctors and pharmaceutical companies and any changes in initiatives due to this scenario. The criteria for selecting participating doctors included: (1) having a specialist title in Psychiatry, Cardiology, or Dermatology, (2) receiving visits from pharmaceutical representatives, (3) seeing patients, even if part-time, in locations where the doctor is not subject to prescribing products standardized in predetermined protocols, and (4) preferring to prescribe branded products rather than generics.

Nine physicians were selected, with three representatives from each specialty studied. Of the nine interviews, eight were recorded on audio and video, while one, conducted in person, was recorded only on audio. All were transcribed for later analysis.

3.2 Quantitative Stage

The technical procedure adopted for the quantitative phase was a survey, as described by Malhotra (2019) as a method aimed at obtaining information through a structured questionnaire. The author highlights advantages such as simplicity, reliability of predetermined responses, and ease in coding and interpreting the data.

An electronic questionnaire was used, developed and hosted via Survey Monkey. The link was shared with doctors through WhatsApp and email. The researcher directly shared it with their contacts and requested that colleagues do the same. Accompanying the link was a standard text detailing the purpose of the research.

To achieve the expected volume of responses, the physician database from Biolab Farmacêutica was utilized. This database includes 17,374 physicians from various specialties. Before starting the research, the physicians were informed about the academic nature of the study and the role of the researcher. The criteria for selecting the attributes in the quantitative study included: relevance in the literature, representativeness in medical promotional investment, and insights from the qualitative phase. These directed the investigation to five variables, assessed at two levels, according to physicians' perceptions of the standard market practices in each criterion.

Regarding medical promotion— a tool widely mentioned in the literature and responsible for most of the promotional investment by the pharmaceutical industry (IF)— the evaluation was divided into two dimensions: frequency and technical-scientific quality of the visits. The intention of making this distinction was to determine which of these two aspects is more valued by physicians.

According to the literature review on AC conducted and the need for participant convenience, the method of presenting complete-profile stimuli was adopted in this research. This method is considered capable of providing greater realism in the evaluation, while also reducing the number of comparisons required, which can increase participant adherence.

Considering the number of attributes evaluated, two levels were defined for each attribute: high and low. Participants assessed each level based on their perception of the market performance for each attribute.

After defining the attributes and levels, the fractional factorial design method with orthogonal arrays was used, employing the SPSS statistical software. This strategy allowed for the efficient construction of subsets of stimuli, resulting in a total of ten stimuli. In comparison, if the full factorial design method had been used, which considers all possible combinations, 32 complete profile stimuli would have been needed to evaluate the same number of attributes and levels.

To ensure the reliability and validity of the analysis, following the recommendations from the consulted literature, eight out of the ten constructed stimuli were used for estimation, while the remaining two were retained as additional stimuli.

The research participants were instructed to consider each card (or stimulus) as the representation of a hypothetical pharmaceutical laboratory. Based on the specific characteristics presented for each laboratory, they were asked to rate, on a scale from 0 (would never prescribe) to 10 (would certainly prescribe), their propensity to prescribe a product originating from that laboratory.

The data collection for the quantitative phase of the research was conducted between May 6, 2023, and May 24, 2023. The survey included participation from 645 respondents. To ensure the reliability of the results, certain criteria were established for qualifying respondents considered in the subsequent analysis. To ensure the study's reliability, a total of 229 respondents were discarded from the survey. Of those, 416 were considered for analysis after qualification, with 296 having one of the specialties focused on in the study.

For data analysis, Conjoint Analysis (CA) was used, which is a method capable of capturing the utilities, preferences, understandings, perceptions, beliefs, or judgments of decision-makers and, ultimately, identifying the relative contributions of attributes and their levels to the actions of decision-makers (Connolly, Arkes, & Hammond, 1986). Malhotra (2019) explains that this technique seeks to identify the relative importance that consumers assign to relevant attributes and the utility they associate with different levels of these attributes. This information is obtained through the evaluation, performed by consumers, of brand or company profiles that are composed of these attributes and their respective levels.

After consolidating the data from the Conjoint Analysis (CA) for each of the three evaluated groups, an Analysis of Variance (ANOVA) was conducted to compare the group means individually. The goal of the ANOVA was to measure potential perception discrepancies related to the medical specialty.

Gomes (1990) posits that ANOVA should be applied when the goal is to verify whether the means of two or more populations are equivalent or disparate. In contrast, Malhotra (2019) defines ANOVA as a statistical tool used to assess data variation concerning a dependent variable in relation to one or more independent variables. This technique allows for the comparison of means from distinct groups to determine if their differences are statistically significant. Additionally, it facilitates the understanding of the contribution of each independent variable to the variation of the dependent variable, aiding in the comprehension of the factors shaping the results.

4. Analysis and Discussion of Results

The objective of this chapter is to present and analyze the results obtained through the application of the sequential exploratory mixed-methods approach. The analysis of the results provides important insights into the prescribing behavior of physicians and guides marketing strategies in the pharmaceutical sector.

4.1 Attributes Evaluated in the Conjoint Analysis

Based on the interviews conducted, it was evident that the interviewed physicians have varied experiences regarding visits from pharmaceutical representatives and their relationships with laboratories. They demonstrated distinct preferences and criteria when receiving these visits, valuing aspects such as technical knowledge, scientific basis, patient support, and personal relationship.

Two additional aspects emerged from these interviews and were considered crucial for selecting the attributes evaluated in the quantitative phase of the research, as they were not identified in the initial literature review. These aspects are: (1) the first aspect was the disaggregation of the medical promotion concept into two dimensions: frequency of visits, which refers to the regularity of the laboratory's visits, and the technical knowledge of the representative, which relates to the professional's ability to present relevant and updated scientific information, thereby contributing to the physician's knowledge; (2) the second important aspect to consider is patient support initiatives. The first interviewee mentioned a specific example, which highlighted the need to validate the importance of this initiative in subsequent interviews. With the exception of one psychiatrist,

who attributed patient support to free samples, the other physicians valued this attribute.

Therefore, the conclusions from the interviews guided the definition of the attributes that were evaluated in the quantitative phase of the research. These attributes are described in table 2 below:

Table 2. Attributes evaluated in the conjoint analysis

Attributes evaluated	Significance of the attribute
Frequency of Visits	Frequency of Contact with the Laboratory: the number of visits the laboratory makes throughout the year.
Technical Knowledge	Technical-Scientific Proficiency of the Laboratory Representatives: they present relevant and up-to-date technical information, enriching and complementing the practice of medical professionals.
Free Samples	Volume of Free Samples Dispensed by the Laboratory: the amount of free samples provided by the laboratory.
Medical Education and Sponsorships	Opportunity to Participate in Scientific Events Sponsored by the Laboratory: the laboratory invites and/or sponsors participation in medical congresses, lectures, article writing, and other academic and professional activities.
Patient Support	The Laboratory Provides Patient Services: these can include discount programs, informational materials for patients, assistance in acquiring specific medications, treatment monitoring apps, and other related services.

Source: Authors (2024)

Furthermore, from the analysis of the collected data, it was possible to conclude that for the physicians participating in the study, the most highly evaluated tools, in order of importance, are: (1) the technical knowledge of the representative; (2) the support provided to the patient; (3) medical education and sponsorships; (4) followed by free samples and, finally, (5) the frequency of visits.

4.2 Verification of Differences in Valuation

In order to investigate if there is a statistically significant difference in the relative importance attributed to the different tools, obtained by conjoint analysis, and considering all the physicians' preferences, an analysis of variance (ANOVA) was conducted. In this case, the dependent variable was the relative importance attributed to each tool, and the tools were considered the groups of comparison (independent variable). The results of this analysis are presented in table 3 below.

Table 3. Results ANOVA: relative importance of the attributes

Attributes	Subset for alpha = 0.05				
	Homogeneous subsets				
	N	1	2	3	4
Frequency of visits	416	0.1413			
Free samples	416	0.1586	0.1586		
Medical Education and Sponsorships	416		0.1774		
Patient Support	416			0.2108	
Technical knowledge	416				0.3118
Sig.		0.584	0.492	1.000	1.000

Source: Authors (2024).

From the analysis of the collected data, from Scheffé post-hoc tests, four different statistically significant homogeneous subsets were obtained. This suggests that the participants of the study assign greater importance to technical knowledge compared to other aspects assessed. Additionally, a statistically significant preference for patient support was observed, which was identified as the second most important attribute by the physicians.

However, the analysis found a statistical tie between free samples and medical education and sponsorships, which were both ranked in third place. Similarly, there was a tie between free samples and the frequency of visits, with the latter occupying the fourth and fifth positions, respectively. Therefore, due to this statistical equivalence, it is not possible to conclude that physicians prefer free samples over the frequency of visits, even though the numerical value for free samples is slightly higher. Similarly, the preferences between medical education and free samples cannot be definitively distinguished.

Conversely, the data indicate that physicians have a statistically proven preference for patient support compared to the other three tools described above (free samples, frequency of visits, and medical education and sponsorships). It is also worth noting that technical knowledge was preferred over all other evaluated tools, reinforcing its importance highlighted in this study. A significant concentration of respondents was observed in the higher levels of importance for the technical knowledge attribute. This indicates that the majority of participants considered this attribute to be highly relevant in their evaluations.

As mentioned earlier, Conjoint Analysis (CA) allows for the analysis of data at both individual and aggregate levels. Based on this, the relative importance attributed to each marketing tool was analyzed, considering several stratifications.

The initial data analysis was conducted by stratifying by medical specialties. In a general observation, the hierarchy of attributes maintained a remarkable similarity among all evaluated groups.

However, a particularity was identified among dermatologists: this group of professionals showed a tendency to place greater importance on receiving free samples compared to medical education and sponsorship initiatives. Although this distinction in the hierarchy of preferences is intriguing, no statistically significant difference was found.

Therefore, although there is a noticeable difference in the evaluation made by dermatologists, there is not enough statistical evidence to assert that this discrepancy is relevant. In other words, the statistical inference does not confirm a significant difference, reiterating that the observation may result from random variability or an insufficient sample size.

Furthermore, it was possible to investigate potential differences in prescribing intentions based on the attributes evaluated across the three medical specialties. To achieve this objective, the statistical method ANOVA was used once again. This method was applied to verify if there were statistically significant differences between the mean evaluations (dependent variable) of the physicians grouped by speciality (independent variable).

Based on the data obtained from the ANOVA, presented in table 4 below, it was concluded that there are no statistically significant differences in prescribing intentions based on the evaluated promotional tools among the groups studied. Although different levels of importance were observed for the tools among the groups, this variation did not reach statistical significance. In other words, none of the attributes showed statistical significance in the comparison ($p < 0.05$), representing that there is no evidence that physicians from different specialties attribute different relative importance among the tools.

Table 4. ANOVA Results Among Groups

Attributes	Sig.
Frequency of Visits	0.974
Technical Knowledge	0.631
Free Samples	0.285
Medical Education and Sponsorships	0.825
Patient Support	0.500

Source: Authors (2024).

Subsequently, as a validation step for the ANOVA results, the Scheffé, Bonferroni, and Dunnett T3 tests were

employed. These procedures, however, reiterated the absence of significant differences between the groups regarding the analyzed pharmaceutical marketing tools and resulted in only one homogenous subset for the five promotional tools considered in the study.

The evaluation results were also observed by gender and age group. Although no statistical differences were found between women and men, it was possible to perceive a slightly higher valuation of the patient support attribute by women and the medical education and sponsorships attribute by men.

However, it is important to highlight that these differences were not statistically significant. This means that we cannot definitively state that there is a real difference between the groups of women and men regarding the importance given to these attributes.

Regarding the age group analysis, no statistically significant differences were found either. This indicates that the importance attributed to pharmaceutical marketing tools does not vary significantly among the different age groups of the participants.

Nevertheless, small differences can be observed, such as a slight preference for medical education and sponsorships among Baby Boomer generation physicians, while Generation Y physicians tend to prefer technical knowledge over the frequency of visits.

These results suggest that, in general, the relative importance of the evaluated attributes is not significantly influenced by the gender or age group of the participating physicians.

Although not directly related to the objectives of this study, an additional analysis was conducted to examine possible behaviors that deviated from the average in the evaluations. Since conjoint analysis allows for individualized assessment and assigns a score to each respondent for each evaluated attribute, the number of respondents whose evaluations deviated from the average assigned to each attribute was analyzed. This analysis revealed that attributes with lower importance ratings had a higher number of physicians whose evaluations diverged from the average, as can be seen in table 5 below:

Table 5. Divergence analysis

Attributes	Importance Values	Number of Divergent Physicians	% of the Sample
Frequency of Visits	14.38	87	21%
Free Samples	15.65	63	15%
Medical Education and Sponsorships	17.37	67	16%
Patient Support	21.28	37	9%
Technical Knowledge	31.11	17	4%

Source: Authors (2024).

Based on the analysis, a probable resistance or even rejection was observed among some physicians regarding certain promotional initiatives. A potential hypothesis for this observation—though not confirmed—is the concern among physicians about possible conflicts of interest. This is particularly evident as the two initiatives with the least divergence are related to attributes that are less likely to raise such concerns: patient support initiatives and, especially, the technical-scientific knowledge of the pharmaceutical representative.

It is important to note that no statistically significant difference was detected in the number of divergent responses among the studied specialties. This means that the inferences drawn from the collected data are applicable only in an aggregated manner.

4.3 Summary of Key Results

Based on the interviews conducted, it was concluded that, although the interviewees have different criteria for choosing a brand for prescription, there are certain pharmaceutical marketing tools that have an impact across the three studied specialties. These tools play a significant role in influencing the prescribing decisions of the interviewed physicians.

It was identified in this phase that, for the interviewed physicians, there is no distinction in the criteria for choosing a medication brand based on the type of treatment, whether chronic or acute. Therefore, the interviewed physicians consider the same aspects and pharmaceutical marketing tools, regardless of the nature of the medical treatment in question.

The reports and content generated by the interviewed physicians were crucial in leading to the conclusion that it

is reasonable to suggest a possible dissociation between the aspects of quantity (frequency of visits) and quality (technical knowledge) in medical promotion.

Although this distinction is not found in the existing literature consulted, the information shared by the interviewed physicians revealed the importance of analyzing these two aspects separately within the scope of interactions with pharmaceutical representatives.

Consequently, the reports and perceptions from the physicians provided a unique perspective on the preference for representatives with higher technical-scientific argumentation skills, highlighting the relevance of this criterion in the decision-making process for medical prescriptions. Physicians' preference for representatives with stronger technical-scientific argumentation aligns with the concept proposed by Carvalho and Teixeira (2002), who state that many doctors find product presentations by representatives to be tedious and merely tolerable. However, the conducted research did not identify a perception of reduced visit time, which differs from the concept presented by the authors.

Moreover, the statistically significant preference for the attribute of technical-scientific knowledge aligns with the importance of medical promotion in influencing medical prescriptions, as proposed by Stros and Lee (2015).

The physicians' reports and the ranking of tools emphasized the significant influence of interactions with pharmaceutical representatives, highlighting the importance of technical knowledge as a valued attribute among physicians.

This preference for representatives with strong technical knowledge is supported by Murshid and Mohaidin (2017), who emphasize the relevance of representatives as the most useful marketing tool for prescribed medications.

Therefore, the alignment between the perceptions of the interviewed physicians, the statistically significant preference for technical-scientific knowledge, and the existing literature further strengthens the understanding of the importance of this attribute in the effectiveness of medical promotion.

In turn, the aspect identified in this study expands on the view proposed by Scharitzer and Kollarits (2000), who highlighted the relationship between physicians' satisfaction with their interaction with sales representatives and their prescribing behavior. The significant value attributed by physicians to the technical knowledge of sales representatives underscores the importance of quality interaction and the provision of relevant technical information in influencing prescription decisions.

This deeper understanding enables the development of more effective and tailored medical marketing strategies, focusing on both the frequency of visits and the quality of information provided by pharmaceutical representatives. This knowledge aids in better allocation of investments in pharmaceutical marketing, thereby maximizing its impact on medical prescribing.

The finding that physicians value representatives who provide relevant and scientifically grounded information suggests that a less technical approach in medical marketing may not be effective in engaging healthcare professionals. Physicians seek more substantial and enriching interactions where they can gain valuable insights for clinical decision-making. This highlights the importance for pharmaceutical companies and their representatives to adapt to the needs and expectations of physicians by establishing more effective and constructive dialogues.

The mapping and ranking of tools in terms of relevance address the need to assess their relative importance. It was concluded that the ranking of the mapped tools corresponds to their relative importance. Additionally, it is important to note that medical specialty did not show significant differences in the evaluation of the relative importance of pharmaceutical marketing tools. This indicates that, according to this study, regardless of their field of expertise, physicians have similar perceptions and preferences regarding the tools that influence their prescribing decisions.

Given the substantial promotional investments made by pharmaceutical companies in medical field marketing (MFB), it is relevant to evaluate the allocation of these resources in relation to the preferences highlighted in this study. According to IQVIA data (2024), these investments reached USD 2.1 billion over a twelve-month period ending in February 2024. It is noteworthy that, according to previous reports (IQVIA, 2023), the majority of this investment was allocated to medical promotion, which accounts for 72% of the promotional spend. Additionally, 23% of the total investment was directed towards the distribution of free samples. These figures indicate the significant importance assigned by pharmaceutical companies to these two promotional tools.

Despite the report not providing a detailed breakdown of investments across all the tools evaluated in this study,

it is possible to observe a discrepancy between the investments directed towards medical promotion and the relative importance attributed by doctors. According to the available data, medical promotion represents a significantly larger portion of the total investments compared to other tools. This suggests a possible disconnect between the allocation of promotional resources and the preferences of doctors.

The research results suggest that prioritizing the quality and depth of promotional visits, rather than their frequency, may be a more effective strategy in pharmaceutical marketing. Additionally, the significant investment in distributing free samples compared to the importance attributed to this attribute by doctors highlights a discrepancy. These discrepancies emphasize the need for a more detailed analysis of the effectiveness of investments in each tool, taking into account doctors' preferences and needs. This would enable more precise resource allocation and improve the effectiveness of pharmaceutical marketing strategies.

6. Final Considerations

Indeed, the existing literature on pharmaceutical marketing consulted in this research mostly considers medical promotional tools as broad elements encompassing various attributes related to the representative's role. These attributes include the frequency of visits, the technical-scientific knowledge of the representative, their argumentation and persuasion skills, the presentation of studies and relevant information, among others.

Understanding the importance of these attributes in medical promotion and stratifying them into dimensions of quality and quantity can be seen as a significant theoretical contribution of this study. This approach allows for a deeper analysis of the interaction between the representative and the physician, recognizing the importance of both technical-scientific knowledge and persuasive argumentation, as well as the frequency of visits. By considering these attributes separately, marketing professionals can segment physicians according to their profiles, enabling optimized communication and relationship-building. This approach allows pharmaceutical marketing professionals to tailor specific strategies for each group, enhancing influence and persuasion in prescription decisions.

In turn, segmentation based on attributes related to medical promotion, such as technical knowledge and frequency of visits, can provide a more personalized and targeted approach, maximizing the impact of the interaction between representatives and physicians. This segmentation can contribute to better resource allocation and enhanced effectiveness of pharmaceutical marketing strategies.

Nevertheless, a potential limitation of this research relates to the data collection base, which was sourced from the Biolab medical education portal registry. It is important to consider that this sample may exhibit a bias concerning the preferences and behaviors of physicians, as professionals who register on such portals might have specific interests in scientific information.

However, as a counterpoint, it is worth noting the observation made by some interviewed physicians who reported being registered on various pharmaceutical laboratory portals but do not habitually access them. Therefore, the results obtained should be interpreted considering this potential limitation and recognizing the need to expand the sample for a more comprehensive representation of the medical population.

Another potential limitation of this study is related to the researcher's identification as a marketing professional working in the pharmaceutical industry. This circumstance could potentially be perceived by the interviewed physicians as a possible conflict of interest in the research, raising concerns about the impartiality of the results. Despite the measures taken to ensure the objectivity and transparency of the study, it is important to acknowledge that physicians' perceptions regarding this issue might influence the interpretation of the results and introduce some uncertainty.

Based on the reflections presented, potential directions for future research include evaluating the relative importance of pharmaceutical marketing tools from the perspective of other medical specialties beyond cardiology, dermatology, and psychiatry studied in this work. This approach would allow for a more comprehensive understanding of the preferences and needs of physicians from different fields, contributing to a more precise segmentation of medical marketing strategies.

Additionally, it would be valuable to conduct a supplementary study to evaluate the effectiveness and impact of promotional tools from the perspective of pharmaceutical representatives. Understanding the representatives' perceptions and experiences regarding the strategies and tools used in their interactions with physicians can provide valuable insights for improving promotional activities and relationship-building with healthcare professionals.

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Canadian Center of Science and Education.

The journal and publisher adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

Provenance and peer review

Not commissioned; externally double-blind peer reviewed.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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